

**new** statesman



# Innovative Britain



**Special  
Supplement**

## Introduction

Making Britain a centre for innovation and new technology has been a long-standing concern for the business community. The benefits are clear: exciting jobs and economic growth.

But despite the fact that we have a strong science base and world-leading creative industries to build on, science and technology are widely portrayed as dull and difficult to learn. If Britain is to create excitement about the acquisition of new scientific knowledge and the process of turning ideas into new products and businesses, that attitude has to change.

On 21 December, the *New Statesman* and Pfizer jointly hosted a round-table discussion where participants from the public and private sectors attempted to identify the main obstacles to creating a more innovative Britain.

**Does the UK education system sufficiently encourage innovation? Cast your vote at [www.policyforum.co.uk](http://www.policyforum.co.uk)**

## Participants



**George Cox**  
Chairman,  
Design Council



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Associate director,  
Arup



**Eliot Forster**  
Vice president (development),  
Pfizer Global Research and Development



**Claire Fox**  
Director,  
Institute of Ideas



**Wendy Hall**  
Professor of computer science,  
University of Southampton



**Anya Hindmarsh**  
World famous designer of bags



**Andrew Jack**  
Pharmaceutical correspondent,  
*Financial Times*



**Digby Jones**  
Director,  
CBI



**Jude Kelly**  
Chair, Culture, Ceremonies and Education, The  
London Organising Committee of the Olympic Games



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Chief executive, National Endowment for Science,  
Technology and the Arts



**Ian Livingstone**  
Product acquisition director,  
Eidos



**Vivienne Parry**  
Writer and broadcaster;  
former presenter of *Tomorrow's World*



**Chris Powell (chair)**  
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Technology and the Arts



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# Driving innovation forward



**Chris Powell (chair)** We are here to discuss the main obstacles to creating a more innovative Britain. We need to cover the science base, education, skills, university spin-outs, research and development (R&D), innovative business start-ups, social innovations, cultural innovations, the cross-fertilisation of science, technology and the arts and the role of the creative industries.

I thought that the best place to start was the science base, and the best person to start us on that is David.

**David Sainsbury** Britain is actually rather good at both science and innovation. With one per cent of the world's population, we fund nearly five per cent of the world's science, produce 11 per cent of the world's scientific papers and get 12 per cent of the scientific citations, including 13 per cent of the most cited.

In recent years, we have become much better at transferring knowledge from the science base. In the last two

years, 20 spin-out companies from our science base floated on the Stock Exchange. The total market value of those is £1 billion. We have a number of world-leading industries in innovation, namely aerospace and pharmaceutical (15 drugs out of the top 75 drugs across the world were designed in this country), and in the emerging sector we have areas such as biotech, motor sport, nano-technology and computer games.

I think the barriers are about scale, whether we are doing enough quickly enough; and that we are poor at the critical technician level of skills.

**Emily Shuckburgh** I agree that there has been significant improvement over the last ten years in knowledge transfer from universities out into industry and vice versa. But the way universities are organised is a barrier.

The career structure for a typical academic does not reward being more outward facing. ►

► **Wendy Hall** On the Council for Science and Technology, we are beginning to look at how we fund research and the way that the universities are structured. Innovation will increasingly happen at the interface between disciplines. The way we are funded and assessed is very discipline focused.

**Chris Powell** That is one thing that the National Endowment for Science, Technology and the Arts (NESTA) is charged with. We are trying to offer grants to scientists to spread out from science, but it is very difficult because of their career structure.

**Wendy Hall** Academics are required to produce well-respected papers in fantastically well-respected journals, and all that is discipline focused.

**Vivienne Parry** The European Science Foundation has just produced a report on nano-medicine which shows that, despite the fact that it was here in Britain that lycro-zomes, the delivery vehicle for those potential new medicines, were invented, all the commercialisation of nano-medicines is essentially going on in the US. In Britain, I think we are risk averse to taking big leaps into commercialisation.

**Wendy Hall** Perhaps we are risk averse but perhaps we also lack ability. Perhaps, also, some academics do not want to be "tainted" by commerce. The arts are seen as creative, marvellous, free and liberated, but science is somehow perceived to be involved in big business and there is a big swell of anti-globalisation feeling.

**David Sainsbury** You could have made these arguments five years ago but over the last two years there have been 20 spin-off companies from universities with intellectual property owners (IPOs), at a level of £1 billion capitalisa-



tion. This does not suggest that people are risk averse these days.

**Jo da Silva** Innovation does happen at the interface between disciplines, but it also happens at the interface between different sectors, such as academia and the commercial world. At Arup, we have made some interesting cultural exchanges by seconding people from Cambridge University into the organisation to actually get research embedded. The academic structure is very

hierarchical and you progress up it, whereas if you work for a commercial organisation, you tend to progress upwards, sideways and diagonally, according to your own individual flair.

Organisations such as the Royal Academy sponsor a number of professorships at universities but, at the middle management level, there is no means for people to take up part-time positions in universities or for people in universities to take up part-time positions in industry.

**Elliot Forster** Certainly, the size of awards in science and medicine has dropped proportionately with time, but I think that that is a reflection of the growth in other countries.

With regard to these companies that are launching themselves through IPO's, one needs to bear in mind the life-cycle of the development of products; pharmaceuticals can take ten years or more. So how do we sustain these companies for a long enough period for them to bring a new product to the market, before they are snapped up by foreign companies? Our real challenge is to enable them to fulfil their full product life cycle.

**Andrew Jack** If we are talking about financial services, in advertising and marketing we can argue that the UK is still doing a very impressive job in terms of innovation. Clearly this sector has very high salaries and a free market

in terms of pricing goods and services. But if we are talking about healthcare and drugs, the market is much more controlled, with no free determination of prices and heavy cost constraints on the NHS as the main procurer. This clearly has a long-term effect on where companies and researchers put their focus. The IPOs of the past two years are a reflection of what was being developed five or ten years ago. Where new drugs, devices or other areas in healthcare are being developed, I think that the reason there is still a significant proportion in the UK is a lot to do with inertia and the historical base of academic centres and commercial research. Someone told me yesterday that the trend over the next five or ten years will see India and China dominate.

An Indian drug company recently told me that they bought a UK company and when they came to look at its laboratories they were appalled. They were 30-year-old facilities with outdated equipment compared to their recently completed state-of-the-art facilities. When the new British colleagues were taken to Mumbai, they were astounded.

**Chris Powell** The perceived wisdom has always been that we are very talented at having ideas in science but we are

useless at commercialising those ideas. Often the UK is an unsuitably sized market for the mass production of those ideas. However, I believe that all the production in this area is in the Far East because of the cost of labour. However, that may not matter because we can charge a considerable premium for the innovative leading edge.

**Eliot Forster** I operate in India and China. In Mumbai the guys constructing new buildings, office blocks and laboratories think “supply chain”. They run universities as well and they talk to western companies about what it is that they need, not just in terms of facilities but in terms of staff and how they will be able to operate for us in the future. We need to continue to work on that and drive that home in order to keep our advantage.

I was at breakfast with Richard Sykes the other week, and one of the things he pointed out was the spread, which he said was now a thin veneer, of science education. Opportunities for laboratory-based training are declining, so we have imbalance beginning to occur.

**Ian Livingstone** Computer games have gone largely unnoticed in the UK. I have been in this industry for 30

years and it is regarded as a joke, despite the fact that we are very good at it and it adds £2 billion a year to UK plc. We have produced some of the most famous games ever created; Grand Theft Auto and Lara Croft have been world-beaters everywhere. Protecting intellectual property (IP) is going to be key to the growth of wealth of this country. For example, Alan Greenspan stated quite recently that it is the migration from physical property to intellectual property that drives sustainable growth as we start to rent content rather than own content. It does not matter if we outsource art to China as long as the IP resides here. We have to make sure that all the long-term profit comes back into this country. China has got manufacturing. One day they will legitimise their own economy with IP ownership and recognise our IP and then they will come and buy our brands. If we make them cheap, we are going to end up with more BMW Minis.

**George Cox** The idea of our future being in premium businesses and the premium end of the market is a lovely concept. The impressive thing about countries like China, and it is by no means alone, is the build-up of a high level of skills, research capability, hi-tech industries

and an indigenous design capability. There is nothing that is ours by right that the world will always come to us for. I think it is imperative that we do move in this area.

Our scientific research is tremendous compared with other countries of our size. Our creative industries are outstanding. With architecture and fashion, we are still in a very strong position. But how do we exploit those skills? It is down to attitudes, behaviours, understanding and some of it is structural and aspirational.

One of the things that concerns me is that there are plenty of examples of start-ups but we do not continue growing. The first commercial computer in the world came from this country but where are our Googles, Microsofts, Apples, Dells? We run out of steam with our start-up companies. I did it myself. I sold the company a year or so after flotation.

**Ian Livingstone** What we have to do within business is to focus on changing these aspects. We have to encourage more R&D and try to get more businesses to understand what can be achieved. Every business needs to innovate. The facilities are there if you take advantage of them. I am concerned about the compartmentalisation ►

## Protecting intellectual property is going to be key to the growth of wealth in this country



► of higher education. At the age of 15 you get divided. If you are creative, you go into the arts and humanities and the rest of us go into science or engineering. It is ridiculous to believe that creativity belongs in the former, not the latter.

**George Cox** We take people through an engineering degree without an understanding of design in other areas. We produce people through our art colleges with, by and large, no contact with other fields. The same applies to business and science.

Government should be a real force for demanding innovation. If we were very demanding about what we wanted in these areas, the industries would grow. That is the way we built our creative industries. We did not build great industries serving nothing. We got into fashion design because we produced clothes. The government could be a great force for this if it was less risk averse and hidebound in procurement.

**Chris Powell** David, the Treasury has always resisted public sector procurement, has it not?

**David Sainsbury** No, that is no longer true. A major part of the innovation report produced in December 2003, was the role that public procurement can play in innovation. The mantra of the Treasury is always value for money. The Treasury accepts now that standard procurement, where you take an out-of-date specification, put it out to tender and take the lowest cost tender, won't necessarily give you value for money. The problem is business transformation and how you get that message across Whitehall departments.

Through the Technology Strategy Board, we are setting up innovation platforms, where we take a group of people involved in both the government department and business to drive technology forward. We are starting with one on intelligent transport and another on security of computer networks. It is a question of how you deliver this in all the purchasing decisions surrounding government.

**Claire Fox** We live in an incredibly cautious age in relation to science and scientific experimentation. You cannot experiment without considering the consequences, which I think is quite damaging and puts the brake on innovation. If you look at the debate around how we can change science education, particularly for those aged 14 and over,

it seems what we are going to be doing is teaching them ethics, rather than science. We have got everybody sitting round discussing MMR and the threat of mobile phone technology. These public policy interventions go against the rhetoric we need to be innovative.

There is intense suspicion in relation to corporations, but corporations are where some of the most exciting science is happening. This perception needs to be tackled. I know it is often perceived that all the scientists have to go off and learn to communicate but society is generally nervous about science; it wastes a lot of time.

I think it was actually loss of nerve from government that stopped the development of GM. If you do a public consultation, what are you doing that for? Someone needs to be out there to fight for this amazing technology in a leadership capacity, but it was thrown out, allegedly, to the public and the government said, "Oh, God. They don't like it so we won't do it".

**Andrew Jack** In the US, the National Institute of Health spends \$30 billion a year on research in healthcare. It is a huge driving factor for innovation in the US. In the UK, the Treasury still has a very narrow focus on value for money and not on the broader economic implications of health outcomes. Let's work back from that rather than focusing on how we can meet short-term management targets and not exceed budgets for the year.

**George Cox** Yes, I have a good example of that from a design company that looked at hospital beds. They designed a bed area in which patients could sit themselves up, get themselves up, get themselves a drink of water and turn on the television. Those are all things for which many patients would have to press a button and call the nurse.

But when they tried to sell the concept, take the idea along to a health trust, the trust said, "We'll put you in touch with the man who buys beds". When they described the concept to him, he said, "Well, that's very impressive. How much is it?". They said, "About £4,000." He then said, "Oh no. I buy beds for £800 to £900."

When you point out that it's not just an issue of the cost of the bed but also of occupancy rates, that it gets the patients out of hospital much quicker and it makes the patients' lives much better, the response is, "I buy beds and I have a budget to work to". That is what you are up against.

## We live in an incredibly cautious age in relation to science and scientific experimentation



It requires the involvement of people like the National Audit Office and the Audit Commission. Caution is structurally reinforced: “If I buy it and it goes wrong, I will have everyone around my ears”. The media promotes a “heads must roll for this problem” type of attitude.

If you want to change the people going into science and technology or taking risk and innovating, the media could be terrifically influential. We had a campaign some years ago, which is still running, on getting young people to recognise the value of enterprise. Research showed us that it is down to things like TV soaps. In soaps, every businessman you see is dodgy. I think programmes like *Dragons’ Den* and *The Apprentice* are making business exciting and relevant to young people. So the media has a role in changing attitudes towards science and innovation.

**Vivienne Parry** To me, scientists are incredibly creative. Yet science in schools is not the box of delights that I thought it was, but a box of broccoli that you must have because it is good for you. People teaching science need to ensure people realise the creative qualities that are

required to be good at it, so that people can then aspire to it, rather than feel bludgeoned into it.

**Jonathan Kestenbaum** I am reminded of Richard Sykes’ conversation at the breakfast that was mentioned, where he said that his enthusiasm for science at the age of 15 was driven by the belief – taught at school – that he had the capacity to blow up his own kitchen if he applied his mind to it. What we discovered in our own *Real Science* report was the absence of experimentation in science in schools.

I do not know if you have been following the series on the *Today* programme about who really runs Britain but the answer was very clear: Britain is run by health and safety. And health and safety has removed experimentation from science in schools.

**Vivienne Parry** And where are the chemistry sets? On Christmas afternoon, you used to mix as much as you possibly could in one vessel to get the biggest bang you could from your new chemistry set. ▶

► **Jo da Silva** I have a lot of public sector clients. With every job we win, we push innovation and, in the changes that government is trying to make in education and health, it has been driven by the consultants. But the people we are interfacing with in the Department of Health and the Department for Education and Skills do not have the same aspirational levels. We are continually tripped up by obstacle after obstacle because the focus is on the bottom line and short-term initial capital costs, not long-term value.

The business of risk is very real. We have an innovation forum and had a huge discussion on what is stopping us doing innovation. What came out of it was that risk management has taken over. Every building and engineering project we design is a collaboration with clients. We have to persuade them to take the innovative journey and we have to couch that in terms of risk mitigation. We are going for innovation because we are mitigating their long-term risk, the increase in energy prices or whatever.

Also, there are side swipes all the time about scientists and engineers being anoraks. I think today's young engineers and scientists would be deeply offended at that prejudice.

The division between science and arts is a problem. As an engineer, I am a designer. I am a creative person. I do not believe that the process I go through in terms of identifying and solving problems, and then pushing ideas through to their successful implementation, is any different to the process that Anya goes through in creating wonderful bags. But that process does not exist in the school curriculum. Creative design should embrace engineering. I became an engineer because I loved designing clothes. I loved making things and I happened to be very good at maths. People say, "Oh, you are an engineer. Did you like taking your father's car apart when you were small?" But engineering is not about taking things apart. It is about creating things.

**Emily Shuckburgh** There is a very unfortunate stereotype of scientists as being geeks who are not creative. Being creative is fundamentally important for a research scientist. Addressing that stereotype in education and more broadly in society is incredibly important.

Many people have been suggesting that the UK is too risk averse but I think it is important not to make broad statements like that. Spin-out companies are places where you can have disruptive innovation, whereas you would not want to have that same risk threshold in, perhaps, a

larger organisation like Pfizer. Pfizer might want to develop innovation networks.

**Claire Fox** More real science and experimental science is a good thing in the class room, but I have some nervousness about the idea that you have to be blowing up the chemistry lab in order for science to be exciting. Official literature presents the idea of an abstract challenging and difficult concept as dull. Somehow "hands on, making it fizz" is exciting, but "difficult, challenging and an abstract concept" puts everyone off.

I think there is a danger of patronising people but also of doing them a disservice. If anybody has ever taught teenagers they will know that teenagers often say things are dull. You have to reply, "It might appear to be dull now but it won't be after I have taught you", rather than say, "They say it is dull so we need to sex it up". We're in danger of losing our nerve and being dictated to by them.

Only this morning on the *Today* programme it was argued that scientists should be taught at university to

consider what the consequences of their science will be. In citizenship lessons in schools, students discuss all the things that scientists have done that are terrible and not trustworthy. So how can they then go into a

science lesson and be enthusiastic. There is a cultural clash we have to attend to.

**Chris Powell** Anya, can anything be done in education to make people think both creatively and innovatively?

**Anya Hindmarsh** I get very frustrated with schools, universities and fashion colleges because there is very little commercial education in the courses at all. It is all very free and very artistic. Most of the people I interview cannot type and have no idea about the critical paths and the supply chain. They spend three years, often longer, and come out ill-educated. There should be work experience put into the course or the long holidays, perhaps some sort of apprenticeship programme.

Manufacturing is obviously a very big issue in fashion. Sadly, we are giving up on England more and more. The DTI was trying to encourage me to manufacture here but we could not be competitive in so many ways if we do. That is the reality that we have accepted. I think that does not mean that we will be any less successful in the UK.

## The division between science and arts is a problem. As an engineer, I am a designer, a creative person



However, when you start a business, things such as meeting minimums, sourcing and understanding should be more supported. Perhaps there should be some sort of mentoring system for taking great ideas through to a successful commercial venture. Some of the professors who I have met in the colleges are brilliant but unfortunately many of them are just failed business people.

Of course, there is a whole side of fashion that is art, perhaps less commercially driven and rightly so. Equally, there is art that does translate into large portions of revenue for the country so it needs to be treated as a business and not mentored by failed entrepreneurs.

Financial aid is vital in encouraging great ideas, but 99.9 per cent of banks won't give it, unless you are very talented, have some help in another direction, or have someone looking out for you.



**Jude Kelly** My daughter had her first poetry book published when she was 15. But she gave up English literature because of the way it was taught. She felt she was compelled to answer the questions in the way that she was told to do so, that she would not pass the exam if she were too imaginative. The push to get grades of a particular kind in order for the school to sustain its position in the league tables was genuinely affecting the ability of the classroom to be creative. Children can become cynical as to what an education is for. The role models that the children are being presented with are giving double messages.

While we keep that cycle going, I think children are beginning to feel that they would not look to school for an education in terms of creativity. That is separate from the fact that there are pools of wonderfully creative activity going on in the best schools.

**Andrew Jack** We need to find ways to use the arts and humanities to inspire greater interest in science. In lectures on biology, for example, John Oxford uses works of art and paintings to talk about historical context and so on.

I think ethics is well taught, actually. It does not just say

that scientists created the H-bomb and this is bad, but it talks about choices and how science can progress things.

Another area that stimulates a lot of young people is global warming. You could stimulate a new generation of people who are interested in measuring and using science for the good of humanity. We need much more overlap in the curricula to allow those interfaces.

**Ian Livingstone** Kids should be learning about science, computer science, building, art, architecture, animation and all of those things without even realising that they are doing it because it is great fun. But we do not teach fun any more, we teach boring stuff.

**David Sainsbury** There is a very interesting issue here about how you get kids excited by science. One school of thought says that you put science within its social and ethical context so that you are looking at how science impacts on society and so on. The other is that you take ideas of science and make them exciting through demonstration and experiments, blowing things up, for example. I rather strongly believe that the second approach is the right way because I have often asked scientists, "How did you get ►



►interested in science?”, and they have never said “Because of the ethical issues”, or “Because I wanted to solve this problem”. They all say, “Because we grew crystals in class and it was exciting”, or “I collected butterflies”, or “I built a radio”.

The fall in demonstrations and experiments is not just to do with health and safety. It has to do with things like school discipline as well. Large classes that are not very well disciplined do not give children the opportunity to start trying things out.

**Emily Shuckburgh** You need diversity of purpose among scientists. If you select only those people who are excited by a big explosion, it would be unfortunate. Excitement comes from being involved in a big explosion and being engaged by the social purposes of your work.

**Jo da Silva** Cambridge’s engineering department used to be based on hard science and mathematics but, over the years, it has evolved and there is much more environmental engineering and sustainable development in the

course. People read engineering because they want to be research scientists and technologists or because they are fascinated by global warming or climate change and they want to go into it for social reasons. That is echoed in every university throughout the country. People are getting into engineering precisely because it is anoraks and technology. They see it as a bigger purpose, where they can create change.

**Vivienne Parry** The exam system makes creativity in science very difficult. If you do a school project, it is better for you to do a project that the teachers know is going to be graded and marked in a particular way, rather than something more creative that may impact on the marks and affect the school’s position in the league tables.

**Jude Kelly** I think the main problem is that if you are corraling children to learn in one direction, it is the opposite of individual creative learning. I do not know how children will get a love of science until you suggest that each child will love it slightly differently.

**Chris Powell** A big part of innovation must be new business formation and taking new ideas to market. One of the old debates is whether failure is a lack of capital or lack of good ideas.

**Jonathan Kestenbaum** I learned in my previous career in venture capital that you cannot view finance in isolation. It tends to be seen in a context of bursts of innovation taking place within an ecology within one kind of system. The most innovative environments are places where the ecology is in some kind of alignment. You see it in Israel, Ireland and, to a lesser extent, in Korea. Finance is not just poured in out of context.

Entrepreneurship has much less to do with an aspiration for being in a corporate environment and much more to do with that sense of excitement and wonder that young people have. They are full of ideas and they want to find a workplace in which they can implement those ideas.

Finance needs that kind of cultural backdrop in which to take root. We see that on the west coast of the US where every second person is leaving school, college or university looking to finance an idea.

You also need to create strong networks and strong clusters where there is secret capital, the supplier of capital, the role model who has done it before. When the inter-disciplinary phenomenon comes together, you have a much richer environment for finance to take route.

There is no shortage of investment capital in this country. But we have considerably less risk capital. The traditional sources of risk capital were the venture capital funds. Venture capital funds are now huge. They will not foster or encourage early stage risk investment in this country. So you need a different type of capital – diverse pools of capital, that are not tyrannised by short-term return. You need very creative partnerships between publicly endowed capital, public capital and early stage angel investors. Investment capital will not foster the type of innovation we are talking about here.

Commercialisation is also crucial. I think the journey is from the creative spark through to the application of that idea, through to the exploitation of commercialisation of that idea. From a business perspective, you need different types of people associated with different parts of that journey. Venture financing is at its most potent where a product is developed in the context of a very rich team that is able to incorporate and absorb the creative genius, together with the applicator of that idea, where the team is mature enough to understand that the creator of the idea is not going to be the commercialiser of that idea.

**Chris Powell** But the rate of new business formation in the UK is about half of that in the US pro rata.

**Jonathan Kestenbaum** And it is even less than some of our Asian competitors.

**Wendy Hall** With regard to academics being in one pot and people who run businesses being in another, I am on my fourth start-up and I have not yet made any money. This time I am in a team that knows how to do it, so I might. I am learning from them but it is very hard to teach entrepreneurship. I am an engineer and technologist. I can see technology coming down the line and what impact it will have. I do not think enough people like me are involved in the venture capital companies, sitting on the boards of big and small companies. Most academics are not interested in making money. That is why they are academics.

**Chris Powell** University finance is much less academically driven and much more commercially driven than it used to be. Commercial people are coming in to see what looks commercially viable in there, which seems to me to be a very welcome way of doing it.

**Emily Shuckburgh** David was saying that there had been some huge success stories of spin-out companies doing very well but we need to be addressing those stories that have not been so successful. Are there specific structures that we could put in place to try to get those companies to do more than be just a cottage industry for academic scientists, for example?

There has been a lot of emphasis over the past few years on knowledge-transfer activities within universities but you sometimes get the feeling that what results is two wheels turning without any teeth on them.

There needs to be a few key individuals who have knowledge of both academia and the business world, to act as translators between environments. Where those people exist they are often either failed business people or failed academics.

**Eliot Forster** I would fully endorse Emily's point that interaction is critical. The piece that is in part missing from the capital discussion is the business-to-business capital. If you look across research and development in the UK, pharmaceuticals, information technology and other creative media companies are actually driving capital into smaller ventures. We mustn't lose sight of the creative, innovative and distributive steps that also occur, driven through capital fund, the business-to-business capital. ►

► **David Sainsbury** We are falling into the traditional British pose of comparing our performance with the US on all these indices. British universities are not like MIT but MIT is not a typical US university either. We have had some failures of spin-out companies. But that is the nature of spin-out companies; that is what risk taking is about. European countries say the UK is doing pretty well. We have learned a lot from the US and we are applying that knowledge.

We have to be realistic about China and India. Of course, China and India are going to be big competitors in the future but we need to look carefully at the level of their science and technology and entrepreneurial businesses.

Chinese growth is driven by low wages, a lot of foreign direct investment and imported technology. They are bringing back their scientists from the US, where they have been trained, and they will be rigorously selective in setting up their top universities.

If you are rigorously selective with a population of 1.25 billion, it is not difficult to produce some world class scientists, but that is still quite largely in the future. We should be a bit careful about overestimating where they are today.

The situation in India is much the same. When you are a poor country and you put market disciplines in and you have a reasonably well-educated population, the striking feature is how fast you can grow. The US is the most entrepreneurial country, but they would also be worried about whether their workforce is now as hardworking, say, as Chinese people are.

**Eliot Forster** Rural inhabitants in China and India can work in Shanghai or Mumbai for four or five years and earn enough money in a western investment company to then go back to their community and set themselves up for the rest of their lives. So, of course, people are going to be working very hard in that context.

**Wendy Hall** About 95 per cent of our PhD students in the UK come from overseas, mainly from the Far East and India. We do not encourage them to stay for all sorts of reasons. I know the government is looking at this problem. Five years ago they would have been clamouring to stay but now they are very happy to go back because there are incentives for them to build a business or become a very senior person in a Chinese university that is having huge

investment poured into it. We are losing out. That is going to hit us big time in a few years.

**David Sainsbury** In engineering, science and technology about 39 per cent of PhD students come from overseas. I think we have to be much more prepared to say, "Come and do your PhD here and then, subsequently, we would love you to come and work here".

**Jonathan Kestenbaum** I think there are probably three characteristics required for innovation to work.

The first, and I cannot stress this enough, is the well-integrated team that has already been spoken about.

Second, is keeping very market focused while developing the product or the idea, always talking to customers.

Third, is the level of ambition that will transform innovation, a cottage industry, lifestyle or however you want to describe it?

**Anya Hindmarsh** I think that innovators breed innovators and successful people breed successful people. Giving people a mentor would inspire them more than a formal education.

## Innovators breed innovators. A mentor would inspire people more than a formal education

**Jude Kelly** People do things beyond logic and not usually for money but for belief systems and values. I suggest that some of the force coming out of India

and China is because people long to build up their countries and communities, their sense of purpose and worth. People form clusters with other people who have those same belief systems. I am involved in the Olympics and amazing energy has been unleashed, and that can take a nation forward psychologically.

The people who are gathering around the climate change discussion are coming from many walks of life and they are going to create a big powerful energy.

Universities are no longer the most exciting places to be if you have a creative mind and so there is not, at the moment, a sense that the country is creating situations for creative people to work together in clusters on behalf of both their ideas and the nation.

**Claire Fox** The Chinese have an incredible sense of enthusiasm about economic growth and about the possibilities of economic growth. They have a great sense of ambition in the world and it is there for the taking.

I do a lot of talks with sixth formers and undergraduates.

There is actually a lot of palpable hostility to economic growth. Economic growth is blamed for a lot of the problems of society. I am enthusiastic about development and economic growth but it is certainly a minority sport these days in the cultural and political sense.

I think that we are very ambivalent about what economic growth can mean, and I think that this is the sort of discussion that we should be opening up. Young people, particularly, express a kind of guilt about wealth and consumption as though somehow these things are leading to the problems of the world.



**Chris Powell** We haven't really touched on R&D. I was going to ask Eliot to speak on this. Was there not a McKinley paper that demonstrated that most of the advances of health in the UK can be attributed to the private sector?

**Eliot Forster** Certainly, 90 per cent of all medicines available to us today, whether they be branded or generic, have come from private industry. But it would be churlish to suggest that it is only from private industry because we have partnerships with academics in order to do our drug development process. We work with physicians not just in the UK but around the world.

There was a fabulous article in the *Daily Telegraph* this morning about a new CT scanner that is coming out. The ability to see organs individually has not been developed in an academic institution; it has been developed in the private sector. We ignore R&D in private industry at our peril. We need to look again at its value to the supply chain and begin to understand what the pool for R&D and innovation is in that context.

**Chris Powell** Digby, there are patches in the UK that are competitively very strong in pharmaceuticals and defence in R&D but in other areas, particularly in manufacturing, we are quite weak, are we not?

**Digby Jones** About 70 per cent of R&D carried out in this country is done by about nine companies. It is quite

staggering. It is not much different in France and Germany. The US is much better at it.

One of the issues we have in stimulating R&D in this country and increasingly in the developing world, is counterfeiting. If, as a smaller business in Britain, you have been innovative and developed something, you don't want to flog it in China because you will find that within ten minutes they are nicking it. The Chinese government will tell you that it has joined the WTO and brought all of the anti-counterfeiting legislation into its national law, but it is not going to prosecute.

China is going to carry on being the factory of the world for other people's ideas for the next five generations.

The other problem with R&D in this country is the appalling link between teaching and manufacturing in our schools. Too many teachers still see manufacturing as dirty and horrible. I do not blame them, either. If you open a newspaper and see a merchant banker has got a £1 million bonus and you also see that 600 jobs are lost at LDV in Birmingham, why would you go into manufacturing?

There are currently six sectors in which this country is either number one or number two in the world. They are pharmaceuticals, aerospace, high class automotive, the creative industries, financial services and academia.

**Chris Powell** Is that enough?

**Digby Jones** At the moment, I think it is enough, if we really do put the concentration of government ►





► policy, private sector investment, teachers, trade unionists and politicians into it. And if journalists get off our backs and let us do it, I think those six will see this country through for the next 50 or 60 years.

Research and development and innovation in those areas means that you can say to Pfizer, "Can you get on with it please and will you do it here and not somewhere else?"

But also we should be saying to our service industries, "How about innovation, research and development in how you deliver your services?" We could get people to understand that innovation is not just science and technology. Innovation can be about a system in a hotel, or delivering a better hospital. That can be innovation. Too often we have kids thinking, and certainly the media are thinking that innovation and R&D are the preserve of manufacturing.

The mentality of the public sees especially pharmaceutical companies as being grubby, exploitative and as ripping us off. If a member of Al-Qaeda dug up your grandmother and took a baseball bat to your kids, you would put him in prison. But if he's an extreme animal rights activist, the magistrate will let him out on bail. If we carry on tolerating that type of environment, then Pfizer will vote with its

feet and go to Bangalore, and John Rhodes will go to Dusseldorf. It is a societal issue.

In the 19th century you found, by and large, business clustered around transport infrastructure; in the 20th century businesses were clustered around original equipment manufacturers. In the 21st century we have clustering around the universities.

If you get a university linking with its schools, then there will be a natural progression of innovative thinking, starting in primary, going up through secondary and into further and higher education. It will all happen around a university in a town.

**Chris Powell** I think Digby was absolutely right on the fact that we are mainly a service economy. We have not really talked about how R&D affects that. George?

**George Cox** We are moving into a world where innovation is at a premium. It is in every field. You are absolutely right about the service industries. I have spoken about stock exchanges. The scene is changing totally. The nature of exchanges is changing. These are big fields. We are going to see a transformation not just in where exchanges are based but in what they actually are.

Take a field that you might think innovation does not touch – auctions. I appreciate we have Sotheby's and Christie's, but it has all been transformed by eBay.

The whole focus of this debate is that we are a very creative nation. The question is how do we turn us into an innovative nation where those ideas get put into practice?

**Chris Powell** I have not yet come across a country which didn't believe that it was not the most creative country in the world.

I want to finish by going round the table and giving you no more than one minute to say one thing that you think is key to making Britain more innovative.

**Emily Shuckburgh** The current career structure for academics demands that you spend part of your week

doing research and part of your week doing teaching. If you want to be radical, bring in a whole new career structure where some of the academics spend part of their time doing research and part of their time working externally with industry and business.

**Digby Jones** Educate the young that risk is good and get them to understand it, to embrace it and stop the great lie that for some reason you can regulate risk.

**Claire Fox** Stop watering down the science curriculum from the age of 14 onwards with the excuse that we are sexing it up. The term “sustainability” is quite dangerous because it is an acceptance of the idea that we have to accept limits.

**Jonathan Kestenbaum** Innovation takes place not in isolation but in a supportive culture. One of the things which characterises strong supportive cultures is the types of role models that would translate what we mean practically, making it very real, very alive and really aspirational.

**Wendy Hall** The push for entrepreneurship does not feature at all in the current academic reward structure. We have to encourage interdisciplinary approaches, get academics on to boards of corporations and get people in companies to understand how academia works.

**Anya Hindmarsh** Let's work on our strengths rather than starting over again and educate by giving really sensible hands-on skills.

**George Cox** What I would like to see is the government not just welcoming and endorsing what I have said here but bloody well doing it.

**Vivienne Parry** One thing that would make a real difference is that we should acknowledge creativity in fields other than the creative arts and that we should value it, encourage it and appreciate it.

**Ian Livingstone** Creating content, investing ideas, establishing IP and retaining ownership. We must not be afraid of failure. We must change the perception of business people if we can.

**Andrew Jack** I think the key theme is breaking down barriers and creating a much more holistic approach. And it is probably also about breaking down traditional geographical boundaries.

**Eliot Forster** We should build upon what we have. We all aspire to the “eureka” moment, but real innovation goes from day to day. That will sustain us.

**David Sainsbury** Make science education in schools more exciting and inspire more young people to be scientists, engineers and to be creative. We need to stay focused on what we are doing.

**Jude Kelly** For me, one of the barriers is language, which is coloured by risk aversion, and also orthodoxy which is an essential controlling mechanism that government chooses to adopt when its own culture is risk averse.

I think our big push is to stop being defensive and not keep looking over our shoulder to see who is behind us but

to be steaming forward because of what we want to do for our country and for ourselves. That, for me, is very much about engaging creativity because, to me, that is what humans do. I would encourage people not

to be frightened of China or India and we won't be if we have language that is aspirational and is not defensive.

**Jo da Silva** I think we should stop this polarisation between science and the arts in education. I think we should put words like “design” and “engineering” into the vocabulary of all our teachers because the reason we do not get people going into this space in the middle is because the teachers do not know what the innovators do for us. I think that we have to teach the teachers about what we have been discussing.

Then we need cross-fertilisation between academia and industry. I think everyone has to understand risk. I think risk in terms of business and innovation is about understanding change.

**Chris Powell** I think there is a degree of commonality in those remarks. Thank you all for your contributions. You were very positive in what you said. Future generations may be deeply grateful to the *New Statesman* for arranging this round table. It's possible we may have solved the problem of innovation in the UK.

## The push for entrepreneurship does not feature at all in the academic reward structure



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