INNOVATION TRENDS

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MAIN SUBJECT

THE UK INNOVATION SYSTEM

Ultimate Innovations the English-way



Keith Smith – Deputy director of Science and Innovation Analysis, Department of Business, Innovation, and Skills (BIS)

Mr. Smith, being a deputy director of Science and Innovation Analysis, you are, so to say, at the very top of the state innovation system. How long have you been working in BIS?

I'm not a bureaucrat or a civil servant. I came from university. And we have an interchange between universities and government. I've been working here for 3 years but really I'm a university professor and I'll be very happy to go back to the university at Imperial College in London. I'm an economist and I have worked on science and technology for a long time. The first thing that I did when I was an economist is that I worked on Soviet Union, on development of 1920's Soviet planning.

In some way innovations have always been with us. But when did the innovation process intensify and, so to say, become visible?

I think that UK is a very important country in this respect. As you say innovation has been a characteristic of human society for a very long time. Humans have always used tools and equipment, from the Stone Age when we used stone tools and stone equipment. Technology and innovation evolved in a very long run. We made stone tools, we developed technologies in many areas - agriculture, making metals and things like that. These are extraordinary achievements. But things really accelerated in the XIX century as Britain was the first country to create a really intensively capitalist economy. And capitalism is a system which creates technological change - because the competition which characterizes capitalism is not about prices. It's about the quality of a product. So, when capitalist production emerged in Britain which was in the late XIX and the early XX century it brought for the first time a system which was strong in innovation, continuous innovation. It has really been a character of the world ever since. It started in Britain and spread to other countries. British manufacturers were selling machines all over the world by 1850. British skilled workers were going to other parts of the world, including Russia, as early as XIX century. I would say that a real breakthrough in the world economy and in Britain occurred 200 years ago. But what we are now living with is a long term impact of that, as we see more and more radical innovations appearing.

What were the main turns in innovation policy after the $\ensuremath{\mathsf{WWII}}\xspace$

The Second World War was extremely important for innovation policy because the war was fought in different ways. This was of course an industrial war in which countries had to produce on an industrial scale the weapons and equipment that were needed. And they had to innovate in doing that. Now, the Soviet economy was actually very successful in this, but as we know, at enormous costs. The Soviet Union took the heaviest toll in the war and fought significantly more German armies than anyone else and produced more tanks and guns in this industrial war. And this was a very important thing. In the West it was slightly different because we fought not only in an industrial war but also a scientific war. And that is, I think, the difference between the Western allies and Soviet Union. Britain and the US were much more heavily involved in scientific ways of fighting and development of technologies such as like radar and telecommunications and ultimately the atomic bomb. All that research started in Britain and then shifted to the US. Coming out of the war people realised that, as you know, this scientific effort has been extremely important not only to the military but also it had important implications for other sectors. For example, in Britain we developed penicillin - an antibiotic drug - on a large scale during the war and this became the basis of a huge industry. And of course there were military implications as well. But I would say the real lesson of this was the role of science in the West

After the WWII did there remain military facilities that were turned into research facilities?

Yes, we never stopped what we began during the war and either turned this into military or civilian application. For example, developing computers. I'll give you an example of one of the things that we did in the West which was unique. The Germans used a coded radio system to communicate with their armies, navy and air force. The British were able to break the codes but in order to do that they had to first develop computers. People began to realise that this was very important. That led to the whole developing process of computing after the WWII. So, I don't think we should make a great distinction between the war and the peace.

The government did support the innovation at those times. What happened later on in the 1970s and 1980s?

Government has never stopped supporting the innovation process. It just changed in its forms. We had government, so to say, more committed to market solutions or to supporting companies.

The government has played a major role in either developing or fostering or regulating new innovations. Many of the innovations our system uses are things which in some way have been supported by the government

Like Margaret Thatcher?

Yes, such as Margret Thatcher, but even Margaret Thatcher never changed the science system, she never changed our scientific effort. She needed it, all governments needed this.

May we say that what we are observing is a shift towards market again?

Yes, but I'm not sure how long this will proceed. One of the things that we are facing in the world is a number of very big technological challenges. We have a problem of a climate change, we have a problem of infectious diseases, problems of aging population, and so on. We are not going to solve these problems unless we innovate more. And agencies that will do that are government agencies.

How important is the role of government compared to that of market forces in the innovation process in the UK?

Well, this is a market economy. It's really driven by major market forces and that affects both consumer demand and demand from companies. But it would be wrong to think that the government is not important. The government has played a major role in either developing or fostering or regulating new innovations. Many of the innovations our system uses are things which in some way have been supported by the government.

What BIS is specifically responsible for?

This department is called Business, Innovation and Skills and what we are responsible for is all legislation relation to business and industry – competition policy, regulation and things like that. We are responsible for all of the higher education system, all of universities and that includes both teaching and research; we are responsible for all skills training, all innovation policy instruments, all of the science system. We have a special area which is known as the science budget that means basically 7 large Research Councils and funding for the university system. In a way we attempt to integrate all of the major elements of the innovation system – education and training, business regulation, investment policy, things like that, innovation policy instruments and the science system. These are the key elements of the innovation system and we are responsible for them. And we try to integrate them and to produce an integration policy across them.

The budget of your department is about 16.7 billion UK pounds. What this money is going to?

The two biggest elements of this are the Science budget and the Education budget. The Education budget is changing quite significantly at the present time. The government is switching funding of the education system away from central government and financing it more through university fees

which students pay. I think, probably, the biggest single item in the overall budget is the Science budget. This is funding that goes firstly to our system of Research Councils and secondly to universities. We fund approximately 2.5 billion pounds to the Research Councils, about 2 billion ponds to universities. There is another block of funding which funds infrastructure and capital goods in the science system. This funds a big scientific research effort and a big effort of maintaining laboratories and capital goods, scientific infrastructure and so on.

How does this system of Research Councils work?

We have 7 Research Councils. Two of them are related to social sciences, arts and humanities. The others of scientific Research Councils are organized roughly according to function. There is one in biology and life sciences, one on engineering and physical sciences, one on natural environment and so on.

It works like this: the Research Councils make a proposal for funding to us, to BIS. This is a strategic proposal, outlining their priorities and how much they would like to spend. We then asses these proposals and make funding decisions according to views of ministers. We also talk to many scientific stakeholders, interested parties. We have an extensive discussion inside the ministry and out of that comes allocation of funding to each Research Council. They then invite applications from scientists either for programme in some particular area or specific project areas or more general things which scientists can propose. The proposals made from the science community then evaluated by other scientists. There is an extensive peer review system and out of that comes funding decisions. The Research Councils also fund a number of institutes. We have quite a few Research Institutes just as you do in Russia. We have approximately 140 institutes and they also get direct funding from the Research Councils.

The same happens when you give money to universities? No, it's a slightly different system. We have an organization

No, it's a slightly different system. We have an organization called the Higher Education Funding Council. It's independent of government. We give a certain amount of money to the

Higher Education Funding Council. They then have the job of allocation it to universities. They do this on the basis of a quality assessment. They monitor and access the output of the universities and they make funding to universities depending on their judgment of the quality of their work over the past 5 or 6 years. The practical effect of this is that we have about 20 or so top universities who get most of the funding. Most of our funding goes to a relatively small group of elite universities. Outside that we have approximately 150 universities in England and many of them get some level of research funding. But usually funding is very concentrated on the top universities.

Do you give the money for specific programmes they apply for or you just give them a certain amount of money and it's them who decide how to use them?

No, they decide. This is money which is based on judgment of their quality and they can use that money in any way they like. So, if they want to build up a completely new area of work then they can use money for those purposes.

You give money for building infrastructure, right?

Yes, that's the third stream of funding. We have a particular Council which is responsible for this called the Science and Technology Facilities Council. They are responsible for financing infrastructure and equipment.

On top of that we would also have funding which is separately provided and goes to things like CERN which is a practical physics organization in Switzerland. We fund a certain amount of international collaborative projects outside of all this.

You build all these facilities. But who can use them?

They are designed for use by research community. Often they will use research facilities in collaboration with other people including companies. For example, we have a big synchrotron that is used for research into molecules and that would be used not only by academic researchers but also by academic researchers working with business companies. For example, Rolls-Royce which is a very big aircraft engine company, would use that facility both by themselves and with university scientists. Look for example at the materials that they are using in their engines.

Do they pay for using these facilities?

Yes, they pay, that's right. Well, if you are a university researcher and you want to use the synchrotron you have access to it free for a scientific project. For a large company then you'll be paying a fee which might be somewhere in a region of 10 000 pounds per day to use it.

By 2014 your budget will go to 13.7 billion pounds. At the expense of what areas this is going to be?

The science budget in the UK was not cut significantly in the last budget. The government is reducing public expenditure as you say by about 15%. But this doesn't apply so much to science. Science budget has been frozen in cash terms. But we do have a decrease in budget for capital equipment and facilities and so on which is much more substantial. I would say a big area which will give us a problem from now on is capital equipment for science meaning laboratories, scientific instruments, large facilities – that kind of thing. There funding will fall. That's the real area that suffers. The science community is going to have to figure out how to handle that.

You won't be able to build as many facilities as you used to build?

We will be building something. We do have some priority projects which we are still continuing to build. We have, for example, new Centre for Medical Research and Innovation in London which will cost about 750 million pounds. It's quite an expensive operation. We will continue to build that. We are also building some new Technology and Innovation Centres. The first one will be on advanced manufacturing technologies. We do have areas which are growing.

Do you expect the private sector to participate and invest more including in building these facilities?

The private sector is participating in some of them. I've just mentioned the Centre for Medical Research and Innovation. That is collaboration between the government, the Medical Research Council and foundation called Wellcome Trust which is a private sector foundation. There will be some participation from the private sector, from charities and foundations.

You've also mentioned business regulation as one of the areas of your specialization. In case businessmen or researchers feel that some regulations need to be changed how can they affect the policy process?

We have a continuing discussion about regulation. Some of our ministers including our Secretary of State believe that the system is too regulated at the present time and they are in favor of deregulation in a number of areas. There is a kind of a dialog between researchers, companies and government about where we need regulation. I don't think we have major problems there.

Where I think we have difficulties, which many countries have, is how we create regulatory systems, for example, for health and safety regulation, environmental regulation that will actually promote innovation. That's a more difficult thing. But we are not trying to use regulation to inhibit or stop innovation. We are trying to use it to promote innovation. Environmental regulation is often directed towards encouraging people to use innovative products that are more environmentally friendly.

Are there any councils where academics can talk to people in the government?

Yes, we have forums. We have a special agency inside this department, for better regulation and they have a continuing dialogue with companies, researchers and universities, people in the health system for example. That's a discussion that is just continuous and never stops.

It's widely discussed at the moment that, the fees for education are going up. What do you think about it?

The basic idea the government has is that education is really quite expensive. There has been expansion of the access to the education in the UK. We now have a million students in this country which is much more than we ever had before. The government finds it difficult to finance all this. That's one problem. We have to find some other ways to finance the system.

The second consideration is that education provides many benefits to students. We do very detailed studies on what happens to students after they graduate and we look at whether or not they earn more money. So, the argument here is that those students who earn more money than they would have earned without education should pay fees for it.

I should emphasize that in this new system the students don't

actually pay upfront. What happens is that the government pays and then the students repay the government. But they only repay the government if they achieve a certain level of earnings. If you don't achieve a basic level of earnings – then you don't pay. If after 30 years you will not repay the debt then the debt is removed, you don't pay anything. It's not complete system of students paying. They only pay if they have a level of income that justifies them repaying.

Why did the government decide to change the policy for foreign students who won't be able to stay in the UK and work after they graduate?

The students can remain in Britain after they graduate if they are able to get jobs and visas. It's not automatic however. But it's important to distinguish between two categories here. There are students who come from the EU into Britain and students from the outside EU. Anyone who comes from inside of the EU has a right to remain here. They can do that, there is no change. The government has tried to reduce the number of visas from people outside the EU.

I think it's reasonable to say that this is a subject of big debate at the moment also inside the government. Our minister, for example, Vince Cable, is opposed to this policy and he has said so. He wants to see more visas for foreign students in the UK. Essentially what is happening is that the people who are responsible for immigration want to reduce immigration, and people who are responsible for innovation want to increase it. We have this disagreement.

How will it influence the innovation process?

We have historically relied very much on flows of people coming into and out of this country. Last year, I mean if we just look at science, Britain won 4 Nobel Prizes with which we are very pleased. One of those people was Greek and two of them were Russians. We are happy that these people are working here but they all are immigrants into our country. We recognize that the flow of people from outside makes a big difference to the scientific capability of this country. This can have a big impact on innovation as well.

There has been a shift from regional to national approach in innovation policy. More specifically, Regional Development Agencies will be cancelled. What idea is behind this change?

I think that the government felt that the Regional Development Agencies were not effective enough. And so it has abolished Regional Development Agencies and replaced them with two things. One is that some of these funding goes to Technology Strategy Board. There will be a more strategic and centrally directed use of resources. There will also be something called Local Enterprise Partnership which will provide, for example, consulting services and venture capital finance for small firms in regions. The government is really looking for organisational changes that will improve how the system works. In government you'll never find a complete solution to these problems. It's very rare that you are completely happy with it. I think the government in this case just thought that a different organization would work better.

The government assumed that Regional Development Agencies were not that efficient. How did you measure their efficiency?

We collect a wide variety of data. When we provide finances for the Research Councils or the Technology Strategy Board, for example, we look very much at what they do with that money. We try to look at the outputs of that as well. We'll be looking to see how many scientific projects are led successfully in scientific terms, did they lead to scientific publications, and how important are these publications. If we are funding something like the Technology Strategy Board we are looking to see what emerged out of the projects, do they develop new products, new prototypes, new processes of production, have made advances in some area. We tried to develop metrics, measures for those kinds of areas. We also collect a lot of data on R&D, and we also do a big survey of innovation firms in Britain. We survey something like 25 000 to 30 000 firms every two years to see what their innovation output looks like. We do have a range of measures adapted for different purposes that we try to use in making policy.

What is the main difference between these two systems – between Regional Development Agencies and the Centres of Excellence?

The Regional Development Agencies were mainly concentrated on small firms. I think that Centres of Excellence are much broader or will be much broader. We are only just establishing them now. They are meant to provide much bigger critical mass of technological expertise. The Regional Development Agencies were too fragmented in support of different sectors of the economy. Centre of Excellence, Technology and Innovation Centres will be more focused on core technologies with a large number of people working on them, a lot of the expertise.

One of these Centres of Excellence will be for manufacturing, correct? What will be the other seven?

It isn't clear what they will be yet. The first to be established will be the Centre for the Advanced Manufacturing. And that would be looking at issues like the development of use of advanced robotics in manufacturing, the use of new materials. So, that will be a range of areas. It will also look at design processes, design and prototyping using new IT solutions. That will allow a very large amount of firms to participate. There then will be a centre which will focus on life sciences and pharmaceuticals research and the other centres are not yet decided.

My view of these things is that in some areas we've concentrated too much, on areas like informational communication technologies and biotechnologies, life sciences. These are important areas but they make up a relatively small part of our economy. If we look at what the structure of our economy is you would find that it's actually very similar to the structure of the Russian one. That is to say that we have a large food sector, food production and food distribution, we have a large construction sector, large transport, one of the biggest sectors in our economy is health. We have a resources sector, not as big as Russia but we still produce natural resources, and that's big. I think if I was going to say what I would think about, it would be some of these very large sectors of trying to induce more innovation and raise the technological levels of these sectors.

If You Have Someone at the Top – Just Do It!



David Baghurst – Head of Isis Innovation, University of Oxford

What are the specifics of the innovation system in the UK? Historically the UK has always had a very good basic research. So, obviously the universities are part of the innovation system. The government had a role in formulating various policies to include exploitation of innovation from the research base and to support the growth of companies. Maybe this is a cultural thing but everyone in the UK is open to an idea of running a business. We are a nation of shopkeepers, a nation of people with the desire to be an entrepreneur which I think is not the same in other countries. Historically there has been a financial community willing and able to support the investment that is needed in innovation to take things forward. I do think we have a tendency maybe to be a little bit obsessed with high tech innovation and probably not to recognize the strength country has in media, arts and design - the softer areas of innovation. The guy who designed Apple iPod is an Englishman who was in London. So, innovation can become too closely associated with high tech rather than just good products.

Do you think that innovation system of the UK was initially planned by the government or it evolved spontaneously?

It's a common problem in many democratic societies that the government changes every 3, 5 or 7 years. The problem is that there isn't a consistency of policy: as governments change new policies come, innovation ecosystems take a lot of time to develop and everything is broken. So, after 5 years, just when things are starting to work, a new government comes in and you start from scratch with a new set of initiatives and policies. I think that's an issue.

The other issue is that the UK tends to behave as if it's still a massively powerful country with unlimited resources. We try to do everything instead of concentrating in selected areas. So, when you compare the system here to the system in Singapore or a system in China this isn't very good.

What are the major participants of the innovation process in the UK? Could you please name any specific organizations? This is difficult because of the current changes that are

going on after the impact of the financial crisis and the new

government. It must be very frustrating for you trying to research this.

Historically there have been a number of different government schemes at different levels. What do I mean by level – I mean local, regional, national. There used to be the Department of Trade and Industry. They used to run all these schemes from there. And there was a period of time when Regional Development Agencies were active. And within those regions there were sub regions that would do things in the area of innovation.

I am a participant in something called the Oxfordshire Innovation Growth Team which covers Oxfordshire. This was sponsored by the South East England Development Agency which covers the South-East of England. It was a regional body. That regional body got its funding from BIS which is a department of government that replaced the DTI. So, money from the national level goes to regional level and then goes to sub regional level. And at the sub regional level there are people like me who help companies to innovate. This is all in the process of disappearing.

Today we have a group called the Technology Strategy Board which is a national level body which is trying to find some priorities to invest the limited money that we have available in some key areas. They have groups of people that have written reports and that is leading to creation of so-called Technology Innovation Centres.

The concept of the Technology Innovation Centre is this: it's modeled on very various different schemes overseas, one of which is German Fraunhofer Institutes. The concept is to bring together government with industry with universities to do some collaborative work that helps the industry innovate. The financial structure that is being discussed is a third of the money comes from the government as a grant; a third of the money is secured by the universities who write grant applications to the government. This is a competitive source of funding. And a third of the money comes from industry. There will be 8 of them in the country and they will be targeted in particular areas where the UK has industry-universitygovernments cooperation.

If you were to decide in what areas would you create these centres?

That's a very interesting question. At the moment one of the projects I'm working on is trying to make this decision for Oxford. So, there is a government programme which is very competitive, not clear with the structure, I don't really know what the outcome is going to be. You have to invest a lot of time into preparing an application for one of these sources of funding. There is a little amount of money available.

Separately you can try to decide how to position yourself as an institution in this new environment. I'm working on this project where we are trying to work out what it is what we have here that we can take further along the technology development pathway. And there are a few different areas which I'm not ready to share though where there is a significant strength in the university and there is an opportunity to collaborate with industrial companies to do some early stage industrial R&D rather than just do pure basic research. And where do we go from there? We have to find a different way of funding. I think what our country needs is a radical change. And I don't think you can run a radical change with an all encompassing inclusive committee. The UK has become a committee. The leaders consult with other people who have their own viewpoint. And the focus is diluted in part to satisfy the desires of powerful parties. I think if you have someone at the top you just decide what you are going to do and make a choice. Just do it. If you want to make a radical change you don't involve a committee because a committee just takes a lot of time and doesn't have the guts to make hard decisions. They tend to achieve compromise.

If you were to decide, would you have done this kind of changes that are occurring today?

If I was in charge, I would make the decision just which sector we are going to invest in from the centre, from central government.

You wouldn't have kept the regional approach?

Yeah, I wouldn't do that through regions. I would do it centrally but I wouldn't consult for very long. I would just make a decision. We don't have enough money to invest in a large number of different sectors. We need to pick a small number and pour in the money that we have into those sectors.

How important is the role of the government compared to that of the market forces in the innovation process?

It's important in two ways. One it's important because early stage innovation is risky. So, it's quite difficult to do it successfully in a purely commercial way. Because you spend money and the most of it doesn't work because of a very high level of risk and failure. The role of government is in taking some of the risk out of the investment for other investors.

Where the government can have a sort of negative role is when they change the legislation and the consequences are that it stops, hinders some part of the innovation mechanism. There is an example from 2003 in the UK. The government wanted to stop the banks using a tax loophole to reward their employees. So, they put in place some new policies. The new policies meant that academic researchers who got shares in spin-off companies would immediately receive a very large tax bill. This stopped the creation of innovation companies from universities research base. The government sets legislation for good reason, but it has damaging consequences for the overall picture of the economy, particularly in the area we are interested in. When the government messes with the tax it's dangerous.

Investing in innovation is very risky, so we need to put some public money in there. You can't do it purely for the market because the market doesn't work. If you look at the financial performance of the early stage venture capital companies the average is that they make a loss if you look at the statistics. Some of them would be very successful, some of them would be very unsuccessful, but the average is poor. The market doesn't work. It's too risky. The investments are too risky.

Does that law you've mentioned still exist?

No, we had a campaign to have this law changed. So, in the case of the university spin-off companies we've changed it.

How does the legislation regulate the innovation process?

There are some tax rules. One of the interesting changes recently was in the area of patents. If you spend money on patent you can get tax breaks. Historically there has been an R&D tax credit. So, if you spend money on research you get tax breaks and there have also been incentives for investors to invest in early stage, risky businesses, so that if those businesses are successful you don't pay as much tax.

What about grants, direct incentives?

As for direct incentives there was a scheme in the UK called SMART scheme. SMART – Small Firms Merit Award for Research and Technology. Its name changed to R&D grants or something but the structure remained very similar. For a relatively small amount of money, maybe a project of 60 000 pounds, 15 000 is provided by a company and 45 000 by the government under the scheme. That was a very, very successful scheme and it's there to encourage the smaller firms to invest in innovation.

What helps and what hinders the development of the innovation system in the UK?

What makes the good kind of mechanisms for making innovative companies succeed seem to be things which bring companies in a similar circumstances together, so that they can learn from each other. There are business incubation programmes. Most of the incubation programmes we see around the world when we visit them, they don't feel like the innovation centres that I was involved in. Because in the ones I've been involved in there is much more collaboration and communication between people leading those companies, much more interaction, much more of a networking community. Everyone is trying to succeed and helps everyone else and there's a very high level of trust.

In some territories there is no trust, so people don't share problems and ask for advice because they don't trust each other. In the UK people in our community trust each other, help each other. So, one of the key things about innovation centres is that you have to have a facilitator that knows all the companies and helps to create this community, it make difference, big positive difference. When we've established companies, the trick seems to be to get the chief executives of those companies to come together to help each other – we call this peer support. That seems to work quite well.

What doesn't work is where you've got a government official who gives advice to a company but because the government official doesn't or hasn't run a company usually, what do they know about it? The trickiest thing is trust. We work across Eastern European countries and there is a very low level of trust between people who run the companies.

To your mind, what is the reason? Culture.

How can one build trust if it doesn't exist?

By having a skilled facilitator, someone to bring those people together, to convince them through experience that it's OK to work together, collaboratively, to be helpful to each other. You don't have to be in competition. Usually these businesses are in completely different industries, but they can help each other because they share some of the same common problems.

In what areas the results of innovation has scored the most impressive results?

I think the ones that aren't recognized are the ones related to relatively low technology or design. You know that kind of area. It's frustrating that those aren't recognized. The things which are recognized are the strengths in pharmaceutical technology, the strength in aerospace, the historic strength in cars. More recently there is a lot of innovation in film, very well design products, that kind of area.

What were the areas where innovation failed to produce a breakthrough despite the efforts made?

I think we have very few mega-companies, companies that have become world leaders. We've got very few of them in the last 20 years. And where there are companies that have gone to become world leaders in the last 20 years we haven't been very good at communicating to ourselves and to the rest of the world. We've got very negative attitude toward our own capacity to do this, to innovate really big. We naturally talk ourselves down. As a country we are very critical about our own performance and this becomes self fulfilling. If you think you are bad at something long enough, like turning basic research into innovative products, then you become bad at it. Or you don't recognize a success of it. A good example is a very interesting company in Cambridge. They make computer chips. And they make computer chips that power lots and lots of devices. They have an enormous success story which few UK people have heard of.

How important are innovation or technological parks?

That depends. Most of them add little value because they are just premises. A proper park is more than that – it's got a community, it's got inter trading, it's got companies talking to each other. When you have that kind of environment then a new company that goes into that environment is supported by the community and is helped to win business and join this park. There are projects with other companies. There are lots of things called innovation parks, but very few of them are actually anything more than just property.

So, it depends on the quality?

I think it's the environment. I used to recruit clients for innovation centre. I recruited clients on two criteria: the business plan and the willingness to become part of the community, part of their own support network. I even had to reject good businesses because I had more people who wanted to come than I had space. And as the result of that I've created sort of a community of 30 who did lots of stuff together, who grew and they all are mostly still trading.

What is your forecast for the development of the innovation system in the UK?

I don't know. I think that we are in a period of change. And I don't know how things are going to be. I'm worried. I don't see anything focused: I don't see a leader, I don't see initiatives that will make a difference, I'm not confident that we are going to come out of this very well.

What research and technological achievements may assure a technological breakthrough in the years to come?

I follow with interest the trends in the investment community, they are very amusing. There is a period of time when the trends appears to be the emergence of biotechnology. Everyone is very excited about this area. And then there is a trend towards clean energy and the environment. These new technology areas become a focus of interest – a little like a fashion. I think people forget the basics which are that we need water, food, more energy and better healthcare. Some of these industries are not very sexy but they all need big innovation. I would go to basics – water, food, energy and healthcare.

What does Isis Innovation do?

We link the people that make new technology, the technology providers, with the people that are looking for technology in industry, the technology seekers. The technology providers can be university researchers, early-stage companies, and established companies – any source of a new technology anywhere in the world. We link them with the people who are looking to get hold of that technology and turn it into innovative products or services again anywhere in the world.

We sometimes do that on behalf of governments. We are involved in the process in different countries where there is an interested government. At Isis we are good at recognizing the potential of an early stage technology based idea, we know how to communicate it to people who want to take that technology idea and make it into a product.

Do you work in Russia? If yes, is it easy or difficult to work there?

We work in Tomsk. We collaborate with people in Moscow. This whole area of technology innovation is an international, global thing. In terms of working with Russian people I think the level of trust is lower than in other countries and I don't understand why. People are more protective, they are very suspicious. If you go and say: "I can help your business", the response could be: "I'm threatened by that", "I'm not going to give you any information", "I don't trust you". And I think that's cultural. I don't know how do you fix that unless you've got some people that are just very good at encouraging people to come together.

There is a lack of trust, but in Russia you have the advantage of a government that can take a decision and go in a direction for as long as it wants. It has the capacity to choose a direction of travel, to stick with that direction of travel for 5, 10, 15 years; as long as it takes. You can do that. You can't always do that in West. That's great. The problem is that you have a bunch of people that don't trust each other. That's my perception.

The nice thing about Russia from my point of view is because the technology economy has been kind of closed for a period of time, there is not much trading across international borders. The government has always invested in innovation. technology and research. So, from my point of view it's really exciting because whenever you visit the Academy of Sciences research centres there's always a chance that you find things that are unique and very special. Because when you are in the West and you visit people because there is a much more free flow of people around, you are very rarely surprised by the exceptional guality of what you find. In Russia you've got a chance to be surprised more often and have something which has been developed for the Russian market which is fantastic. When you take that out to the global market it just blows away the industry. That's the excitement of Russia. At the same time you can come across something which some people in Russia are very excited about but which is so out of date, you are not so surprised.

I think this is a great time because if we find things which are unique and special and if we can get the level of trust, then I hope we can collaborate in helping Russian companies to take their products overseas. For more information on Isis please see our website at *www.isis-innovation.com*.

Companies Are More Important than Universities



Peter Dobson – Director of the Begbroke Science Park, University of Oxford

What one needs to turn science ideas into innovations?

You need to have an environment which is favorable to invention and also to taking those inventions and growing them into small businesses. Alternatively one might want to license ideas to business units of existing companies at an early stage. It seems that there has not been very much activity in large corporate research labs in recent years in the UK. This is contrasting very strongly with what has happened in Japan, and to some extend the old US laboratory pattern, where you would have big corporations like IBM, Xerox, Bell Laboratories and many others. They have all tended to cut back their corporate R&D. In Britain we did not have very much corporate R&D for the past 20 years. Our large companies like ICI and GEC, they have just disappeared or cut back their corporate research. The current innovation policy is trying to make good that cut-back on corporate research, to harness some of the ideas coming out of the university system, and to take them forwards.

Do you think government should help young scientists who want to run start-ups?

Yes, I think government should play a role. The big problem I think we will face is dealing with what, in Europe, we call state aid rules – the fact that the state should not intervene too much in terms of financial aid. We have very strict rules about this. And frequently there are cases where there is a disagreement in the amount of state aid we should allow within the EU and elsewhere in the world. We have to try to keep within the state aid rules.

Some European countries have a very neat way of getting around this. Many of us envy the German system of Fraunhofer Institutes. Fraunhofer Institutes are not new. The idea was conceived back in 1948. And this was seen as research institutes which helped to take basic ideas through to an idea which could be commercialised, and they were divided up to different sectors. The state subsidy for Fraunhofer Institutes is large by European standards. I believe that around a third of their funding comes directly from the state and has done for many years in a directed and controlled fashion. This is one way that state can intervene.

What I think the state should not do is provide a direct funding to spinoff companies, We tend to go straight from the University idea into a spinoff company. And there have been suggestions that state should provide some of the funding for that initial stage. In reality that would be hard to manage, without contravening the state aid rule. So, most help in the UK has come through tax breaks for investors in that early stage or for research and development costs at a slightly latter stage. But they are not proving to be very attractive to create new business partly because of the complexity.

In cases when the government gives a direct aid to companies in the form of grants for R&D, for instance, who would own the property rights?

The question of ownership of intellectual property rights is a very tricky issue. In the cases where government has funded basic research in universities in the UK all the IP (intellectual property) belongs to the university and then it is up to the university to exploit that and create new business or create license deals.

When research and development is funded directly by the government in small businesses, the government does not require ownership of the IP, but it does expect and encourage the company to exploit the IP. But there is very important proviso – the government never or hardly ever supplies more than 50% of the funding. Technology Strategy Board funds only 50% of the project and the other 50% has to come from the companies. So, it's not a full government subsidy, only partial. And in return for that they do expect the company to exploit the IP within the UK.

In the UK there were two universities where there was a slightly different model comparing to the other universities. More specifically, scientists but not the university would own the property rights, correct?

It used to be. And the two universities were Cambridge and I believe one of the Manchester Universities. Certainly Cambridge has now adopted the same policy as we have here in Oxford where all the IP belongs to the university, not to the individual academics.

What difference does it make?

It makes a huge difference in terms of risk and cost. If I own the IP I would have to take full responsibility for filing the patents and then marketing those patents. Once you get to the PCT stage of a patent the annual cost can be quite high. It can be between 5 and 10 thousand Euros.

Here in Oxford we don't have to personally find that money. If you were doing it in Cambridge in their original system, you would have to do that, you'd have to find the money and pay it. What usually happened in Cambridge was you'd assign the rights over to one of the consultancy companies that grew up around the University of Cambridge. There were companies like Cambridge Consultancy, TTP, Scientific Generics and so on. And they tended to fulfill the role that is currently performed by Isis Innovation here in Oxford. So, that's the difference. Doesn't it motivate the scientists more if they know that they will own property rights?

It might motivate the scientists more, but you've got to be realistic. Probably, less than one in twenty, it might be as small as one in fifty of patents is ever going to generate significant income. In terms of motivation, I think we've got higher motivation in the system we are operating Oxford because you have no worries or diversion of attention. You have no concern that if anything goes wrong you are not putting your family money or house at risk. Everything is managed by the university. And, by the way, the conditions for exploiting IP within Oxford are very generous. We would keep as much as 20 to 25 % of the equity for ourselves and in terms of license revenue income I think its first seventy five thousand pounds per year goes to the inventor for no risk. I think it's the best deal I've seen anywhere in the world.

What are the major participants of the innovation process in the UK – companies, universities, labs etc.? What does the innovation chain consist of?

I think it would be predominantly companies. If you were to take the life of invention, if you have to go from somebody inventing something to what happens next it would tend to be this. Two things would happen. One is you can form a spinoff company, and then you would get involved, may be, with venture angels, venture capital, possibly banks. You would also have some government intervention if you are going for grants through the Technology Strategy Board. If you went through a license deal it becomes multinational very quickly, you would talk straight away to companies, both large and small, and government would probably not get involved at all in that negotiation. We could go, for example, directly through to a Chinese government funded company, and they would pay royalties, and we would get money back. With the license routes, governments hardly ever get involved. Except these large Chinese funded companies - you never know where the money is coming from. Is it from government in China or is it from an investor? You don't know.

What is the role of Russian scientific diaspora or more generally the role of scientists from Eastern European countries in the UK?

I think in the UK we've, probably, got the broadest mix of anywhere in the world in that respect. We have a very large number of scientists from Asia, actually guite a lot from Russia in the past 15 years. We've had many Europeans, particular from France, who did not have a very advanced postdoctoral system. In French universities you could do research as a research student and then you usually left, because there was no highly developed postdoctoral system. Many French scientists came to Germany, UK, and America. We've always had a very large number from Hong Kong, Singapore, China. We also have quite a few coming from the developing countries, especially Brazil and Argentina, India, very large numbers from India because of their familiarity with English. If you'd look at researches in Oxford you would find an almost equal mixture of British and foreign students. In fact, I would think the foreign students would be in the majority in some subjects.

What are the latest trends in the innovation policy in the UK and how did the crisis and budget problems influence it? There has been very little change between the coalition government and the previous government on innovation

policy. Most of the emphasis has been on using the Technology Strategy Board to fund research at the translational level. By that I mean going from basic research into private research. We hoped that the coalition government would increase the amount of money going into that stage. At the moment there are not very clear signs that this will happen because there is a very powerful lobby group saying we should not cut any money going into basic science. And nearly all of the science policy decision making is dominated by people who believe that basic science should be protected at all costs. I'm very concerned that we should not lose sight of the fact that wealth creation comes from the translational research, and that some of the UK funded basic research has not created any significant wealth in the UK. Personally I believe we should shift our emphasis from basic to applied research.

There are very big changes going to happen in the way Research Councils operate. And the signs are that the Research Councils will want to see more evidence that the researchers are thinking about future exploitation right at the very first stage and this is not popular among scientists. I think it is popular among people like me who work in industry but it is not popular among university scientists.

Why do they have such a strong lobby?

I think because they dominate the decision making parts of the country particularly the Royal Society. The Royal Society is dominated by people who are pure scientists and believe that purity of science has to be maintained. Few of its members have any industrial background.

What helps and what hinders the development of innovation system?

I think what hinders is easier to answer. What hinders it is the promotion policy within the universities. We have a promotion system, career development system, which is based almost exclusively on publishing papers in the scientific literature. And very little emphasis is given to patents or spinoff companies' formation. If you do those things your career can die, if you publish a lot of papers it is good for your career.

What helps? Well, I'm optimistic. I think some universities like ours are beginning to do much more training at the doctor level to get students aware of the whole invention and innovation process. The Research Councils have also played an important role. They've got new doctoral training schemes in place and many of these require the students to go through a period of training in innovation and entrepreneurship. So, that's helping.

I think also that there are signs that our Technology Strategy Board is much more proactive and it has introduced new schemes. One I'm particularly keen on is the knowledge transfer networks which act as brokerages between companies and between companies and universities. They are helping enormously. And I believe that the quality of the staff what have been employed within the Technology Strategy Board has improved and is able to be much more effective than the old Department of Trade and Industry which it replaced. I'm pretty optimistic about some of the things that are happening now to improve our situation. But I would still like to see the stigma attached to creation of new business removed because that will help academics feel that they are doing something worthwhile when they are setting up a company or doing something commercial. What were the areas where innovation failed to produce breakthrough despite the efforts so far?

To take the semiconductor industry in the UK we lost it in terms of fabrication. We had good designers, but we did not have a very good eco climate for chip manufacture. And I've never figured out why. I think it was because there was an undue emphasis on military applications back in the 1960-s and 1970-s and we did not put enough effort into electronics which would have commercial applications. That's my own personal thinking. But I worked in that sector at the time and it was very unusual to find any of our large electronics companies doing innovative work in chip design for a consumer product. I think it was only Philips, which is a Dutch owned company which had a big base in Britain that worked in that area. And I saw the Philips organization at close hand because in the mid 1980-s I worked in Philips and I saw the developments of the laser for the CD players and various other applications. They were very focused, and a lot of the basic research was done here in UK. But very little of it filtered through into the UK companies apart from Philips, which is partially UK based.

I can talk about lots of other areas, like aerospace and drug design. I think there are some particularly good examples in drug design and development which happened in the UK. And that was because of the close relationship of some of the big companies like AstraZeneca, Pfizer, GSK with our universities and their recruitment of students with a very good training from within our university system. But they are multinationals really and they could now do their development elsewhere.

And they do?

They are changing rapidly now. I don't know if you've noticed but in the last few months all of the large drug companies are cutting back on the R&D here in the UK. Pfizer has just closed their R&D facility in the UK, loss of 2000 jobs. GSK have downsized, GE Healthcare have downsized over the whole world. We are going through a period where it is very hard to predict what will happen next in that area.

Because of global economical problems?

Partly of the global economic situation, and partly because of the rise of highly skilled facilities in China and India. It's cheaper for a multinational drug company to do the work in China or India than it is in the UK.

It seems to be a major trend?

I think that is a major trend. Also, you can check that trend in aerospace. There is an increasing will to do some of the R&D, especially the "D" in other countries like Korea, Singapore, China. Even big companies like Rolls-Royce and GE are doing that. That will have a bad effect on our own innovation chain.

How important are innovation parks?

Well, I obviously think that they are very important. Especially this one. Because this one is different from many innovation parks. We've got university activities here alongside spinoff companies.

We have two very large departments represented here on the site. We have Department of materials, who develops new methods of characterizing materials with electron microscopes and other techniques. And that work has now reached the stage when we offer a service to the whole of the UK and beyond for people to use those facilities. We even have a company founded by Russian scientists using our analytical materials facilities. That has meant that the costs to the company are much lower because we have the expensive facilities, we have the trained people, and we can offer a very competitive service. That's one thing that is happening.

The Engineering department here is increasingly getting involved in materials testing for the aerospace industry and for the automotive industry. We are beginning to see large contracts coming from companies like Rolls-Royce, British Aerospace, hopefully from some of the car companies to use our test facilities for new materials. If the material breaks we can analyze it with the material's department electron microscopes.

What is your forecast for the development of innovation system in the UK?

If the current coalition government plans are kept to, and we increase our spending on the translational part of research, I think it is pretty good. If we don't increase the funding, I think the situation will get pretty bad. In the UK we have not had a stimulation package like the US, France or Germany. I think that is bad. I think France and Germany put in place their stimulus package and we will see lot of business moved to France or Germany as a result. In America they have had a huge stimulus package, but I think they, probably, spent most of that on basic research and do not appreciate the importance of putting money into the translational stage.

The US has not been very effective in innovation I think. People think it is good, but there are very few new companies, new exciting companies growing in America. We see big corporates shrinking and we do not see new ones coming up despite the fact they put billions of dollars into research. I think it has been put in at too early level and they haven't been putting it in at high enough technology readiness level scale.

But what about the famous all around the world Silicon Valley?

Well, I think it was efficient years ago, but I don't see very much evidence that it is working now. Most of the companies in California doing really exciting new work are probably on the South of California, in the San Diego region. I don't think very much is really happening in Palo Alto area like it did. I think that period saw the foundation of companies like Intel, SUN Microsystems, HP and many others. But I don't see that being repeated. I think there are some quite interesting papers, produced by American policy makers which question whether they've got the right policy. I think they haven't. They've been funding too much blue-sky early-stage work and not enough second stage. They've been relying on their venture capital system to pick everything up and run with it whereas the venture capital system in the States seems to have nearly collapsed, because of the recession. Any investment now is, probably, coming through the Chinese money.

Is there cooperation going on between UK and other European countries in the sphere of innovation?

Very little I'm afraid. We have representation on European Union framework discussions but I'm not optimistic about that. Europe has never had a high risk agenda. Germany has had this very safe steady state funding via Fraunhofer Institutes. Belgium and the Netherlands have had a very, if you like, sound foundation through their larger research labs. In Belgium it's electronics at IMEC in Leuven which is predominantly state funded. And in the Netherlands it has been state subsidies with the universities that are connected with Philips, Shell and DAF Trucks – three big sectors, and also the plastic sector, via DSM and others as very strong in Netherlands.

Here in the UK when we talk to Europe, we are talking to people who still see things as been funded through those traditional routes. And forming spinoff companies in the European countries has been very difficult and very slow. The venture capital ideas are even less developed in Europe than they are in Britain. You could think of America as having a very advanced venture capital system. Britain is catching them up in terms of risk taking and money, but Europe seems to be very far behind. And there is one other factor in Europe, which I think holds them back and that is the conditions of employment law and the grip of the trade unions making it more risky to put money into a spinoff companies. I think Germany still requires that when you set a company you have to guarantee three years of employment. Whereas here - there is no guarantee. In one month you could in principle sack everybody. But in Germany you've got employment legislation to keep all employees there for three years. This means that an investor would see it less attractive, because of this guarantee of employment and pay.

What do you think about innovation policy in Russia?

I think you got two or three big problems in Russia. I think one is the story that comes frequently – the businessmen don't like investing in Russia because of the potential for corruption. It might be simply "rumour", but that's still a big worry. If you can remove the worry, the concerns about corruption, that would be the most important stimulus that you can have.

I think Russia has a huge reservoir of talents. Its education system is more like ours used to be with a strong emphasis on technical training as well as higher academic training. That will insure success. The other thing that will insure longer-term success is resource management. Resource management, making sure that your country has access to strategic materials is very important in the innovation process. It's not obvious but it comes in this way: supposing in the innovation process you need to insure that you can continually get rare metals, cobalt, phosphates etc. As a country you manage your recourses pretty well, you have not allowed foreign companies to exploit them. If you've got a home access to the strategic materials that you need for innovation to work then you are in a very good shape.

What you probably need is to have the people in the universities and the Academy of Science having this innovation park idea so that they can see a well defined path to developing ideas. And that is good. But I think you still need to address the situation of attracting in some foreign investment and that is when the issue of corruption may be a concern. You know, there has always been this suspicion if you to invest heavily you might suddenly find officials taking off money here and there, state nationalization, and then all the investor's money is lost. That's always going to be a huge concern.

To your mind, Chinese and Indian markets are more attractive for foreign companies?

Currently – yes. China – yes, India – question mark. I'm not sure. India has been very successful in areas like IT. It's increasingly successful in electronics, by that I mean assembly of electronics not chip manufacture. India has got huge problems and it has got very poor infrastructure for power. China has done the opposite. It is putting a massive capability for power generation – a new power station every week. India hasn't got there yet. Russia probably is in between.

China has been doing quite good, why?

China has done very well because it is putting in place all of the infrastructure for power, scarce materials, and now it has built huge innovation parks around all the clusters of its leading universities. Around Hong-Kong on the main land you have got Pearl River Delta with many large research institutes which have a connection through to the universities on the main land and Hong-Kong. The Shanghai area is also building a large number of innovation parks for different sectors and again linked through to the universities. They follow this model, and to an extent that is huge compared to the UK or Germany.

In terms of energy innovations, for instance, Europe and the US are behind China. Will this gap between China and other countries grow in the future?

Yes. For sure.

What is your forecast for the future?

It's difficult to say. If you take energy, I think that is a very good example, China has now got two of the largest silicon PV manufactures in the world. Three years ago it did not have any that were well known, and nobody knew of Chinese PV manufacture. They've happened and they've grown in three years from nothing. Another example is air conditioning units – the whole of Asia is becoming air conditioned. Most of them are now coming from China whereas five years ago they would come from Japan. China has worked out how to do solar air conditioning.

Do they copy or do they invent?

They do both. In the early days they copied. But what we've seen recently is that they've been inventing. And this shows up - if you track patents in recent years, you will find that about five-six years ago China started to join the Patent Treaty organization and in the last year, I think, in most of the important sectors of energy, electronics and ICT China has been filing as many patents as any country in the world, except the US. The growth and the filing of patents have been very significant. That is an indication that they stopped copying and they've started innovating. And it will be very interesting to see how that unfolds because we used to claim that all they did was copy and they were very good at copy manufacturing. Whereas the evidence now seems to be that there are many new devices that are coming available which were invented in China. Fuel cells is a good example. Many of the fuel cells being bought over here for small vehicles, bikes especially, are made in China, and designed there.

RDAs Have Been Regarded as Money Wasting



Jonathan Liebenau — Reader in Technology Management at London School of Economics, head of the "Technology Innovation: Management, Economics & Policy" team of LSE-Enterprise

How would you define national innovation system?

The general way that people define innovation systems brings together the various institutions that have to do with technology encouragement. We can include the intellectual property regime, the tax regime as it relates to research and development, the support for entrepreneurs in the way in which small businesses are encouraged to go into innovation activities and a number of other things that might bring together industrial policy, education policy, and trade policy.

The UK has been very conscious of its role as a generator of innovation. Historically British scientists and engineers have been very successful in generating patents, in coming up with new designs and products. However, there is a perception in Britain that these developments have not been sufficiently exploited in the UK. I don't think that this is a very easy claim to document and analyze but the fact that it is widely believed has made a lot of people focus on the need to ensure that a large comprehensive system of innovation is in operation nationally, so that advances that come out of scientific laboratories or engineering departments of large corporations or university activities can be exploited commercially within Britain. For this reason there is a very self-conscious innovation system and there are bodies in Britain, in government and in particular in organizations like the Department of Business, Innovation and Skills and those branches of government that are responsible for higher education and science and technology all to coordinate as much as possible.

The ability to coordinate in Britain is not nearly as good as it is in some other countries because the responsibilities of these different arms of government are fragmented. That's because they have portfolios of activities that are very wide ranging and innovation coordination activities are only one part their responsibilities. The system doesn't always do particularly well. One example is the way in which the tax law has dealt with the investments that the companies make in R&D and the manner in which they categorize capital investment as opposed to operating expenditure and the way that these are taxed. At various times in the recent history of the UK they've changed the structure of incentives. They worked in that direction to try to coordinate innovation activities in a better way, so that economic incentives for firms can be taken into account along with the incentives that firms may have to look to new scientific activities that come from universities or national research labs, or that come from the competitive market place.

Britain has, probably, the oldest patent system but in terms of modern patent practices Britain's patent system is well respected and is operating well. Intellectual property elements of the innovation system are pretty well in place. The perceived failure or the weakest point is with entrepreneurship and the ability of entrepreneurs' innovative product ideas to be commercialised. But these perceived failures are always taken into account in comparison to the US. While Britain has a relatively high proportion, maybe the highest proportion of small businesses, Germany has more medium size businesses, and the growth of small businesses is relatively healthy. And venture capital, which is very small by American standards, is still considerably larger than anywhere else in Europe. So, it depends on who you compare with to decide whether the system has sufficient inputs in terms of monitory support and other kinds of incentives and sufficiently well operating institutions.

There is one institution you should be aware of which was established as a quasi autonomous non-governmental organization called the National Endowment for Science, Technology and the Arts (NESTA). They have an arena to promote innovation in the British economy, within British business. Although they operate a little bit as venture capital firm themselves, their main purpose is to create infrastructure.

Are government incentives mostly direct – in the form of grants – or non-direct – in form of tax breaks?

With the new government and new financial constraints over the past couple of years we've seen fewer and fewer direct incentives. For example, there used to be a very healthy functioning set of Regional Development Agencies (RDAs). The current government is going to eliminate them. But they provided one form of grant system for innovative companies, especially small start ups. That was a direct incentive. They also provided infrastructure services including advisory services, network opportunities for companies, and allowed companies to meet on a neutral territory with the regional development authority supervising negotiations.

Those are also the kinds of direct services that NESTA provided, along with some direct funding. NESTA's money comes from the National Lottery. It's a large amount of money, but it's not money that passes through a normal budget. In this way lottery money goes into the NESTA's coffers and is distributed to promote innovation. That's an interesting way in which a non-governmental activity is using the official lottery. The lottery is a private enterprise also but it has responsibility to channel a certain proportion into this purpose.

Why does the government want to eliminate the RDAs?

There are two reasons. One is that they are relatively easy targets for cost reduction. The second reason is that they had inconstant records in different regions. Some of them are highly successful and have been influential in promoting business and others have not. They've been regarded as money wasting. It's hard to judge these things. First of all, there is a sort of counter-factual analysis that people have to do which is: if they didn't exist would the business have been as healthy as it is? Or if they didn't exist would these declining areas have declined more quickly than they did?

What is the relationship between universities and companies?

There's been ambivalence in Britain historically and I think it still exists about the relationship between universities and companies. And that ambivalence has meant that both companies keep distance from universities and universities don't really know how to deal well with companies. There's not the kind of smooth exchange that we find commonly in the United States or in Germany for example. This is improving. I'm involved a lot from the LSE with companies, and Cambridge of course has the best experiences, Oxford has got very good experiences, Imperial College is extremely successful institution in fostering government – industry relations. But it's not so widespread or deep as it is in leading American institutions.

This kind of cooperation between industry and universities usually takes place in innovation parks. How efficiently do they work?

I'm not sure that they mainly take place in that form. Cambridge works well because there is a lot of financial control and influence that Cambridge University institutions have on the Cambridge Science Park. They have opportunities for venture capital funding, opportunities for formal links with the university; they have opportunities to ensure that there is a good flow of information about both research activities and individuals including research students. It works in Cambridge for a few industries in that one area. It works slightly different in Oxford where the focus has been more on biomedical industries, not exclusively of course. But it's less formalized and it's less of a direct mechanism than exists in Cambridge. Other industrial science park experiments I think are less successful in promoting innovation and ensuring that there is a lively, replicable, sustainable community of innovating companies. Cambridge has pretty much succeeded and I don't know whether we would regard Oxford as having succeeded in the same sort of way. But I think that all these efforts to replicate Silicon Valley fall short of the features that Silicon Valley has.

Is Silicon Valley today as efficient as it was 20 years ago?

I don't know what measure of efficiency you would use. I think that it's extremely successful still. There were obituaries written for Silicon Valley 9 - 10 years ago. In 2002 there was a lot of journalistic writing about the death of Silicon Valley. And I had some data about the extent to which Silicon Valley companies reduced their R&D investments at the time of the economic downturn of 2002. But then by 2005 - 2006 people were saying - "How can we explain the revival of Silicon Valley? What features of Silicon Valley allow it to reinvent itself repeatedly?" If you look at the long history of Silicon Valley it's not a history of smooth growth and success in one industry. It's a variety of cycles, a change in industrial focus from its historical origins to new kinds of businesses. The one thing you can say is that it still exists because it's been able to reinvent itself so many times and it's that kind of vitality that really characterizes Silicon Valley and is a distinction from almost every other effort, with the possible exception of Cambridge. We'll see.

How important is the government role compared to that of market?

The most important institutions are government institutions. Other institutions like the financial institutions and the infrastructure developing institutions like the law practices, and the construction industry, and the consulting and advising industry, and the job search industry - all those things will thrive only where government institutions are working well and are trustworthy in themselves and become trusted because of the constituency, the predictability of their behavior. One of the key things in California was the way the labour laws work. They don't work so well in Britain and some other European countries. In Europe there is still a great deal of ambivalence about the trustworthiness of labour market institutions, labour law and the mobility of labour in general because of the other things that are associated with this workforce mobility. That is an example of how the Silicon Valley institutions are highly successful in ways that European institutions including British ones are less so.

Do they want to decrease the role of government in the innovation process?

The government role was supposed to be decreased across the board anyway. That was partly ideological, partly explained by financial constraints. We see a reduction across the board in universities. Funding has dropped considerably. The direct subsidies dropped considerably. Some of the close indirect subsidies like the services of the Regional Development Agencies, and, perhaps, the influence of NESTA, these kinds of things have been diminishing. The Department for Business, Innovation and Skills has been reduced in size and in power. The government has given a narrow commitment to ensure that science, technology, engineering and medicine in the universities continue to be supported. But I'm not sure that the level of continuing support will compensate for the other reductions in funding that the universities will suffer through the procedures for direct grants to research and through the general grants for universities receive.

Why the flow of investments is low?

Because of the inconsistencies in government policy. The investors both in the financial services industry and individual entrepreneurs investor always want a feeling of stability about the things around them: the legal structure, the accounting standard, the taxation regime. They want to feel that these are stable, so that they could go and innovate in areas where they have some control. Investors will immediately shy away from activity when they see too many things changing at once. They are trying to look at the innovative capacity of a company they might want to invest in. But if they fear that the taxation regime is going to affect it next year they are going to be reluctant to maintain long standing investment risk portfolios in those companies. The course right now we've spoken about is the reduction of direct incentives and subsidies to the industry, which is a problem. I don't think it's a dramatic problem though but it is one of the things that create uncertainty in the industry.

The proportion of venture capital available in Britain relative to the US is dropping. I think it's dropping in absolute terms. It certainly dropped in 2008 and 2009 but I'm not sure whether we can take a 5 year period and see. But I think the availability of venture capital is insufficient. And I don't think that the government will in the foreseeable future make any effort to compensate for that through government supporting venturing. What helps the development of the British innovation system?

The presence of big companies of course helps the innovation system. Most of the R&D takes place in big companies. The fact that some of these sectors are most healthy in Britain such as the pharmaceutical sector and specialist engineering. These are big investors in R&D everywhere where there is a significant industry – in the US, Germany, France, Switzerland and elsewhere. The fact that those big companies are successful companies helps both internally and also helps the environment which they are part of. Sectors such as aerospace, where there is a very large number of small and medium size companies in Britain doing high quality work in engineering and avionics – these companies are healthy and I think work well. That's what helps.

The courts help. The courts are important. They enforce laws well, they have a lot of knowledge about things related to intellectual property law, the way in which contracts are written and enforced in courts of law is extremely important. It gives contracting parties the confidence that they need and it gives outside investors a perception of the environment here as one where rights are protected and if infringements occur it doesn't take a long time to get redress, they'll find a miscreant and the fine will be paid quickly. That kind of thing makes people feel that they can take risks and be relatively well protected.

The other thing that helps is the expertise of the City of London. They have a great deal of expertise about innovating sectors. They know the industries well; they understand the relationship between technical risks and other kinds of innovation risks that companies are taking and financial risks that are being associated with it. That's an extremely important thing. There is a lot of complaint about the quality of manpower in Britain but I don't really believe that this is critical. I don't think that it is much worse than competitors'. I would say that the quality of the labour force and, in particular, the mobility of the labour force – this is something that helps. Employment law is better than most for innovation purposes, better than most in Europe but not as congenial as employment law in California or Texas.

How will the fact that big pharmaceutical companies close their R&D facilities in Britain and take them to India, for instance, influence the innovation process?

There is a lot of discussion about the Pfizer research facility in Kent that is closing. I don't think it will do systemic damage. In that case we are talking about 2400 employees, of whom a half or a third, I suppose, were centrally involved in R&D. I think that high proportion of that capacity will stay within the country and other investors will exploit the fact that these high skilled labour forces are now available to them.

In terms of a signal for foreign investors engaged in high tech or innovative capacity building I guess it's bad. But it's part of a very long trend. A very large proportion of UK companies' pharmaceutical R&D has been in the United States for 30 years and more.

It hasn't gone to India. It didn't stay in the UK. It got located in places like North Carolina and elsewhere around the US because these were companies' decisions that were based on specialization, competitive trends within particular kinds of research based product development, like Pfizer's. I think it's too easy to generalize and jump to conclusions about particular events like that. I don't think that there will be a large scale trend of moving research facilities away from the UK. I also think that the opportunity to use Indian labour for high skilled jobs like this is a net benefit to the UK and the UK industry.

The Economist magazine some years ago did an analysis of the job effects of outsourcing in general. They found that for the US and for the UK the net job effect was positive: the more outsourcing – the more jobs there are domestically. This is not true of German industry. When German jobs are outsourced, they reduced employment. This is not a simple, direct, linear relationship between things like Pfizer moving out or companies like Philips that has long had very big R&D facilities in India. Philips is not a healthy company but that is not because they move their R&D to India. That was one of the strategies that helped them to at least slow down their decline.

In which areas are the results of innovation the most impressive in the UK?

One way to analyze that is to look at patents and just see how many patents come out of different sectors in which case its same old sectors: pharmaceuticals, precision engineering, avionics and software development, the creative industries. In particular design – fashion design but also industrial design, including elements of architecture. It's the same as those industries in Germany, France to some extent also the US.

What sectors failed to produce results?

Some sub-sectors in engineering lost capacity to assemble cars with British branded companies. But the automobile industry still exists both with foreign companies in Britain and also with the supply chain of smaller companies that are British that are servicing those firms. In one sense the loss of the automobile industry is an example but I don't think that it's a very clear example. The chemical industry is one that, I think, really did decline, except for pharmaceuticals. People were expecting much more from it. 50 years ago Britain had a few of the most important chemical companies in the world. Those companies did not leave much of the legacy of innovative capacity.

Were there any obvious reasons why it happened?

Some of the reasons have to do with overall change in the character of those industries. Some sectors that were successful in Britain when those companies were growing quickly are no longer high value added, high profitability parts of the industry, investors expect smaller returns. They withdraw their funding from them. Competition does that. Some elements are, probably, explicable by managerial blunders, strategic mistakes. I think that these are important often in describing the fate of individual companies but not so clearly when you look at the competitive profile of a whole industry. But the chemical industry is an interesting case.

What is your forecast for the development of the innovation system in the UK? Do you think there will be an improvement?

People constantly try to improve it, yes. I think that they might be doing the right things. I guess the underlying question is whether the improvements that are being made here are going to be rapid enough to keep up with the improvements that have made elsewhere. We'll see, I think, relative decline. Rapidly growing economies in East Asia in particular are able to make rapid improvements from a much lower base in every sense. But as they improve quickly, they demonstrate relative superiority. The US has a very resilient economy. There is always a feeling that there is that competition between United States and Britain.

Why Did They Divide the UK Innovation "Lake" into "Ponds"?



David Hardman — Chief Executive Officer, Birmingham Science Park Aston

What are the latest changes in the innovation policy in the UK?

In summary, recent changes in government direction have taken certain aspects of government to a local level but the innovation agenda has been moved back to central government.

In 2008 the Technology Strategy Board's own strategy ("Connect to Catalyse: A strategy for Business Innovation 2008-2011" TSB, 2008) identified the need to "simplify and streamline" innovation support mechanisms. A government White Paper put out by the then Dept for Innovation, Universities and Skills (DIUS) "Innovation Nation" ("Innovation Nation" DIUS White Paper presented to Parliament March 2008.) called for the standardization of vital components of the innovation system to enable pull-through of products and services and provide confidence to consumers and investors. The latter also suggested "innovation often does not obey artificial administrative boundaries" and proposed that the "challenge is to create a framework at national and regional levels where activities to support innovation are focused in cooperation between different the actors involved, are responsive to different places and spatial levels and work across administrative boundaries".

The Sainsbury Report "Race to the Top" (Implementing "The Race to the Top" Lord Sainsbury's Review of Government's Science and Innovation Policies. DIUS. 2008.) tasked the Regional Development Agencies (RDAs) with leading economic development by promoting a regional dimension to the national economic performance.

RDAs promoted "Technopoles", structures founded on people in a social environment that promote enterprise. The strength of a Technopole is defined by the region's "Intellectual Capital" and the effectiveness of a region's ability to manage and develop its assets related to knowledge creation and exploitation. This is a function of the critical mass of entrepreneurs and experienced management, the relevant professional service provision, sources of the ideas and intellectual property, public and private sector funding and physical infrastructure such as innovation centres, incubators and science parks.

Technopoles, innovation ecologies, are innately unstable if one or more of the Intellectual Capital components is weak or missing. The creation of the administrative boundaries led to the UK innovation "lake" being divided into RDA "ponds" that [often] could not support complete knowledge-economy ecosystems.

The change of government in 2010 resulted in the planned closure of the Regional Development Agencies (from March 2012) and the establishment of Local Enterprise Partnerships (LEPs; from April 2011). One could suggest, indeed I have, that the LEP localism agenda risks dividing the ponds into "puddles"; in puddles, whole ecologies are unlikely to be sustainable.

So, with the change of government came a change in approach from an innovation support mechanism that had been driven at a local or sub-national level to one that is going to be driven from a national level from the Deptment of Business Innovation and Skills (BIS) with aspects of the strategy managed by the Technology Strategy Board (TSB). As well as creating LEPs the government has also dismantled Business Link which was a national structure run at a local level through the RDAs that provided business advice – some would say with limited success, especially for the tech-based sectors.

What may be achieved through these changes?

Assuming local interfaces can be achieved, which I believe should be through the UK's science parks and innovation centres, the innovation agenda will then be addressed as the "lake" not the "puddle" – to help ensure complete innovation ecologies. Reduced duplication of support services and access to the best not just local support for the new ideas

How does the legislation regulate the innovation process? Answer as above in terms of regulating the support for innovation... Other factors are fiscal measures such as corporate and personal tax incentives to encourage investment into R&D and the commercialisation of new innovative products and services. Recent cuts to the public sector funding has also resulted in severe limitation, if not cessation, of equity funds based on public monies.

What are the major participants in the innovation process in UK?

Universities as a source of intellectual property;

• Individual entrepreneurs taking personal risk to get their ideas to market;

• Government through fiscal incentives, grants and (in the past) publicly-funded equity funds willing to invest in early stage technologies;

• Larger corporates through corporate venturing and by acting as a the ultimate route to market for technologies generated by start-ups;

• In the biotech sectors the pharma multinationals are particularly key;

Incubators, innovation centres and science parks.

How important is the government role compared to that of the market forces?

Importance is in terms of helping

to manage early stage risk – market failure where the private sector finds the activities too risky. Public funds help address the equity gap. That said there comes a point where government's role should end and the private sector needs to take over, so that the market forces can exert Darwinian selection to ensure the new products and services are truly commercial.

What helps and what hinders the development of innovation system in UK?

A mature venture capital community helps as does a strong university research base. UK tax system helps and an increasing number of experienced CEO's and senior managers.

The lack of true early stage risk taking by VCs hinders start-ups. In

Oxford it is the technology clusters that have developed around the two world class universities over the last 30-40 years. Other hot spots are driven by universities or centres of technology including multinational companies – e.g. pharmaceutical.

How do you explain it?

The effect of clustering, the aggregation of all the necessary components – people with ideas and technology primarily driven by university dons but also from people exiting large corporate as a results of mergers, acquisitions and/or downsizing, people with relevant commercial experience and people with funds to invest.

What were the areas where innovation failed to produce breakthrough despite efforts so far?

In areas dominated by the old/sunset industries such as heavy engineering and manufacturing.

n Cambridge and Oxford it is the technology clusters that have developed around the two world class universities over the last 30-40 years. Other hot spots are driven by universities or centres of technology

comparison to the USA the fact that equity funding is drip-fed as small sums into ventures is a significant problem as it means numerous investment rounds are required with concomitant dilution of founders and the early investors interest in the ventures. Lack of timely major investment means founders exit relatively early to protect their returns but then do not see the businesses grow as UK companies. These ventures are then often bought by overseas investors with deeper pockets. There is concern over the fact that whilst UK produces many technology opportunities and SMEs, a number of them gazelles, few become big gorillas – UK has not yet produced a Google, Facebook or PayPall.

What are the main innovation regions in the UK?

In terms of innovation the key clusters are: London, Cambridge and Oxford. In terms of London it is driven by strong universities and access to the financial markets. In Cambridge and

What was the reason?

Lack of relevant expertise and experience/competencies in the knowledge-based economies – as management experience around low tech or mass manufacturing and workforce skill sets not relevant to the new industries. In many such areas overall education attainment levels also lower than in the more successful areas.

Lack of tech-savvy investors – note 70% of UK venture capital spent in the Greater South East (defined as the Cambridge/London/Oxford triangle).

How important are technological (innovation) parks?

Biased view but I would say crucial, especially going forward – science parks are generally recognized worldwide having a proven to be a driving force for accelerating entry of products and services into the market and are often at the heart of technopoles. They are seen to stimulate and accelerate innovation through agglomeration of talent, technology and finance creating knowledge-based communities operating within a geographic location.

It is interesting to link urban locations and science parks: The importance of "New Century Cities" in tomorrow's economy is increasingly being recognized and this is translated into Knowledge Quarters in cities around the world. The future plans for the development of science parks such as Birmingham Science Park Aston are directed at offerings that promote knowledge-economy led recovery as a consequence of their/our urban location. Either as part of a national initiative, or as a locally inspired one, such parks will create and operate a knowledge-driven growth hub, to promote regeneration in and around Birmingham.

Could you dwell upon the most improved innovation parks in UK?

Lead ones in UK: Cambridge/Milton (Oxford), Manchester/Guildford and for a biotech focus BioCity in Nottingham. There is a new generation of parks based on unique R&D facilities such as Harwell (ex UK Atomic Energy Research Station) or alongside big company R&D facilities – Martlesham (BT); Colworth (Unilever) and a new one in Stevenage (Biocatalyst on the GSK campus).

I also believe our plans for a Science Park Without Walls will be seen as innovative in the coming year or two.

What is your forecast for the development of innovation system in UK?

Science Park WILL become of increasing importance as a focus for activities but with three differences...

Increasingly centred near corporate rather than academic centres of excellence;

Increased focus on urban locations as drivers of urban regeneration;

Connected urban development as a consequence of the fact that the availability quality and efficiency of the web infrastructure will determine the strength of digital communities: the strength of digital communities will determine the pace of innovation and as the pace of innovation determines the effectiveness of the "science park" digital connectivity rather than geography will increasingly become the reason why a given location will be successful at driving the innovation agenda.

The Government Isn't Adventurous



Bill Wicksteed – Senior Research Associate at the Institute for Manufacturing, Cambridge University and Senior Adviser at SQW Ltd

What are the major elements of the innovation system in the UK?

In the UK we have 4 major elements on the supply side of the innovation system. The university system is the largest. Then there are public scientific research establishments (PSREs) funded directly by government. Third, there are charities which are funded either by raising money from the public or from endowments. As is true in the US, they are very important in the UK. Finally, we have many research and technology organizations, most of which are membership based.

Over the past 10 years, the university system has been given money through government policies specifically to help develop offices which commercialise research through protecting intellectual property and assisting knowledge transfer to the private sector. The money came from Higher Education Innovation Fund (HEIF) and went to most universities. In the early years they had to submit proposals and compete to win the money, but now a grant is given without competition. Each university can decide how it wishes to allocate the money – the funding is flexible though the amount given to each universities varies quite a lot.

HEIF has been very important in enabling universities to set up knowledge transfer offices and it has helped with some of the patenting costs as well. There has been a similar fund to help public sector research establishments develop their intellectual property and technology transfer activities.

Although it has now finished, there was a separate fund from the Ministry called University Challenge. It provided Seed Finance for the universities to use, so that they could take some of their inventions to the point where venture capital or angel funding could be raised "proof of concept". Those, I think, have been the most important funding streams for knowledge transfer and exchange.

I should mention Research Councils here too – such as the Medical Research Council and the Engineering and Physical Sciences Research Council. Their money comes from government and, as well as allocating funds to university researchers, they fund some important laboratories directly. There is a very famous one in Cambridge called the Laboratory for Molecular Biology (LMB) whose scientists have won 15 Nobel Prizes

The biggest UK charity is the Wellcome Trust. They support a great deal of biomedical research and they also have a venture capital fund. Their grants each year are similar in size to the government Research Councils. The total size of their endowment is about 14 billion pounds – that's the total fund not the annual income – which is, of course, much smaller. Some charities also pay for university buildings. The Gatsby Charitable Foundation is funding a new plant science laboratory in Cambridge through a grant of around 85 million pounds.

Research and technology organizations are less important in the UK now than they used to be, as they no longer receive core funding from government. Many are industrial membership organizations and most are members of AIRTO – the Association of Industrial Research and Technology Organization – which has about 50 members. There is one near Cambridge called TWI, (previously it was called the Welding Institute) which has an international reputation for joining technologies.

So, to sum up, the government encourages knowledge transfer through the money it gives to the universities and it encourages public sector research establishments to disseminate their expertise. The charities also encourage knowledge transfer and some have funds to support development projects. The Research Councils now have policies that when you submit an application for a grant you have to explain how the research will be useful, how it will be exploited.

On the supply side the major funders of research have really taken active steps to encourage researchers to commercialize. They have done it by asking them to explain how they going to commercialise and they have done it by allocating money to assist commercialisation.

On the demand side there are two major policies to encourage private sector to invest in R&D and knowledge transfer – R&D tax credit and Patent Box. The R&D tax credit allows you to offset more than you spend on R&D against tax.

How much can a company offset?

I think you can probably offset 1.5. I can't remember the exact ratio. It has changed and there are different rates for big and small firms. Small firms can get more. There was an independent evaluation, which was positive about the impact, but some people criticise the scheme because big amounts of money go to big firms, particularly pharmaceuticals and aerospace.

The Patent Box hasn't started yet. It is an additional instrument to allow companies to offset earnings from intellectual property against tax. I don't know the full details, but the concept is that you can offset against UK tax some of your overseas earnings from IP that has been generated from R&D undertaken in the UK. So, it's an incentive for companies to do R&D in the UK and again it's particularly important for pharmaceutical industry.

What about applied research?

There is a quite new and very important organization called the Technology Strategy Board (TSB). They have a

lot of money and it's meant to be for applied research where the leadership comes from industry – though firms can work with universities. The TSB had an increase in their funding partly to cover some of the work done by the Regional Development Agencies. It's likely, though not yet certain, that the Technology Transfer Board will take over some of their activities supporting innovation.

Isn't the government going to cancel these agencies?

Yes, but we'll, probably, keep the agency in Scotland.

Instead of these Regional Development Agencies the socalled centres of excellence will be created. What is the most significant difference between these two kinds of institutions?

I think that these centres of excellence are going to be called "TICs" – Technology Innovation Centres. They were to be called Fraunhofer institutes, then Maxwell institutes. They won't do the same job as the Regional Development Agencies – which did a lot of work with small companies.

TICs are quite different from the Regional Development Agencies. The idea was prompted by the success of Germany's Fraunhofer system. Fraunhofer is a national, state-owned company with a range of branches particularly focused on different kinds of technologies that are relevant to industry. The first Technology Innovation Centre in the UK will be in high value manufacturing. It has been announced. It won't be regional, it will be national in scope and that's a key difference.

Why pharmaceuticals and aerospace were successful in innovation in the UK while other spheres were not that efficient?

They are very knowledge intensive. We have very strong science, particularly in pharmaceuticals. I'm not so clear about the aerospace sciences, they presumably are strong too. Actually, quite a lot of aerospace breakthroughs were made in the UK. We had the first jet aircraft and the first hovercraft. On the supply side there has been a history of practical inventions in the UK. On the demand side, government purchasing has helped a bit but not as much as in the US. You know the horrible phrase "path dependency"? You become excellent in something and then you naturally stay excellent. That's probably the case with these two industries and I hope it will continue!

What helps and what hinders the development of the innovation system in the UK?

What helps it is that there has been a lot of encouragement through public initiatives; including schemes to help small firms grow.

What hinders? Currently, and over the past 3 years, the shortage of venture capital has been a problem and that's well documented. Added to that, in certain areas we've lost the industries to take advantage of the inventions. We no longer have the demand in the UK to pull though the inventions that are coming from the research community.

Public purchasing is also a hindrance. There is a continuing worry that we don't take enough advantage of public purchasing's potential to assist innovative companies. The US government is very good at that – at using purchasing to develop companies and ideas.

The UK government doesn't buy those products?

It's not adventurous, it's very cautious. And for 40 years, or at least 20, people have complained about it; saying that we must do something – yet nothing much happens. That might improve, but I don't think we see dramatic changes. I think change will be evolutionary rather than revolutionary.

What is the purpose of the innovation parks?

You know, we have a tough physical planning system that makes it quite difficult to develop major industrial sites. The breakthrough was that special legislation was introduced, so that you could develop science parks in places where you would not normally be allowed to develop. They removed a constraint. They were also very important because they gave visibility to what was happening in technological development. They've made it much easier to see the progress that has been achieved.

Maybe innovation parks as physical development are not so important now because the agenda has moved

on. Historically they were very important. Some of the innovation centres, particularly those very close to universities and with creative managers, have been vital in getting small start ups and spin-offs to develop from the academic base.

Did the UK innovation system evolve spontaneously or its development was planned?

In the past quite a lot of it evolved first and then structured interventions sought to widen the best practice. I wouldn't say it was very deliberately planned. There is now a report, called Race to the Top, which provides a clear view of the innovation challenge. After Lord Sainsbury retired from being science minister 3 or 4 years ago he produced this report which covers the whole innovation agenda. It made a number of recommendations which were all accepted by the last government, the Labour government. Because they are not politically controversial, our new government is likely to adopt them as well. It is a very good report. It's about how a developed economy, like the UK, can compete in changing global market place.

What is your forecast for the development of the innovation system in the UK in the future?

It will continue roughly as it is apart from the changes we've already discussed. I don't think we will see other major changes, partly because we have had to make major cuts in public expenditure.

What countries are especially successful in developing efficient innovation systems?

My knowledge is limited to the ones l've worked in – so I would select Singapore, Finland, and, in some ways, Norway. Norway is so wealthy with all its oil that it's in a very different situation. But I think a number of Norwegian policies are very good. I don't really know enough about the US. In any case it varies between different parts of the United States. You can't generalize.

What can we learn from Singapore?

Singapore is a small country and it's easier to plan nationally in a small country. In a big country maybe you have to adopt a regional approach. As I said in the US a lot happens at State level. What you can learn from Singapore and what we could learn from Singapore too is the importance of a very efficient bureaucracy. Easy to say but hard to achieve. They just do things really quickly and efficiently. I was on the advisory panel for a major science city project called "One North" which started 12 years ago.

In the 10 years that I was involved, the developer (JTC) managed to develop an extremely difficult site with great imagination, using top international architects. This was done very fast because they had all the different branches of the public sector collaborating effectively to make a successful project; so, a very well organized bureaucracy.

Many people consider China's innovation system to be a very strong one. And indeed, they've quite succeeded in energy innovations recently. In what direction will be evolving their NIS and how efficient it is?

They have a very efficient bureaucracy of course. And they also move very fast like Singapore. They are doing it at a regional level, at a city level interestingly. I was in Shanghai 18 months ago and they do not think they have a very successful innovation system yet. They are not confident that it's good enough and they are working very hard to make it better. Meanwhile, they have some superb universities and they have some very bright young people some of whom come here to Cambridge. But the problem is that a lot of the advances that they've achieved have been through foreign multinationals moving into China. The multinationals have helped train the workforce to high standards and brought their management systems. But the Chinese believe that the foreign companies are unwilling to transfer their intellectual knowledge and the companies fear that Chinese companies may steal their intellectual property.

There is no trust between them?

There is caution. No trust is too strong. The Chinese view I've heard expressed by very senior people, is that they've got to develop Chinese companies, Chinese owned and based in China, and see those companies drive innovation forward. That has to be the next step. They think that's their challenge. Some say that China is successful in copying technologies but it is questionable whether they'll be able to invent new technologies. Is it so?

People used to say that about Japan 30 years ago: "The Japanese copy things, they can't invent things". I think its nonsense. There may be some constraints but there is a lot of high level Chinese expertise and many of the top of young people are being educated in the West and will return to China. The same challenge is faced in India – developing the rural areas will bring really tough economic and political challenges.

What R&D may produce a technological breakthrough in the nearest future?

In the UK – regenerative medicine (tissue regeneration, growing new skin) looks promising. Another area moving fast in the UK is neuroscience. And maybe energy technologies is another. Technological breakthroughs will be driven by the big challenges of people growing older, global warming and general environmental concerns.

What is the area of specialization of SQW?

SQW is a private firm which analyses economic development challenges and helps to implement solutions. Our sister company Oxford Innovation manages innovation centres and seed finance schemes. SQW did quite a lot of work to support transition in eastern countries. We helped to develop science strategies and technology policies for countries such as the Czech Republic, Romania and Ukraine. We worked in Poland and we had offices in Lithuania and Latvia to help develop small businesses. It was quite an interesting range of work most of which was in the 1990s.

We have also delivered entrepreneurship training to help communities where state enterprises were being split up. In Hungary, their massive steel mills were highly specialized and produced very good steel actually. But they had everything within their boundary. There was no outside supply chain, efficiency wasn't good and they wanted to develop a proper supply chain - partly be helping some of their colleagues develop Those independent firms. were really challenging work and we were fortunate to have the chance to help.

INNONEWS

ERA.Net RUS Call in Collaborative S&T Projects Launched in March 2011

In the frame of the ERA.Net RUS project a Pilot Joint Call on Collaborative S&T Projects was launched on March 16 2011 and applicants are invited to submit online proposals until May 31, 2011.

The participating countries are: Estonia, Finland, France, Germany, Greece, Norway, Poland, Russia, Spain, Switzerland, and Turkey. Project consortia must comprise project partners from at least 3 different countries, of which at least one from Russia. These project partners must be eligible for funding by their respective national Funding Party which are members of the Group of Funding Parties. Applicants non-eligible for funding could join any consortium submitting a proposal in the context of this PJC, however on their own expenses.

The duration of a project can be up to 24 months.

www.eranet-rus.eu

RUSNANO, Micran, Nokia Siemens Networks, and Tomsk Administration Sign Agreement to Manufacture 4G LTE Equipment

On March 14, 2011 RUSNANO, Micran, Nokia Siemens Networks, and the Tomsk Oblast Administration signed a letter of intent for production of fourth-generation LTE telecommunications equipment. The hardware will be produced in the Tomsk Special Economic Zone.

The four parties signed the document prior to a conference in Tomsk led by Prime Minister Vladimir Putin – Perfecting Instruments for Innovative Development in the Regions (Special Economic Zones, Technoparks, Science Cities).

"This project demonstrates how rapidly the high-technology sector is gaining momentum in the country's economy. For RUSNANO, technology transfer to Russia, transfer of knowledge from one of the world's leading telecommunications companies, makes this project especially interesting. Moreover, it offers Russian manufacturers a chance to become vendors of the latest equipment for fourth-generation telecom networks," said Executive Board Chairman Anatoly Chubais

www.rusnano.com

Innovation Is Necessary, But at Least a Half of Money You Spend on It Is Wasted



Graham Thomas — Senior Lecturer in Innovation Studies, University of East London

What is the history of innovations in the UK?

Obviously the UK was one of the first industrial nations very strong in manufacturing - and in the XIX century we were called the workshop of the world. Since that time there has been a considerable decline. Some people argue the decline actually started quite early when countries such as the United States began to outperform Britain because of the scale they could offer, while others like Germany developed a strong science-led innovation base. Quite recently we have been witnessing the phenomenon of globalisation with manufacturing in particular moving overseas. Of course this affects not only Britain but all other industrial powers as well; however, Britain was affected perhaps a little bit more because it has not had a coherent national system of innovation. Also, the decline in British manufacturing has been faster than in other comparable countries like France or Germany. Partially it came as a result of politics - the political orientation and ideology of particular governments. I also think some more general cultural factors have played their role. While Britain still has some areas of strength, it has also shown some considerable weaknesses.

When did the decline that you've mentioned start?

The decline in British manufacturing started well before the Conservative government of the 1980s, but some political decisions taken by that government accelerated it. The government at that time was very worried that Britain was not competitive enough, not entrepreneurial enough, and not responsive enough to the changing world economic environment. It also felt that there was too much government intervention. So, the ideology of Margaret Thatcher's government was to get rid of inefficient industries, to open up Britain to investment from other places, and to provide a more friendly environment to business, entrepreneurialism and capitalism in general. Undoubtedly some things did need to be changed, but the ruthlessness of that government and the speed of the changes didn't help, and several industries have been almost done away with without there being enough new industries to take their place. There was an even sharper decline in terms of British ownership of industries. The one which comes to mind first is the automobile industry where back in the 1960s we used to have a number of major Britishowned firms. Now we don't have any significantly large Britishowned automobile company. We still have a few niche firms, including those which produce racing cars, but most of the ownership of automobile firms has gone abroad. Nowadays cars produced in this country are owned by companies like Nissan, Toyota, BMW, etc. This was not necessarily seen as something negative by everyone at that time, especially by people in government, and the impact of foreign ownership is still disputed, but it does mean that key investment decisions are taken by people outside the country.

The idea behind the 1980s reforms was that Britain should re-orient itself in a world where there were different economic conditions and cheap labour in other countries. Britain should then become a more educated, more highly skilled economy instead, creating and designing rather than producing, and concentrating more on services.

The government wanted to promote these kinds of skills and entrepreneurship in the country but they did it by decreasing the role of the government and letting market forces have free rein. However in the long run the result was not the one the government was hoping for, though in the short term it didn't look so bad. There was indeed a big change from manufacturing towards service-led industries, in particular financial services which were deregulated in the late 1980s by the Conservative government, although subsequent governments, whether Conservative or Labour, didn't change that policy significantly. Britain's economy did actually grow, and I remember in the early 1990s, when trade unions were bargaining for better conditions and pay for their members they always referred to OECD statistics which claimed that Britain had the fourth strongest economy in the world. That was a dubious statistic though, I think, which didn't reflect real economic strength.

So, the idea at the time was to free industry from the shackles of government intervention and consequently to allow entrepreneurial culture to flourish. The problem is that if it refuses to flourish the "hands-off" government then doesn't have instruments to intervene in order to correct the course of the economy. I think that is to some extent the problem of today.

What are the latest trends in innovation policy in the UK?

There has been a recent change of government and it's perhaps not completely clear yet what the new coalition government's attitude to innovation is going to be. This government is trying to do so many things very quickly. Many of their initiatives have been prompted by financial crisis and the deficit in government spending making it necessary to borrow a huge amount of money, and that is the issue this government is always focusing on. However it is a coalition government, with two parties involved, and at times they argue with each other of course. We haven't quite had a chance to see how it will all settle down in terms of support for innovation.

Overall this Conservative-led government is doing a lot of things that – somewhat surprisingly, perhaps – are broadly in line with what the Conservatives were doing under Margaret

Thatcher in the 1980s. In an attempt to reduce the deficit a lot of government quasi-government and agencies are being reduced in size or shut down. Sometimes this is justified, but sometimes the government makes us worry about what's going to happen. For instance, the Food Standards Agency was set up in the 1990s after the outbreak of mad cow disease. It was set up as an independent regulatory body outside the Ministry of Agriculture, Fisheries and Foods because it was felt that the ministry was struggling with the dual role of promoter and regulator of the industry, so the idea was to separate those functions. Now this government has decided that it's too expensive to have a separate agency and so control will go back to the ministry. We will have to see how it works – I'm not optimistic.

Every organisation, be it part of the government or set up as an independent agency by the government, is currently under scrutiny and either they will find their funding cut or they will be closed down completely. It is not a time when we would expect major government initiatives to support innovation, although a few measures were announced in the recent 2011 budget statement. Mostly these related to support for entrepreneurial activity in general - relaxation of planning controls, creation of enterprise zones and some deregulatory changes but there were a couple of things explicitly targeted at innovation, e.g. increased tax relief for R&D in small and medium-sized enterprises and greater investment in publicly-funded research centres.

How does legislation regulate the innovation process?

In general terms I see a problem there because the government ideology is still to try to minimize the extent of intervention in the economy. The means by which government typically intervenes are limited to fiscal policy, monetary policy, etc.; there are not really any comprehensive policies to promote innovation. It doesn't mean that there is no policy at all, because there is: we have a department in government called Business, Innovation and Skills which is responsible, amongst other things, for promoting innovation. However in terms of what other countries have done in the past in terms of directing their economies, explicitly promoting innovation, creating new organisations to bring together government, education and industry, and having explicit policies to promote R&D – we don't have anything very coherent.

There are attempts to improve the situation from time to time. The last Labour government, which ended its term in 2010, produced a major report, a so-called white paper entitled "Innovation Nation" which came out in 2008. The ideas in that paper included the promotion of knowledge transfer partnerships and the creation of an "Innovation Research Centre" in order to bring together all the various actors in innovation system. That government also commissioned a report by one of the leading UK entrepreneurs of the last 30 years, Hermann Hauser. He has been involved in many companies, notably in Acorn which was an important firm during the "microcomputer revolution" in Britain in the 1980s. He produced a report for the previous Labour government which advocated so called Technology and Innovation Centres to bridge the gap between research and the commercialisation of technologies. So, there is clearly some recognition of the need for technical change and innovation. What I would question though is whether any government in the recent past has put effort into this consistently over a period of time. What tends to characterise the previous Labour government as well as others are stops and starts, swift changes of policy. There is a long tradition in British politics of what is called "muddling through", coping with situations and reacting in the very short term to changes in environment and policy, instead of having a consistent long-term direction of policy. I think that's a problem.

Is there an "innovation culture" in the UK?

I think that in our culture there is a general lack of appreciation for technological labour, including engineering, though this is to some extent disguised by an abstract respect for innovation. This cultural problem with science and technology isn't totally new; if you go back to the period of the industrial revolution you will find many novels reflecting an aristocratic disrespect for so called "trade" and industrial occupations. I think that this attitude continued to some extent throughout the XX

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The 10 Most Innovative Companies in Russia According to Fast Company

Fast Company is the world's leading progressive business media brand, with a unique editorial focus on innovation in technology, ethonomics (ethical economics), leadership, and design. Written for, by, and about the most progressive business leaders.

The 10 Most Innovative Companies in Russia according to Fast Company are:

1. Yandex – for mastering search

2. Kaspersky Lab – for turning hackers into an army of virus fighters

3. ABBYY – for pioneering optical text recognition technology

4. Rosnano – for establishing a clearinghouse for innovation in nanotechnology

5. Rosatom – for expanding from nuclear power plants and warheads into medicine

6. M2M Telematics – for positioning itself to dominate the chip market for Glonass, Russia's answer to the US Global Positioning System

7. Optogan – for building a full-scale manufacturing facility in St. Petersburg that will be able to produce 360 million of its patented high-brightness light emitting diodes (LEDs) every year

8. Mikron – for fine-tuning smart cards 9. NPO Saturn – for advancing military aviation

10. Lukoil – for investing in R&D www.fastcompany.com

International Forum Transport Infrastructure, Russia 2011

International Forum Transport Infrastructure, Russia 2011 will take place April 21, 2011 at Lotte Hotel, Moscow. This is a specialized Congress and Exhibition for promotion of innovation-based technologies and services for modern transport systems. Forum highlights are:

Plenary session

The second international conference "Intelligent transport 2011"

Conference "How the Russian regions will benefit from hosting the 2018 World Cup"

Conference "The Railway Transport. Infrastructure Development" www.pibd.ru century as well and was reinforced by the "deindustrialization" of Britain in the 1980s. And now it is blended with a view, prominent in various media, that the main goal in life is to become famous, to be a celebrity, have your name in the papers and on TV without having to do the hard work that brings you the reward of real achievement. Britain's cultural problem is reflected in its education system; we have an ongoing crisis in the teaching of mathematics, science and technology. There is a significant shortage of qualified science teachers in schools, and this means that not so many children get enthusiastic about science and engineering. Not many of them take those subjects when they have a choice after reaching the age of 14-16, which is when they start to specialise in our education system, and this aversion to science and engineering is reflected in the number and quality of students seeking places in these subjects at university and further on also in their choices of employment.

Are kids taught entrepreneurial skills?

That's a good question. I suspect some are, but many are not. I don't want to say the education system in the UK is dreadful; it isn't, it's very good – in parts. And I'm sure some schools will be building in those kinds of skills, or at least they are attempting to create links to local businesses and public sector organizations. However I suspect it is still a relatively minor part of most children's education.

Are there special classes in the universities for students to learn not only how to create but also how to commercialise?

Again, it depends on the university and on the subjects studied by students. There is certainly a need to connect universities to the outside world as long as it's done in the right way: universities need to remain places of critical inquiry and not only be the servants of industry. In my own university, for instance, we have a building just across the square called the Knowledge Dock. The "dock" is because it is located in one of the places where ships used to load and unload their cargo. The position of the campus where I work is itself a graphic illustration of the effects of technical and industrial change in Britain - the

London docks used to employ many workers, but the container revolution in shipping both reduced the need for their labour and relocated it to the new container ports outside the city. The Knowledge Dock contains some companies based here - mostly small start-up companies - and the idea is to promote interaction between those companies and researchers within this university to give teaching and research a practical grounding and to provide firms with access to research expertise. So, there is recognition of a need to connect universities with commercial activities, but the question is always whether we do it as well as other countries. And I guess the answer once again is partially "yes" and partially – perhaps a greater part – "no".

To your mind how important is the role of government compared to that of market forces?

I think they both have a part to play. There is a danger in over-governing when government procedures and processes become entrenched, rigid and inflexible. There is a danger that companies which depend on too much guidance and support from the government may become inefficient and less innovative. But on the other hand market forces alone, I think, are probably not enough. I would say in this country the balance is perhaps too much in favour of market forces.

This "deformation" of the UK, as one of my former teachers put it, can be perhaps mitigated by the fact that we are embedded in the European Union and the EU has its own innovation policy as well as commissioners to oversee it. The EU also tries to bring together universities and research within industries via its Framework Programmes and other measures. Of course the most progressive companies will take advantage of those programmes. But in the UK we have overall a sceptical attitude to the European Union. Although in practice Britain does play a big part in European programmes, the political attitude toward the EU here is that it's against us, it's just a big bureaucracy in Brussels trying to defeat the United Kingdom in various ways. Often people don't see the bigger European picture. I should say I'm personally a big supporter of a European integration and that puts me in a minority in this country.

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Petersburg International Pharmacy Engineering and Biotechnology Forum IPhEB

April 26–28, 2011, supported by St. Petersburg Government, RESTEC® Exhibition Company holds the first International Pharmacy Engineering and Biotechnology Forum IPhEB that is aimed at establishment of a pharmaceutical cluster in St. Petersburg.

The IPhEB Forum is an integral link in the chain aimed at basic solutions, recommendations and measures development to establish a new generation pharmaceutical cluster in special economic zones in St. Petersburg. It is organised to demonstrate the latest achievements in the pharmaceutical industry, innovative medicine, nanoand biotechnology, chemical analysis, instrumentation, metrology, radiology and related sciences.

www.ipheb.ru

12th International Forum "High Technology of XXI" – "High-Tech XXI –2011"

April 18–21, 2011 12th International Forum "High Technology of XXI" – "High-Tech XXI – 2011" will take place at the Central Exhibition Complex "Expocentre" (Expocentre Fairgrounds), Pavilion №7.

"High Technology of XXI – 2011" is the unique exhibition & congress innovative event that promotes facilities of the enterprises in creating and producing high technology production and technology. The Forum is held in compliance with direction No 58-RP by Moscow Government dated January 20, 2010. The Forum has received a wide recognition for eight years of carrying out and is one of the largest forums in Russia.

One of leading directions of a forthcoming Forum are problems of introduction of development of a high-tech complex, "commercialization" of scientific and technical potential, marketing of hightech production, and also questions of assistance of realization of priority National projects and programs. Diversified character of the exhibition program of the Forum promotes development of the new technologies arising on a joint various scientific branches.

www.engl.vt21.ru

How big is the amount of co-operation between the UK and other member states of the European Union?

To begin with the UK is one of the largest contributors to the European budget. Although we also take money out for regional and social initiatives we still are a net payer toward the EU. The UK has influence within a large number of European programmes, but Britain is not a part of the European monetary union and there is still a "small island" mentality that is sceptical about the need for further European integration. Sometimes there is a justified worry about losing too much sovereignty to a larger block which may not be inclined to go in the direction your country would want to. But other countries have managed to work within a European framework and still retain both their independence and their unique cultures, so I don't see any reason why the UK cannot go the same way as well.

What then would help to develop the innovation system in Britain?

The most important thing would be to have a coherent. long-term policy: this would include a closer collaboration between government, industry and academia, more money to support innovation in terms of creating centres that could help transfer knowledge, and some selective direct support for research and development. There are already agencies that do support R&D; for instance in the academic world we have the Research Councils. In my area it is the Economic and Social Research Council, while other councils are responsible for physics, biology, medicine, engineering, etc. In Research Council programmes there is a lot of focus on the impact of research, on connecting with research users and on the usefulness of research in terms of aiding the economy. Of course a lot of that is phrased in terms of helping innovation. But overall, according to recent data, the UK is no better than the European average for funding research and development, and this level of funding is lower than that in the United States or Japan.

Support for innovation is a little bit like what people say about advertising: you know it's necessary, you know it's useful, but at least 50 per cent of money you spend on it is wasted. And the problem is that you cannot know in advance which 50 per cent will be wasted. The point about innovation is that it is uncertain. In any individual case no one can guarantee success even if apparently all conditions for success seem to be satisfied. Even if you have good connections between business and universities, if you have firms open to external influences and if they collaborate with other firms where it's in their interests, even if firms practice open innovation and have a large "absorptive capacity" in terms of acquiring knowledge, and know what to do with that knowledge when they get it - even then a lot of innovation projects fail. So, as a government all you can do is to try to work out how much money you can afford and how many initiatives you want to start, and then have some faith that in the medium or long term your policies are going to be a success.

The problem for any government is that by definition they are elected for a relatively short period of office; they don't know whether they are going to remain in power ten years down the line and benefit from any good policies they put into being. And of course in the present conditions, with a real problem of having to reduce the deficit in our country's finances, I suspect any government would be averse to risk and therefore would not be eager to put too much money into initiatives that may or may not work. There is a mismatch between the horizons of a party in power and the horizons necessary for a better innovation policy.

Which were the areas where the results of innovation have been most impressive in the UK?

We have a few sectors where we are still guite strong. The one which immediately comes to mind would be pharmaceuticals - we have a couple of world class companies there. We have one success in microelectronics too, a company called ARM, Advanced RISC Machines, which some time ago was spun off from Acorn Computers. This was the development of a microcomputer revolution. The UK made guite a few interesting and innovative microcomputers back in the early 1980s, and most of them later were closed down after larger companies began to control the market, but Acorn diversified into chip design, and ARM chip designs are used in most mobile phones throughout the world today. That's a success. Financial services are also considered UK strength - though this is a mixed blessing in these times. I guess telecoms can still be considered a success to some extent, though not so much in manufacturing: BT still has a large R&D capacity, although their big Martlesham Heath research centre has been downsized in recent decades. In the defence sector, I think, there is still guite a big capacity, though not in every area of defence, and perhaps some of that spills over to things like civilian aerospace - Britain is a partner in the Airbus, some parts of these planes are being made here; the Airbus sites at Filton, near Bristol, and Broughton, North Wales, are part of the Centre of Excellence working together with Airbus sites in Bremen, Germany and in Toulouse.

A niche area where we have some expertise is in space science, for instance in the design of satellites – partly through collaboration with Europe via the European Space Agency. And also there are a few other interesting areas: for instance James Dyson produced an innovative bagless vacuum cleaner some years ago, and his firm has on to produce other successful things such as hand-dryers. He employs a good number of designers and engineers in the UK, but sadly he has moved his manufacturing plant to Malaysia. He is a strong advocate of manufacturing culture, government support for R&D and scientific education.

What is your forecast of the development of an innovation system in Britain?

I think we'll carry on muddling through. Some sectors will develop, both in Britain and elsewhere: there are clearly some interesting things going on in nanotechnology, for instance. I believe that this century will be the age of biotechnology: all the things that will follow from breakthroughs such as the cracking of the code of the human genome. Innovation studies researchers sometimes talk about "long waves" in the world economy. One of the most important recent waves has been based on information technology; my bet for the next wave is, as I said, biotechnology. Also, there is clearly a lot of scope for low-carbon and other "green" technologies that might lead to a more sustainable mode of development, although I am not convinced that Britain will become a leader in this field.

The UK Is Going through an Upheaval



Kathrin Peters — Head of SQW International, Cambridge

What are the major participants of the innovation process in the UK?

There are, probably, 3 major participants. The most important group is business. We've got a number of R&D intensive businesses in the UK. The OECD, for instance, publishes regularly all statistics on R&D intensity in business sector. You will see that the UK, probably, not at the leading edge of the ranking. But, still, there are some very R&D intensive businesses, for example in the pharmaceuticals sector, and also in services sector such as banking and the retail sector. There are also many creative companies and innovative software companies. There are other sectors

where there is a high R&D intensity, such as oil exploration.

The second group is universities and research institutes. We have some very well regarded research-intensive universities in the UK. My office is based in Cambridge and Cambridge is one of the leading global universities, known for its research expertise. Cambridge is one of the leading universities in the world in terms of its research credibility.

There are others across the country. There are very good universities in London, Oxford, Warwick, Manchester and many others. The so-called Russell group of universities brings together the most research-intensive universities. Not all universities are as research intensive as others.

The third group is the public sector who supports research through various channels including the Research Councils of which we have a number. If you look up Research Councils in the UK you will find all research establishments which are funded via public sector and they are researching in a number of areas including the life sciences, material sciences, agriculture and others. Let's try to draw a big picture of this structure. So, first of all, on the top we have BIS and then we have Research Councils. Also, now there will be Local Enterprise Partnerships which will replace Regional Development Agencies, correct?

The new Local Enterprise Partnerships (LEPs) will not replace the Regional Development Agencies. The Regional Development Agencies have been abolished but will not be "replaced" literally because the coverage of the LEPs is not the same. Moreover, they are only going to take over some of the functions which the Regional Development agencies used to play.

The "TICs" – the Technology Innovation Centres are a special type of innovation centre which the government wants to support. There is a report by Herman Hauser where he reviewed available innovation centres. We have a lot of innovation centres in the UK already and there is an organization called United Kingdom Science Park Association (UKSPA) which covers all innovation centres and science parks. The government wants to support a new breed of Technology Innovation Centres.

What is the difference between the UK and German innovation models?

The Fraunhofer Institutes are applied research centres, they are not technology innovation centres. There are a number of Fraunhofer Institutes doing research on a number of areas across the whole sphere. They are not innovation centres as such. They do a lot of contract and applied research with industry. There might be some which are linked with innovation centres or science parks but generally they are applied research institutes.

The German system in terms of its spatial organization is completely different to the UK system. Germany is a federal republic and Lander have a lot of autonomy. The UK is not a federal country; it used to have a regional innovation structure but the current government which came into power in May last year has completely changed the system.

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system

In terms of innovation policy which approach is more preferable – the old one, regional approach or national approach?

As I mentioned to you before the key players in the innovation system in the UK are businesses, universities, and the public sector through research establishments. The Regional Development Agencies in some ways cut across that and they had their own innovation policy. For instance in East Midlands they had (and they still do) a number of innovation clusters which are meant, at a local level, to bring together universities, research establishments and businesses, so that technology transfer and innovation can take place. That kind of local networking and cluster developing is potentially very effective.

However, it is also important to take key decisions at the national level on where funding is concentrated, for instance with respect to the distribution between, say, life sciences and manufacturing-related technologies. Those decisions are difficult to take at the regional level.

You really need both: you need a national vision of a country, where it is going and what its areas of key specialization are and how can you support those. And then, at the regional and local level, you need policies for businesses. At the end much less risk averse. When it comes to dealing with businesses they are not much helpful. The availability of funding, I think, for risk ventures, for innovation is probably a key problem in the UK.

You could probably also say that the education system in the UK is not as conducive to innovation as it ought to be. There is a lack of technicians and people with applied skills. There is a lot of investment into higher level education, academic education but effective innovation needs a whole range of skills and the middle level of skills is not as well covered as well as it ought to be.

There is a lot of investment into higher level education, academic education but effective innovation needs a whole range of skills and the middle level of skills is not as well covered as well as it ought to be

businesses are the key suppliers or producers of innovation activities.

How does the Technology Strategy Board builds in this public sector scheme?

The Technology Strategy Board has this overall strategic mission to identify and deliver the key strategic opportunities and drivers for the UK. In that sense it is the key body at the central level to scan the environment and to make right decisions in terms of strategic opportunity.

To whom do they report to?

The Technology Strategy Board reports to BIS.

What helps and what hinders the development of innovation system in the UK?

The UK is going through a bit of an upheaval at the moment because of the government change and serious cuts in government funding. How will this all shape over time? It is very hard to say at the moment. Availability of finance for businesses has been a problem but not just in the UK. This is a problem which many countries are facing. The banks are notoriously risk averse when it comes to dealing with businesses. When it comes to dealing with very sophisticated financial mechanisms they seem to be Why this middle level education is not covered?

It's a long history in the UK of the education system of not being very well aligned with the need of businesses. There isn't a very strong vocational training system in the UK. In Germany you have a very strong system which is on the basis of so-called dual training system where businesses are involved through the apprenticeship system. In the UK that's just not so well established.

How important are innovation parks?

I think that innovation parks are very important. But it's not straightforward to evaluate the effectiveness of science parks. Some say that at the end of the day science parks don't actually generate that much benefit in terms of innovation. I disagree with that. I think that they have an important role to play. They are not the only instrument for innovation but they are in a way a local or regional mechanism which helps small businesses to succeed. which creates links with universities and research establishments and generally put localities on the map of innovation.

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9th FRUCT conference

The 9th conference of the Open Innovations Framework Program FRUCT will be held in Petrozavodsk, Russia, on 26–29 April 2011. FRUCT is the largest regional cooperation framework between academia and industry in form of open innovations. FRUCT conferences are attended by the representatives of 20 FRUCT member universities from Russia, Finland, Denmark, Italy, Ukraine and industrial experts from Nokia, Nokia Siemens Networks and Symbian Foundation, a number of guests from other companies and universities.

The conference is an R&D forum for the most active students, academic experts, industrial researchers and influential representatives of business and government. The conference invites the world-class academic and industrial researcher to give lectures on the most relevant topics, provides an opportunity for student teams to present progress and results of their R&D projects and meet new interesting people and form new R&D teams.

www.fruct.org

Russian High-Tech Development Institutions Open Office in Silicon Valley

Boeing, Cisco, Intel, Microsoft and MIT are key partners in Russia's high-tech Skolkovo Innovation Center (Skolkovo), which opened on April 23, 2011 its American beachhead in Silicon Valley along with OAO ROSNANO and the Russian Venture Company (RVC).

The new Russian Innovation Center will serve as US representative office of the three organizations. It will promote and coordinate high-tech partnerships and scientific cooperation in the IT, biomedicine, energy efficiency, nanotech, nuclear and aerospace sectors among top Russian and American companies, venture capital firms, and academic and scientific institutions.

Almaz Capital Partners, IBM, Intel, Google, and Microsoft have also concluded agreements to partner with Skolkovo to advance software production and IT infrastructure. Boeing is establishing a design center at the techno park to employ 300 IT specialists to support commercial aircraft construction.

www.i-gorod.com

Try – Fail, Try Again – Fail Better!



Garrick Jones — Partner in the Ludic Group and Visiting Fellow in the Institute of Social Psychology at LSE

How the government can stimulate R&D activities?

All governments in history have promoted R&D, particularly for defence purposes. Going back to Leonardo da Vinci and before and ever since: lot of Leonardo's work has been for defence, his ideas of helicopters and submarines for instance, new types of armament. The Mongolians used stirrups on horses. Throughout history many innovation which came to the market have had origin in defence. All the way through history innovations have come down into the market and to common people. This is not new. What is new is a phenomenon of an innovative behavior becoming a driver of the economy.

So, typically the UK government like many governments has invested in primary research, R&D through the academy, engineering for example, new ideas, and then over time ideas have made their way into the market.

The British have a particular history, a cultural history of being very good innovators. I don't know why but it is the way it is. A British has that meter for the inventor in his shed or his garage, at the bottom of his garden, working at his workshop. And this is the way things like hovercraft or the sandwich or jet engine emerged - all these have been created by private initiatives which then have been picked up for further research. This was for example how railways started: George Stevenson from Newcastle perfected the first steam-powered machines and built locomotives which inspired construction of the world first freight and passenger lines. In the British context there is distinction between invention and innovation, we defined innovation not only as an idea but as an invention when it comes into the market.

What Britain has not been very good at was a value-adding part of the process which is taking those ideas and bringing them into the market quickly and effectively. Often the ideas originating from Britain, like a jet engine, have been taken and commercialised very successfully by the United States.

Why did it happen?

I think it was because we had an empire which was doing all that work for us, we just needed to feed new ideas into the empire. With the collapse or loss of the empire there was no appreciation of the world as the market the same way. And it took a long time for Britain to reconfigure itself and to reimagine a new place for itself in the world. Now we are a small nation, we don't have the same access to the markets we used to have in the age of an empire, so we have to re-negotiate our relationship with our trading partners. And commercialisation of ideas is much more focused on nowadays than it used to be. We never in the past had innovation focused on at an entrepreneurial level, even in things like fashion, music (and we have a very powerful music industry), television. For example, we may have invented computers like Univac but then it went to the United States and it was the United States that created Apple and a PC for example. Many people do not know but the very first laptop computer was invented here in the UK. It was called a BBC computer and an Acorn computer. But it never developed into a market product.

The culture of the UK is very inventive but commercialisation is not something we are good at. Having said that there has been government support for things like science parks, the Oxford and Cambridge ones being very powerful... This kind of relationship between the academy and industry is designed to speed up and to commercialise. And we have been doing it for the last twenty years, and that is becoming more and more effective. But again we must make a distinction between creativity and innovation.

Probably this is related to some legislation problems. How does legislation regulate innovation process?

I would mention two things. There is nothing like tax exemptions, they have always been limited. Yes, there are R&D tax exemptions but they have to be limited to pure science and some forms of industry. But also there is a cultural factor: we are not a country that easily deals with failures or bankruptcy. For example in our culture if you went bankrupt and more so if you went bankrupt by law you can never run a business again. It damages your reputation not only legally but also socially. But what you need is an entrepreneurial activity prepared to fail, because innovation is so much about potential failure – learning from the States and the famous story about Edison making one thousand light bulbs to come up with a successful one. So, this idea of bankruptcy and understanding that small failures in entrepreneurial activity are not a disaster is something that we are starting to change.

Could you give some examples from other countries where they want and they know how to risk?

Take the US: great businesses fail now and then and that's OK. And that's what promotes entrepreneurialism. When I lecture on innovation I often start with a slide from Samuel Beckett, an Irish playwright. On his desk there is a card saying: "Try – fail, try again – fail better". And this attitude towards failure is very important not only in generating new ideas but also in commercialisation of those ideas.

In a pure market capitalism failure can be very harsh, it can be catastrophic for people and their families. That's why, I believe, it requires from the state to provide people with cushions for failure, because risk in inherent in innovation.

Are you aware of any recent government initiatives aimed at promoting innovation?

Yes, the one is coming through from the new government. It is called Technology Innovation Centres. These are based on a European model actually, which works very well in Germany and in France. Technology Innovation Centres will be linked with the academies but they are specifically centres working on the relationship between new ideas and research and commercialisation.

Basically they will be places where companies rent some space and may use the equipment?

Yes, that's one model. But the idea also is to facilitate new ideas and project management, so that these ideas of different stakeholders can work together throughout these projects. A very good example is Frankfurt Institute in Germany which can serve a model.

Important point is that these centres are multi-disciplinary, you have to facilitate the overlaps, you have to work very hard on it. For example, you might have a medical company which has dissemination into hospitals. Then you might have a design company which is doing interaction design. Then you might have a technology company that owns the technology for a new piece of medical equipment. And then you might also have a finance company that can help structures to finance all the way through. So, they are multi-disciplinary projects, and it is not a serial approach, it's a parallel approach.

Can you elaborate on major participants in the UK innovation system, i.e. universities, research labs, companies – who plays a bigger role?

It really depends on an industry. Like Canadians we have clusters of excellence. For example London has a very powerful cluster for filmmaking, new media, music, advertising, arts - all sorts of creative industries. Soho in London is a cluster around filmmaking industry. People must have a place to come and to talk. It rarely happens in an official structure: you don't have the same guality of conversation that you can have over meal, or cup of coffee, as you have when you are in a formal academy seating. So, in Soho we have a lot of clubs, member clubs where people from film industry - actors, producers, cameramen can hang out, party together, drink together, enjoy social life together - and talk. And through this talking ideas are found, the UK is very good at that. In the XVII century not far from this area, in the Fleet street zone we used to have coffee houses which emerged before pubs. Coffee came from the New World and was an attraction: people went there and out of coffee houses came new ideas for politics, industry, culture and arts. Newspapers come out of the coffee houses because people were writing down their ideas and sending these sheets to their friends. It became published and Fleet street developed into a centre of newspaper production in the UK - just because the coffee houses were there. So, Soho is an up-to-date version of those coffee houses for the film industry for example.

Clusters of excellence. If you go to Oxford for example, engineering and biomedical science are very powerful there; Cambridge – technology, also biomedical, computer science. In London we also have climate change and sustainability clusters of excellence. These clusters allow people from different industries but working in the same domain to talk together and work together.

You've been to Russia. Communication infrastructure and project management, to your opinion, does it work there?

I haven't been to Russia long enough to know in depth, I can only report on what I saw. After the fall of the communist era your heavy industry is not that big as it used to be and it has become very primary, oil and food for example, manufacturing industry doesn't really exist – it is very small. But Russia is very powerful on a cultural side, your cultural industries are astonishing, lots of discussion and exciting things happen, but only on a very small layer of the society. But I saw a very large part of the population is denied access to those kinds of opportunities. I don't know enough about Russia to comment on it as an expert, but if you want a culture of innovation and a culture of the economy that is driving innovation and entrepreneurship you have to involve people at every level, especially your middle classes and below. You cannot have just oligarchs and workers.

How did crisis and budget cuts affect the innovation policy?

The major impact on innovation policy produced change of government. Under the previous government we tried to support various groups dealing with innovation. I think a lot of those have been cut although less severely than some more basic cultural things like theatres and arts which have been cut really badly.

You have said what hinders development of innovation system. Now what helps development of innovations?

Right structure: you need a policy that supports it, you need education at every level. We start teaching design thinking at schools for children of 6-7 years of age. There are also programmes across the UK for children at the age of 11 and also at the age of 19 to do join-up and design thinking at schools, they are all to make design thinking a part of school experience.

How does it work in practice?

Every project is absolutely unique for a particular school. There are groups working with children to redesign their schools. The children work with architects, inside and outside. I can give you examples when schools have been destroyed completely and then rebuilt entirely new, following the designs done by schoolchildren working alongside with architects. It stimulates creativity and innovative thinking. For children it is very important to participate in a project all the way through from beginning to the end. Also, we have a lot of actors working at schools on creativity. We have children involved in making films and they work with people who did Star Wars for example. So, they are working with professionals and they go through the whole process. Britain is very good at that. Another thing is appreciation of arts and culture, specifically contemporary arts and conceptual arts. Every gallery and museum in UK has educational programmes that touch all the schools. Tate gallery had 5 million visitors last year, 2.5 million of them being schoolchildren. And appreciation of arts, and arts practice and arts thinking is also a very important component of creativity.

So, education, infrastructure, tax regime, policy regime with clusters for innovation, and access to finance. Our problem is that our venture capital is very good in projects over 250 thousand pounds but there is so little venture capital for projects between 30 thousand and 200 thousand pounds. And this is really an important part of the economy where new ideas can be tested. We are promoting social entrepreneurship at that level, and lots of prizes and foundations are emerging, mostly private, some public, which allow ideas to be formed.

In which areas the results of innovation have been most impressive?

Well, I think our multimedia have been world beating, our music industry is the best in the world, our television industry is the best in the world and they export a lot. Also a precise engineering, for example Roll-Royce manufacturing new engines and so on. If you go to Trent in Derbyshire you can see the impact of innovation on very skilled engineering, audio technology etc. Our health care industry is and has been very innovative and very powerful. Creative industry is very strong. Many people just don't know it but creative industries like advertising, design and others contribute to GDP on par with finance: 5 to 7 per cent, which is very large.

What do you think about a recent trend of medical and pharmaceutical companies to close production here and move it to India and other developing countries where workforce is cheaper?

That's a good thing I think. Also the model of innovation has changed very quickly in those areas. Innovation used to be based on what we call "skunk works" where you put a group of several clever people in a room and let them get on with it. This has not proven to be the most effective way to generate innovative ideas and get them through to market. The fact that Pfizer has closed this facility does not mean that innovation has gone out of England. What they have done is a change of model, so that innovation is happening on a broader and much more open way.

What were the areas where innovation failed to produce breakthrough?

You have to have failures all the way through to get a success, and there is enormous amount of failure in testing and prototyping before getting successful. The UK has invested heavily in energy innovation and has a lot of projects, government-funded projects to look at new energy forms, government funding for academies, for new sustainability, engineering, new battery technology and new storage technology and so on, all these are emergent and growing. A key success was a global shift from incandescent light bulbs to new types of light bulbs – this is being done globally in five years, it's remarkable. But in order to get to that particular light bulb how much failure was around! So, I think sustainability engineering or "clean tech" is no failure, it's emergent. And where there is something new there is always lots of experimentation and failure is built into it.

Does the government somehow regulate the innovation process?

What you have to understand about the UK is that we don't have central planning at all. We resist central planning. I think we are opportunists and when we find areas we are good at we tend to rush after them, but we are no good central planners at all.

How important are innovation parks? Can you elaborate on most impressive examples?

They are absolutely vital especially for mid-level small to medium enterprise. All of them, I cannot say a particular one is the most impressive because they all concentrate on different things. And I think this is where the key is: the age of massive big industries is over and coming is the age of multiplicity and massive investment into small to medium enterprises. And this is the shift that happened over the last 20 years.

In one sentence, what is the major purpose of an innovation park?

It is to promote connection between laboratory work and commercialisation, and to nurture small organisations,

sometimes startups but also small and medium enterprises when they are young and trying to grow.

What do you think about Skolkovo?

There are always differences, you may call them differences of cultures but I'd rather call them differences of perception. I welcome the initiative in Russian Federation to be more innovative and to open new business opportunities for its population. I also welcome links that are being made with the rest of the world. So, projects like Skolkovo which is about promotion of international standards of business practice must be welcomed. I think Russians are often too inward focused, Russians look to Russia and not necessarily to the rest of the world. Now I see these perceptions changing. And vice versa: rest of the world sometimes see the Russians as aggressive or opportunists or not to be trusted when doing business, and I think that perception also needs to change. For example, endeavors like Skolkovo, when you read here journalists' reports showing young Russians alongside international students learning international business practice are very important for the perception of Russia as a place to do business.

To your mind what should be a proportion of big businesses and smaller companies and startups to operate in Skolkovo?

I think it depends on what your capital requirements are and what your investments are. I think a proportion of 20 per cent of very large industrial companies and 80 per cent of small to medium enterprises is about right. It could be 25 per cent and 75 per cent. I believe large organisations benefit from having so many smaller organisations around them in, the first bringing investment and the second generating new ideas. You have to subsidise small and medium enterprises and inviting large companies in science and technology parks helps to do right that. You have to create a different regime for the small to medium enterprises to flourish, you cannot ask them to behave the same way you ask large organisations, otherwise they just cannot survive.

What is your forecast for the development of innovation system in the UK?

Within the last 20 years and certainly after the Lambert report in 2003 there has been massive investment in various centres for innovation, in the academies. There is much greater appreciation that you need to facilitate that relationship between academies and small and medium enterprises and science and technology. This will obviously go on.

In what area there will be built a bridge between nowadays and future?

I think it's green technologies. In two words, battery technology and sustainable production of new energy sources. I think the new technologies are to come very quickly, within the next 20 years.

"Open Innovation" Is Not Something New



Alvaro Figueredo — Research Associate, IKC Commercialisation Laboratory Project, Cambridge Judge Business School, University of Cambridge

Did the UK innovation system evolve spontaneously or was it basically planned? What role did the government play?

Throughout history they have always been very good inventors while support from the government was minimal. I would say that perhaps in the last 30–40 years as a result of the success of the Americans through Silicon Valley European governments have started copying that. So, I would say that initially it was not preplanned, it was probably culture and now they are trying to do it more systematically. Whether this is leading to a more successful economic growth I don't know.

How does legislation regulate innovation process?

There was a report (The Lambert report), released in 2003. In fact this report was commissioned to try to find out what you could do with all the scientific knowledge which was being developed in universities. Recommendations coming out of that report were basically suggesting that industry and academia should talk more to each other. As a result a more cooperative approach developed, and although the economic downturn changed it a little bit, big companies and research councils started investing a lot more in universities to conduct applied research. In a sense that was a concrete action taken by the government.

What are the major participants in the innovation process in the UK?

Starting from the government side there are institutions like the Engineering and Physical Sciences Research Council (EPSRC) and NESTA – National Endowment for Science, Technology and the Arts. Definitely there are entrepreneurs, investors, universities. But universities do not sell science, so there are technology transfer offices – TTOs. They basically deal with the legal and some commercial aspects and also try to make available all these inventions to investors, so that they come, take a look at them and then see if there is any potential to create commercial technologies.

So, basically they are in search for money?

No, they deal with all the processes that facilitate the commercialisation. For instance, if I am an academic inventor and I created something I can come and ask them what are, for example, the intellectual property mechanisms I can use and whether they have investors that might be interested: all the things procedural, they are not in charge of money. And sometimes there is a big pressure because if you don't do anything with your invention within one or two years after you have patented it they can just take it and commercialise it.

You mean an invention can be commercialised without participation of the inventor?

University owns all the intellectual property but it gives special commercial rights to use it to the inventor. But if he or she doesn't do anything for one year with those rights they have the freedom to look for someone else that might be interested in taking it to a sellable state. The inventor still has some participation but they have the right to look elsewhere.

What role does the Russian scientific diaspora play in the UK? Or, in broader term, scientists from Eastern Europe?

As you know a Nobel Prize in chemistry this year was granted to a couple of Russians. I've been impressed by discipline and thoroughness of East European scientists. Very often they are much stronger than their western counterparts. I mean you have a strong culture of basic research in scientific disciplines in general, in many ways stronger than in the West. While most of the universities are on Western side of Europe, a lot of scientists in basic sciences told me that they really admire and respect their colleagues from Eastern Europe, especially from Russia.

How important is the government role in promoting innovations compared to that of market forces?

It's very hard to generalise. I would say that if the government doesn't facilitate the process you are missing great opportunities. I mean, you may have a very attractive market but if, for instance, you don't have right intellectual property legislation it will stand on the way of a scientific discovery to be commercialised. So, it's undoubtedly very important. But on the other hand if a market doesn't exist you may have a most encouraging and helpful legislation but no practical result. However, government definitely plays a very important role. It has to foster this culture of innovation and entrepreneurship. It's not just inventions that matter, but the whole commercialisation process.

What are the latest trends in innovation policy and how did the crisis and budget problems influence it?

Well, without a shadow of a doubt the latest trends are that the budgets are being cut down very severely, and I think that can have a major impact. Disruptive technologies may take 15 to 25–30 years to be developed, and I have seen a number of scientists who have been working for the last seven or eight years on some technologies, and now all is going to be stopped because the money flow has drained. That's going to slow down the innovation process and henceforth the whole economic wealth creation process.

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What helps and what hinders development of the innovation system in the UK?

There are two things that hinder and enable it at the same time. For instance, the UK attracts a lot of international students and I think that it gives the country a great advantage to have here the brightest minds from all over the world. A multicultural, very cosmopolitan environment in Cambridge, it is incredible indeed. An MBA here is mainly international, 90 per cent are not from the UK, perhaps just 50-60 per cent are Europeans. How England is attractive to international students is really very important, but at the same time the British authorities are taking the wrong path: the legislation they might be introducing now will be potentially removing the work permits that allowed students to stay here for two years working. This is a great mistake because on the one hand they make a lot of funding available for scientists regardless of nationality: European or non-European, you come here, get your PhD, you are ready to make your small contribution or big contribution depending on what you are doing, and then they kick you out. To the contrary they should be attracting more people, and I believe the ability to attract talents and retain talents in any country is the key.

In what areas the results of innovation have been most impressive?

I would say that here in the UK biotechnology is one, and there is a huge trend to create flexible and transparent electronics made out of plastic and other flexible and transparent materials, and I would say that that is perhaps the upcoming wave of technological shifts. It's in its initial stage now but there will be billions to be made of it within the next 10 to 15 years.

How do you explain success in these particular areas?

I would say that with electronics Britain has perhaps some of the best electrical engineering departments in the world. In places like Cambridge you have also a lot of research and development centres of companies from all over the world, multinational companies and local spin-outs. It's the biggest research centre in Europe that attracts a lot of talent and this network has created a lot of knowledge and shares a lot of knowledge, specifically in electrical engineering. But again creating and commercialising are two completely different things.

How important is the role of innovation parks in the national innovation system structure? Can you elaborate on most advanced innovation parks in this country?

I would not overemphasise the role of innovation parks. I'm sure Cambridge will survive without an innovation park, but it gives you facilities and infrastructure. I mean there are a lot of companies here, they will be here even without any innovation park, and that's a very personal opinion. But what makes Cambridge attractive first is the university itself, a high quality of education: companies come here because they can hire very bright students straight away. Innovation parks are just a consequence of the need to facilitate the physical infrastructure. You can create a very good innovation park somewhere, but if you don't have all the matching systems surrounding it, all the scientists, the students, the companies, what's then the use of it? It is my opinion, and I don't insist it's relevant.

What is your forecast of a future development of the innovation system in the UK?

This is the moment when the government has to invest. If you start cutting down all the budgets it's a great mistake. I mean innovation per se takes so long even if you have all the funds, if you slow down the funding and take out the resources it will take much longer, it will just make worse the crisis and slow down the process.

Do you mean that market forces alone aren't able to change the situation?

I don't think so. Now is the moment when government has to intervene.

Can you explain what "open innovation" means?

I'm not sure whether it is something relatively new, in my opinion it existed for a long time, perhaps not formally. I'm rather skeptical about how novel this concept of "open innovation" really is but anyway the concept says before you have a company and a research department you still create the products without interacting with

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Russian Railways Has Developed Innovation Programme to 2015

Russian Railways has developed a programme for the innovative development of the Company to 2015, said the President of Russian Railways Vladimir Yakunin at the forum for innovative technologies InfoSpace, which began on 30 March 2011 in Moscow. As Vladimir Yakunin noted, Russian Railways has identified strategic areas for scientific and technological development to 2015 and put in place the right structures, including a corporate system for managing innovation.

In accordance with the instructions of Russian President Dmitry Medvedev following a meeting of the Commission for Modernisation and Technological Development of the Russian Economy held on 31 January 2011, a draft programme of innovative development of Russian Railways has been drawn up. This document contains a series of measures aimed at developing and introducing new technologies and innovative products and services that meet international standards. www.eng.rzd.ru

"Innovations and Technologies - 2011"

The Second International Exhibition-Forum "Innovations and Technologies – 2011" will take place in International Exhibition Center "Crocus Expo", April 12–14, 2011. It is an effective business ground where new ideas, inventions and original process solutions meet the business community ready for the transition to innovation rails. The support of government institutions, participation of leading companies and contributions of the professional branch associations provide for the exhibition's participants the high-efficiency dialogue with the Russian economic elite.

Within the framework of the 2nd International Exhibition-Forum "Innovations and Technologies – 2011" the following priority areas of national economic development strategy can be mentioned: telecommunications and high technologies, energy efficiency and energy saving technologies, health and safety technologies, innovations in ecology, medicine, pharmacy, biotechnologies. www.en.innotechexpo.ru

INNOVATION TRENDS

outside organisations. And now the tendency comes with a concept that you have in this research and development process companies and third parties: universities, research labs, governments intervening to create new technologies. In my opinion this is not true. In my opinion vou don't have a network of scientists as something completely isolated. Obviously you have secrecy which is integral part of competitiveness in the industry, you don't rush to share the discoveries you make. But these scientists go to conferences, they talk to colleagues in universities, in research and development laboratories and their governments, to the people they have studied with or have been working with. In my opinion there is nothing new, it has always been the case, simply nobody bothered to give it a name some twenty years ago. If you look at some great scientific discoveries and how great technological shifts have happened throughout history, it was basically by people talking to people, they have always done. Perhaps you can argue that they used to share less before, but I'm rather skeptical about this "open innovation" concept unless you have a very straightforward collaboration and even in those collaborations there is a lot of secrecy. The core of the concept is that now we do it together with all the organisations instead of doing it just within a company. I doubt whether great scientific discoveries have been

In Russia cooperation between universities and companies is very weak. Can you give any recommendations how government can stimulate their interaction?

made within a single company working

in isolation. In my opinion it has never

been the case.

It is rather difficult. I think that history of Eastern Europe makes it difficult. Do your people trust each other, do they trust the government? That's a big question. You can give people the resources but the whole history of Eastern Europe cultivated mistrust in societies. You have to foster trust in people. If I now come and say I'm going to share this stuff with you, we have to be open and trust each other. are you going to believe me? You can pass a legislation, for instance, that favours innovation process and specifically intellectual property. You can make results available to scientists

and offer a lot of incentives to students in universities both from business and scientific backgrounds, give them money and resources to develop their ideas. That's something that you can do. But I'm very skeptical about all this planned innovation process because the moment you have a crisis everything falls apart. Few years ago I participated with London School of Economics in an intellectual capital project. They were trying to foster these ideas and knowledge sharing. People from Poland were reluctant to use recorders for instance, they didn't want it. So, it's more a cultural issue. I don't know for instance how many new businesses can be created in Russia, how quickly it can be. If you open a new business and legal procedures take ages, forget about it. It's impossible, you have to make it simple and easy for the people.

What research and technological achievements can bring about a breakthrough in years to come?

Flexible and transparent electronics. Just to give you an example: the touchscreen properties that you have in your iPod are beginning to be transposed and moved into all sorts of different objects and devices. For instance, in future you will have a very thin film transistor on top of this table. And if I have my hands here I could hear some sensors that are monitoring my blood pressure. If this were a restaurant we could have a menu here and this would be screened. We are interacting with computers now mainly by means of keyboards but that is changing with telephones and iPods. In the future you will stop by a train station with a wall divided into small touchscreens: you will be able to check and send your emails there quickly, etc. I think that we are on the way of getting rid of keyboards. That is my guess. You can have a bigger screen than that one made out of plastic which is much cheaper, a screen that you will be able to carry in your case. All these I see as a major breakthrough.

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A Trade Delegation of Leading European Venture Capital Firms and Top Executives of Major International Technology Corporations to Russia

The European Venture Capital Industry and Global Innovation Partnerships (GIP) today announce a trade delegation of 25 leading European venture capital firms and top executives of major international technology corporations to Russia. They will participate in the Second International Trade Delegation on Global Innovation Partnerships in Moscow and Kazan, April 18–22.

The initiative will connect European and Russian investors and innovative businesses to discuss cooperation in the emerging high technology areas, such as cleantech, biotech, aviation and spacerelated technologies.

In Russia, the delegates will meet government officials, leaders of Russian business, hi-tech entrepreneurs, institutional investors and venture capital backers. After meeting in Moscow, the European VCs and business executives will visit Kazan, Tatarstan, a Russian fastgrowing region.

www.rusventure.ru

The 6th Kazan Venture Fair, April 22, 2011

April 22, 2011, the Sixth Kazan Venture Fair will be held in Kazan at "Korston". The Venture Fair is intended to draw the interests of both technological innovators and Private Equity and Venture Capital investors. It is a platform, where managements of small and medium size innovative companies present their businesses to prospective investors. The Fair gathers all interested parties: enterprises of innovative technological sphere, the Russian and foreign private investors, venture funds and private equity funds, banks and other investment institutions, as well as technological agents. As compared to traditional industrial exhibitions, presenting companies have an opportunity to attract and negotiate with investors. www.ivf.tatar.ru

A System that Now Disappears



Max Broadhurst — Head of Business Development, London Development Agency

What role does LDA play in innovation process?

From the perspective of London, we have been operating in three main areas. The first area was creating the culture of innovation and helping businesses to understand its importance. Second strand of the strategy involved knowledge transfers, helping SMEs (small and medium enterprises) to work with the knowledge base, working with universities and other higher education and research institutions, etc. Finally, the third strategic aim was to help SMEs innovate by providing the right tools and techniques to actually go and do it. The LDA's Innovation Strategy went from 2003 onwards.

How did you promote an innovation culture?

Back in 2003 we made a series of interventions to deliver on this objective including the creation of an innovation website portal. Unfortunately it doesn't exist now but it existed for about 4–5 years starting from 2004. If I was in business and wanted to understand what innovation was and what it could do for my business, the innovation portal provided the information where I could go to get help and advice in one accessible website location.

We also staged an annual innovation conference where we brought the strategic players, stakeholders and actors who engaged with businesses and delivered our programmes, as well as SMEs themselves. The latter could learn from people of very high profile, and also from people who were practitioners themselves. There were events workshops and parallel sessions too. Thirdly we used to publish a quarterly newsletter, a magazine that reinforced the message why innovation was good for business, what benefits it could bring, and had case studies and editorials.

Branding and marketing was quite important, and it was quite successfully engaging people in what innovation could do for them. In London in 2003 when I started at LDA the innovation landscape was fragmented: people knew about universities but they didn't know how to engage with them, few SMEs knew where to go for help and advice, everything was very messy. So, we started working on initiatives to develop the business culture, trying to create a business support landscape where people could navigate as well as understand benefits of innovation. Was LDA engaged in creating this infrastructure or you just let people know about the existing facilities?

The LDA is a strategic partner, and though we have contract managers we didn't engage traditionally with end beneficiaries, (SMEs). We normally had a third party in the middle delivering services. Private companies would bid for work to deliver. Sometimes we worked alongside them or we formed partnerships with private companies or public bodies.

The LDA is one of nine regional development agencies funded by the government. Their role is to bring about economic development by providing infrastructure, capital, skills, enterprise and environment. All these contribute to the economic agenda but the RDA network will actually cease in March 2012 with the budget cuts introduced by the government.

Where do the other eight RDAs operate?

One was in West Midlands, another in East Midlands, there is a North-East Development Agency, North-West, East of England, South-East and South-West. They are now being replaced by another body called Local Enterprise Partnership (LEP), but they are not going to have the same powers or budgets, so it's going to be a different way of promoting economic development. In the policy of business support and innovation a lot of things are going to be led in the future by national government and the LEPs, but there is a lot of work to be shut down and transfer to the new environment.

What was your average annual budget?

The LDA's budget reached about 400 million pounds at one point. Innovation budgets from 2003 to 2008 were some 15 million pounds a year. In 2008 the LDA changed the way of budgeting our programmes and it became a single pot of money worth about 45 million pounds for business support, and then we had another 45 million pounds for inward investment and promotional activities. So, in total terms it was about 90 million pounds per year for the years 2008 to 2010.

How was the efficiency of the Agency's work measured?

A number of reports may be found on the LDA website www.lda.gov.uk . It is an interesting question how to measure the efficiency because in the early reports it was more about impact of setting up interventions and delivering projects, but not so much about the evaluation. Now evaluation is important and the Agency summarises each project by measuring outcomes like jobs created, businesses created, GVA (growth value added) of investments and return on investments, etc. If we designed a project and someone was delivering it on our behalf, we would contractually say you have to deliver so many businesses and so many jobs in the lifetime of that project, and they were measured by our contract managers.

Do you have figures of how many jobs and businesses you have created?

Tens of thousands of jobs were created and businesses started. We had, for example, one project helping the manufacturing sector in London and we have been spending three million pounds a year on one point, and that year

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we have created perhaps nearly a thousand jobs. For the manufacturing sector in London which was quite small, rather a niche sector, it was an impressive return. London has a very high turnover rate, about 75 per cent of startup businesses normally fail here after three years. To start a business is quite easy, the trick is to grow it.

Unfortunately we have had a change of national government recently. Regional Development Agencies were a policy of the labour government. Now it's a different government and they want to do things differently, may be this is the reason why RDAs are to be stopped. There are a lot of quasi public sector organisations that the labour government developed and the new government wants to cut as they are too costly for the public purse.

How many people have been employed in the LDA?

At its peak in 2008 the LDA had 600 people. Now it only has 350, and after March 31, 2011 it will have 145 with the majority of these people engaged in just managing the closing down of projects across the Agency.

How does the legislation regulate the innovation process? Are you aware of the latest moves in this field? In the late 1990s and early 2000s the government was very keen on knowledge economy. A government department that looked after innovation and business has changed its name several times, now it is called BIS (Business, Innovation and Skills) Department, back then it was known as DTI (Department for Trade and Industry). The DTI published a number of "white papers", they called them "policy documents", about the importance of innovation and why the UK government needed to invest heavily in innovation and knowledge transfer to increase our competitiveness. The UK has always been renowned for its academic excellence and invention, the strategic goal was the commercialisation of these ideas and inventions. In 2003 there came a DTI innovation report which was setting this out, and later on there was a Lambert review about innovation and knowledge transfer, importance of academics working with business and business working with academics. Other innovation strategies and policies followed. After the DTI changed its name to

BERR (The Department for Business, Enterprise and Regulatory Reform) they published some further policy documents on innovation. Then the name was changed again to DIUS (The Department for Innovation, Universities and Skills), and they put out a policy paper on national innovation strategy called "Innovation Nation". Recently the latest version of this government department now known as BIS (The Department for Business, Innovation and Skills) set up a new Technology Strategy Board called TSB. It's an arm-length nongovernment department which has essentially taken the national lead for innovation.

So, there was quite a lot of policy documents which came from the UK government. They have identified certain nationally important sectors such as advanced manufacturing, design and high-skilled areas related to manufacturing, nanotechnology and biotechnology, electric vehicles, environmental technologies, health and healthcare, new materials. The RDAs and the RDA network have been seen as very important for turning this policy into reality. It was recently announced that the government will spend 200 million pounds over the next three to four years to develop a network of technology and innovation centres (TICs), and each one will focus on a particular sector. They were looking to start with creating a UK-wide centre of excellence in advanced manufacturing, and in next few months they will announce a competition for the next two or three, one probably being for environmental technology, another one might be in healthcare.

These new centres of excellence are supposed to be supervised from the very top. Is it considered more efficient?

That's a good question. Before 2000 the emphasis was on national approach to innovation and business support for the enterprises, and it demanded running the process from the top. Then it became clear that in order to do something bigger they had to move closer and that was why they created and developed Regional Development Agencies and promoted regional policies. However that cost a lot of money. I think crisis and huge budget deficit made them feel the best way they can maximise the little

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German – Russian Seminar: Opening of German / Russian Research Center for Integrative Biology and Computation (RCIBC)

Novosibirsk, Russia April 19–20, 2011

RCIBC was built on the long term cooperation in the frame of Russian / German Virtual Network in Bioinformatics and Computational Systems Biology. The network was founded 2005 and regularly organizes conferences and seminars concerning the actual problems of Computational Biology. Furthermore, it provided a convenient platform for initiation of joint investigations. Currently, several joint research projects supported by National Ministries of Science, FP7 are active. The mission of RCIBC will concern the facilitation of joint research projects in the fields of Bioinformatics and Systems Biology. At the seminar currently active joint projects will be presented and the perspectives of further collaboration will be discussed. The available mechanisms of support of joint investigations will also be presented.

www.pbiosoft.com

Mitra Innovations Participates in Economic Mission to Russia

Mitra Innovations participates in an Economic mission to Russia lead by His Royal Highness Prince Philippe of Belgium from 3 to 8 of April 2011. The Belgian delegation is going to visit Moscow and Saint Petersburg and have business meetings with several Russian companies.

Mitra Innovations' goal of the visit is to extend its reseller network and to investigate new business opportunities in telecom (both fixed and mobile). Another objective is to establish a base for partnership with banking institutions to give local partners an opportunity for project financing. Therefore, Mitra Innovations will sign a Memorandum of Understanding with one of Russia's leading banks.

www.mitra-innovations.com

money they have is now to turn back to a national co-ordination approach with local delivery mechanisms. Time will tell whether it is a good idea or not, but that is the way things currently are.

Suppose there was a new business created, do you or did you sponsor any research and development?

I'll answer this question in two parts. Now we don't support SMEs directly. But we did fund companies through grant funding to carry out research and development at various stages. Our support helped SMEs develop their ideas, conceptualise them and test them. We didn't fund basic research at universities because that was not our remit, but we would spend money to help companies to do R&D and we also invested money to create venture capital funds.

How many grants did you give out?

It would have been hundreds of grants ranging from 5 to 10 thousand pounds on proof of concept right the way through to grants of 100 to 200 thousand pounds for more development type of activity. Our venture capital funds invested up to half a million pounds in technology based business start-ups. So there was quite a spectrum of funds ranging from small grants, loans and equity to help businesses grow.

How much was an interest rate?

There is an EU law establishing the minimum end, I think it was 8 per cent, and we always tried to keep the percentage lowest whatever the legislation was, since the loans were mostly to disadvantaged companies owned from ethnic minorities, women or disabled because that was one of the agendas for LDA to target inequality.

Who would own the property rights for those new technologies and inventions?

In the case of a grant for R&D the LDA did not take any intellectual property or equity rights. In the loans we did not take anything either. In venture capital it was a revolving fund. We had a separate company to run our venture capital funds and that company would take a stake in the business, so if it wanted to liquidate or to buy out or hopefully to make money and release products, the idea was it cashes in its shares and then the

money goes back into the company to make more investments in SMEs.

In your opinion, how important is the government role compared to that of market forces in the innovation process?

I think it's a very interesting question especially now that money is very tight and the government decided that it wants to see the private sector more influential and taking more of a lead role in helping other companies to innovate and grow - partly because the government does not have money to do that itself. If I look back over the last ten years the government has acted as a catalyst and created the environment for innovation to flourish. Obviously money has helped this process along. The government's role now is even more critical to ensure that conditions are still there for businesses to grow. What is very important is that in any intervention which the government does it has to step in where there is a market failure, where there is a need for public money. If there is a market, a real market, the private sector should be there and the government shouldn't be.

What helps and what hinders development of the innovation system in the UK?

I think what helps is clearly the right type of government policies and drivers and support. What also helps are really good examples of companies that have innovated as case studies, and then getting that message to individual SMEs. A problem that we have found with conferences was that after SMEs hear lot of stories from high-profiled entrepreneur and then go back home to their businesses they often don't know what to do with this information. So, what we were trying to do with all these conferences was to move away from just bringing people and telling them it's great to innovate, but showing them examples how to use tools and techniques, giving them confidence to go back to their businesses and do it themselves. Right balance is quite important, creating environment is important. Also the language of innovation has been baffling to some SMEs, you got to demystify it. to use simple words, saying if you want to grow your business into this new market, to sell more products or processes or services, this is how you can do it, this is innovation.

INNONEWS

Russia Startup Weekend

April 8–10, 2011 Startup Weekend will take place at Yekaterinburg (Urals). Startup Weekends are weekendlong, hands-on experiences where entrepreneurs and aspiring entrepreneurs can find out if startup ideas are viable. On average, half of Startup Weekend's attendees have technical backgrounds, the other half have business backgrounds.

Attendees bring their best ideas and inspire others to join their team. Over Saturday and Sunday teams focus on customer development, validating their ideas, practicing LEAN Startup Methodologies and building a minimal viable product. On Sunday evening teams demo their prototypes and receive valuable feedback from a panel of experts

www.russia.startupweekend.org

TEKES – FASIE: Russian-Finnish Call for Joint Innovation Projects

The Russian Foundation for Assistance to Small Innovative Enterprises and Tekes – the Finnish Funding Agency for Technology and Innovation announce the Call for joint innovation projects for Russian and Finnish SMEs. The proposals should include development of new products and technologies (in any sector) and demonstrate the innovation aspects and commercialisation potential.

A consortium must include at least two partners: one Russian small innovative company and one Finnish SME. Other organisations like Universities or R&D institutes are eligible only as subcontractors, additionally to the basic consortium.

The Call is open till May10, 2011. Eligible duration of projects: 18–24 months. Tekes will reimburse 50% of project costs to Finnish companies, max. 200 000 Euro. FASIE will reimburse 50% of project costs to Russian companies, max. 6 million rubles. The terms of funding in each country are subject to respective national procedures.

www.tekes.fi

When you provide advice to these companies how much do they pay for it?

In the early 2000s when there was lot of money advice was free. Over the last few years we instigated models where one has to pay a contribution, a small one just enough to motivate them. But I think now with public sector financial support dropping, new models of support are being developed where SMEs will need to contribute more.

Are there any governmentally funded agencies where these companies can go to buy advice?

It still exists now though it will change in November 2011, something called "Business Link", a national business advice service. At the moment you can ring up and get advice on the phone, or you can ring up and go and see someone face to face in an office, or you can get access in internet. In November this year as part of a new government strategy they will scale back this service, so it will become more webbased service with a national contact centre: if you are looking for something on the web and feel unsure about something you can ring someone up and they will advise you with the web in front of you. Yet there will be no one to one face to face advice because it is too expensive.

So, in the new world you will have the Business Link service and a focused suite of business support products including TICs. It is a very different picture going forward from what has been in the past. However, if you want a grant for research and development it will still exist, and will be available through the Technology Strategy Board.

How many centres of excellence are to be created?

They are talking between eight and ten in total, each one of them being a different sector, but they haven't decided yet what the remaining sectors would be, they will decide in the next few months.

And how much money will be allocated for that?

Over a three to four year period there will be 200 million pounds.

Can you dwell upon most advanced innovation parks in the UK?

Those parks are part of RDAs legacy, a lot of RDAs invested in science and technology parks, obviously Oxford, Cambridge, West Midlands, North England. In London we never created a proper science park. There actually was one in Northern London but it was not successful, it was a space in the middle of nowhere, next to M25 motorway with no universities nearby, no infrastructure. What the LDA did instead was identify certain issues and barriers in certain sectors, for example, for the biotechnology sector in London. One of the big issues was space because when you start a business in three years there is no place to grow in London, you have to move to Oxford, or Cambridge, or Manchester, or up North, because they have more space and they may handle big companies. So what the LDA did was invest with universities to create a web-club space to grow on, so that we could try and retain in London some of the new companies that have developed here. The approach was quite successful.

What is your forecast for the development of the innovation system in the UK?

As I said the current policy is very limited which is a great shame, if you look at what has been proposed, it is very limited and it will give a very limited impact. However, at the same time there is opportunity. We have to think differently because the government no more has big pots of money to do different things. What government can do is influence and insure that there is deregulation, not overregulation for business growth, creating an environment. And the things really need to be done are about partnership and leveraging: finding people who do have money and prepared to invest, and leveraging different partners and different stakeholders to come together, be more collaborative, create and foster conditions to help companies innovate more. I think it might be a more commercial focus on doing more with less. Otherwise if you cannot think creatively you will not be able to do anything,

A tendency of big companies to transfer their manufacturing enterprises to developing countries, how would it influence the innovation process in the UK?

Yes we have Pfizer, a big company in South East and they are going to stop their research and development facility, 2500 people will lose jobs in the local area. The suggestion is that whereas big pharmaceutical companies are retracting and find a source of cheaper labour smaller biotechnology firms should be able to come to their places because the workforce is highly skilled and there are opportunities for growth. The government could perhaps increase tax credits to help these small biotechnology firms to invest more in R&D, bringing alongside projects and programmes to help keep skills of these people or to upskill people. Yesterday we have seen government announcement about apprenticeships to go to industries and learn trades.

How does the tax credit system you have mentioned work?

Whether there is a big company or small company, the tax credit applies. For instance, Nissan, a car company invested heavily in R&D at their facility in the UK and the government gave them a tax break for that. It is a real tax break and companies big and small who want invest in R&D may then effectively claim some money back from the taxman. I think the government also is looking at bringing in some legislation on patents to make it easier as well for entrepreneurs to patent across Europe and the UK and offering some assistance in that as well.

How much time it takes to patent?

May take months depending on that you are doing. It varies, it can be much longer – twelve months plus.

What research or technological developments can assure technological breakthrough in the years to come?

I would name service industry; lot of innovation is being done in service and finance sector. In London a lot of work goes on electric vehicles and environmental technologies, around renewables and retrofitting – that is looking at the old buildings that are not very efficient and determining how we can use new technologies to improve the environmental performance without building new ones. In London especially East London especially with the Olympics a lot of work is being done around regeneration including implementing new environmental technologies and waste recycling.

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