



HOUSE OF LORDS

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The Select Committee on Science and Technology

Inquiry on

THE FUTURE OF INNOVATE UK

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Questions 17 - 25

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Witnesses: Stian Westlake, Dr Ruth McKernan and Professor Jackie Hunter CBE

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on
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Members present

Earl of Selborne (Chairman)
 Lord Borwick
 Lord Broers (co-opted)
 Lord Cameron of Dillington
 Lord Fox
 Lord Hennessy of Nympsfield
 Lord Hunt of Chesterton
 Lord Mair
 Lord Maxton
 Baroness Morgan of Huyton
 Baroness Neville-Jones
 Lord Oxburgh
 Lord Vallance of Tummel
 Baroness Young of Old Scone

Examination of Witnesses

Stian Westlake, Executive Director for Policy and Research, Nesta, **Dr Ruth McKernan**, Chief Executive, Innovate UK, and **Professor Jackie Hunter CBE**, Chief Executive of Stratified Medical and ex Chief Executive of BBSRC

Q17 The Chairman: Welcome to this very short inquiry on the future of Innovate UK and particularly the proposed arrangements for integrating it within UK Research and Innovation. Would you introduce yourselves for the record? If you would like to make an opening statement, please feel free to do so.

Professor Jackie Hunter: My name is Jackie Hunter. I have interacted with Innovate UK wearing a number of different hats. My past role as chief executive of the BBSRC was possibly where I interacted most with Innovate UK, but in my previous role at GlaxoSmithKline I had some quite fruitful interactions. I now head a small biotech company and have previously run a spin-out company and an open innovation consultancy, so feel very able to comment on Innovate UK and its role in the innovation ecosystem, which is very important, and I am very grateful to be able to do so. I would also like to mention by way of conflict of interest that I am a member of the governing board of the University of Hertfordshire.

Dr Ruth McKernan: I am Ruth McKernan. I am the chief executive of Innovate UK. By way of an opening statement, I have been in the role for a year. I am thoroughly enjoying leading this very expert organisation, which I feel contributes a lot to productivity and economic growth in the UK.

Let me give you some statistics. We have worked with 7,600 businesses. For every £1 spent we have returned more than £7.30 to the UK economy in GVA. Since its inception—we are only eight years old—Innovate UK has spent £1.7 billion and returned £13.1 billion and created 55,000 jobs, which is seven jobs for every company that we have worked with. We

are a business-facing organisation. We work with Research Councils at the moment. The way I see it, the research councils are the verticals, of which there are eight, and Innovate UK cuts across on the horizontal. A bit less than 20% of our funding goes to researchers in partnership with the 80% of our funding that goes to business. We run a lot of programmes that work across both research and innovation, but our focus is absolutely business facing and our programmes are led by business.

Stian Westlake: My name is Stian Westlake and I am executive director of policy and research at Nesta. Nesta was formerly an NDPB and is now a charity with the objective of promoting innovation for the public good in the UK. We have worked on a number of things that are relevant to Innovate UK's performance and future. We recently put together a report comparing innovation agencies around the world, which I feel obliged to hold up. We have done research and written about repayable funding, which I have seen the Committee is interested in. We have also opined on the question of UKRI and Innovate UK's status within it.

By way of disclaimer or statement of conflicts, the non-think tank bit of Nesta is a partner with Innovate UK in putting together the 300th anniversary Longitude Prize for antimicrobial resistance and we have worked closely together with them on that. I am also working with BIS on a prospective evaluation of repayable loans. Those are two conflicts or disclaimers.

Q18 The Chairman: As I say, our accent is very much on looking at Innovate UK's role in the future. As a nation, how well do we do in the performance of rolling out innovation and, indeed, supporting innovation? What is Innovate UK's role in that? It is clearly only one of many players.

Dr Ruth McKernan: The most robust data set comes from the Global Innovation Index, which is 79 indicators that look across lifestyle and environment in more than 100 countries. In that index, the UK comes out second only to Switzerland. It covers a huge space. It is a very rich set of data, and in some areas the UK does really well. As we know, in scientific research in universities, citations, patents and university performance we punch well above our weight. That is part of the Global Innovation Index. Those things are fantastic. I cannot claim that Innovate UK has any responsibility for those.

There are other elements, such as innovation ecosystems, research and industry collaborations, the development of clusters and knowledge transfer, where Innovate UK plays a part. There are some areas in this whole innovation index where, even though we are second, we do not do terribly well. They are mostly in the business elements: educating science and technology graduates for business, productivity and capital formation. We have a paradox here. We are extremely good at science. Within the broad definition of innovation, cutting across many different areas, we do very well, yet our business performance in productivity and economic growth is not what we would like it to be. The challenge for Innovate UK is to take the business perspective and see how we can encourage science to be better adopted and encourage businesses to invest more in research and development, because innovation accounts for more than 50% of productivity growth.

Professor Jackie Hunter: It is important that we see the UK innovation ecosystem in a global context. If we think about the amount of GDP we invest in research and innovation—1.7% compared with Germany at 4%—we are doing well to punch above our weight in that context. There are other components of the ecosystem such as venture capital. When I was

trying to spin assets out of pharma companies, it was incredibly hard to get UK venture capital interest. Indeed, our VCs were from Europe and the US. That is another reason why the research councils and others became partners to set up the Rainbow Seed Fund. We need to find ways of incentivising and funding early start-up companies over this valley of death. Innovate has done a very good job of that.

It is also important to point out that Innovate's role is not to look solely at the commercialisation or translation of research funded by the research councils and the universities. In fact, a large proportion—70%—of R&D in this country is funded privately through businesses or charities, and again Innovate plays a big role in stimulating that.

I will give an example as I have now moved partly into the artificial intelligence and machine-learning world. SwiftKey started up in 2008 with a £15,000 grant from Innovate UK. From talking to the founders, I learnt that was incredibly important. It grew to a company of 160 people, attracted over \$17 million in a Series B investment and was then sold to Microsoft for £250 million in 2013. That is an example of the way in which Innovate is a really powerful lubricant in the innovation ecosystem. But it also acts to stimulate networking interactions between SME and big business. Innovate plays an important role, and perhaps the best example of that is in life sciences, where the biomedical catalyst, other funding and grant mechanisms, together with a clear life-science strategy for the UK, have really stimulated the growth of life science companies.

Stian Westlake: The Committee knows the figures and background, but it is worth highlighting the mental trap that we must not fall into when discussing the UK's innovation system. It is very easy to point at our excellent universities and our relatively lower levels of business R&D and assume that there is a problem because we assume that technology must flow linearly from academics to businesses. However, as my fellow witnesses have said, that is a gross simplification of how innovation works. In fact the most significant driver of innovation and R&D in businesses is the kind of ecosystems that Innovate UK plays an important part in developing—the role of the supply chains and the role of customers. We must see those business-to-business elements as important.

The Chairman: Dr McKernan, I want to come back on one specific point. You quoted the Global Innovation Index. Indeed, this was given to us in evidence from BIS. It is impressive to go up from 14th in 2009 to second in 2014. However, there are other innovation indexes, and one gets the feeling that BIS has perhaps done a bit of cherry picking here, because the Bloomberg index gives a rather different story of 17th over the same period. One gets a feeling that it is what you put into these indexes that matters. From what you have all said, I think we can agree that our science base, our university sector, is absolutely excellent and, in so far as that is a contributor to innovation, that will give you a very high index reading. If you are looking at performance, knowledge diffusion and knowledge absorption, for which the GII itself gives quite different readings, this is clearly where we have some problems as a nation. I think you have all said that in so many words. We have to ensure that however Innovate UK is configured in future, it addresses this issue. There is no need to address the universities, which are apparently doing so well. If the issue is performance and application, we have to make sure that there is appropriate governance for Innovate UK and not governance that is convenient just for the universities and research councils.

Dr Ruth McKernan: I agree entirely with you on the innovation indices. If you drill down into the different reviews, the data that is illustrated in the content is exactly as you said: the

universities are fantastic, on translation there is work to be done, businesses have a productivity challenge. Even though one says that we are second and one says that we are 14th, if you look at the content of what they are measuring, the data is entirely consistent.

Q19 Lord Vallance of Tummel: Dr McKernan, what is the principal measure of your success, of your value added? Is it the impressive return that you were talking about or something different? How much of that success comes from providing free money, which is a bit like being a substitute for the venture capital markets, and how much from the other services that you provide?

Dr Ruth McKernan: The data that we have been able to measure thus far since our inception is economic analysis, looking at the return in GVA, the number of jobs created and some very high-level measures. Let us remember that we give matched grants. For state-aid reasons, we require matched funding: that they put in an equal amount themselves, either from the business, if we are giving them money, or raised from the private sector somewhere. It is not like a grant that goes to a university. We measure that grant spend quarterly in arrears, and we check that the company is spending the money on what they said they were going to spend it on, so we have very tight control on how our matched funding is spent. I would love to be able to have more in-depth analysis of the benefit of our matched funding. Obviously we want that so that we can compare it with our financial products in the future. We are just implementing a new automated grants system that will allow us to have a richer database of what happens to the businesses we support. We have generated 40 questions that we will send annually and we will track the growth of those companies. We will have much more microevaluation as well as the very high-level econometric analysis that we have been able to do. We need a richer analysis of the quality of what businesses do with our money and how we make them more productive.

Lord Vallance of Tummel: Coming back to basics for a second, in a sense you seem to be saying that you are a substitute in part for a failure in the venture capital market, because it does not have the risk appetite or perhaps the knowledge and skills to invest in your area. That is part of your role.

Dr Ruth McKernan: No, I would not agree with that. We take the risk out so that companies become investable. When we give grants at very early stages, we are looking at feasibility studies; we are looking at going from an idea to a business that is investable or a product that is developable. That is very early-stage investment and it encourages growth in and improved productivity of businesses.

The other really important element is collaborative research and development, which helps to cement the supply chain. I can give you a good example, Evoque-e and the low-carbon vehicle technologies, a project involving £16 million and 12 different companies, academics included, all working to solve some basic problems in low-carbon technology that will cement that supply chain in the UK. That is a very valuable way of using matched grant funding to help whole industries.

Lord Broers: As we are on this question, I want to ask Dr McKernan how far down in quality you have to go before you have spent your budget? Are there a lot of extremely high-quality applications you cannot fund?

Dr Ruth McKernan: You are asking whether we are oversubscribed. We are always heavily oversubscribed. In some of our programmes we are able to support only the top 10%, and usually only 50% or so of applications are worthy of funding.

Lord Broers: So there would be little loss in quality if you had twice as much money?

Dr Ruth McKernan: I think that is probably right.

Q20 Lord Broers: What is the rationale for the integration of Innovate UK into UKRC, UK Research and Innovation, now? Were you considered at the beginning of this proposal, and were other options considered?

Dr Ruth McKernan: There were three options in the business case which the Department for Business, Innovation and Skills published on 7 June: to do nothing and leave things as they are; to create a new body for interdisciplinary research, which is one of the core opportunities; and to integrate all the bodies into one entity, UK Research and Innovation. I have had multiple conversations about it. I have shared my thoughts about the opportunities—and I love to see opportunities in things. I have also shared my organisation's view about the risks. I can say more about those now or I can leave that until later.

The Chairman: Professor Hunter, would you like to answer?

Professor Jackie Hunter: From my perspective—I have not seen the business case—when I was at the BBSRC I saw four main drivers for this: an increased alignment between investment in research by the research councils and that by Innovate UK; a need to align the investments in research with government priorities; a reduction in the number of NDPBs; and a reduction in the complexity of the environment for business, especially for SMEs.

The first driver does not need Innovate to be incorporated into UKRI. The representation of the chief executive of Innovate on the UKRI board, or RUK board, and vice versa, would be a logical and simple way to do this. In regard to the second, the alignment requires a clear strategy from government that should also be business focused, and not focused solely on investments via research councils or HEFCE QR, which is more focused on the universities. Indeed, there is a danger that if this is the case, the underpinning basic long-term science funded by the research councils and HEFCE QR would become too focused too early.

On the last two—the reduction of NDPBs and the complexity—clearly the Government need to save money and cut the number of bodies with which they interact, but I am not sure whether other, perhaps more radical, options were considered. Looking at it from the business case, UKTI interfaces with SMEs and business, and there could be real synergies for investigating the linkage between Innovate UK and that organisation. Other organisations such as NCUB add to the complexity of the landscape. I am not sure whether these other, perhaps more, radical alternatives were considered. Given that we have a £6 billion investment in R&D, I would have thought we need a very in-depth business analysis of the implications of what is going to be done. I am sure this has been carried out, but I have not seen it.

The Chairman: Have you any reason to believe that such an in-depth analysis was ever done?

Professor Jackie Hunter: No.

The Chairman: Mr Westlake, would you like to comment?

Stian Westlake: I agree with the other two witnesses. There are two reasons that I have heard reflected from within government, one of which is the hope that integrating Innovate UK and the research councils will allow more mission-oriented projects to be undertaken. That is difficult to do given Haldane and the fact that these organisations will still operate independently to some extent. The other reason is the hope that savings or administrative simplification would result. Given there is already a degree of shared services between the research councils, and that there will still be a lot of institutional integrity of the different research councils, it is not clear to me that those savings are there to be had.

Professor Jackie Hunter: Clearly there were savings to be had by centralising a lot of the functions of the research councils, but the way the research councils operate with their customers—the universities—is very different from Innovate UK. By trying to incorporate Innovate UK you will dilute the potential efficiencies gained by synergy with the research councils, especially if you have to incorporate loan mechanisms, or, by not doing that, you will impose a burden on trying to get Innovate UK to force fit into a streamlined RCUK system.

Lord Hunt of Chesterton: First, I should make a declaration of interest that I am on the advisory committee and a consultant to Tokamak Energy, which receives some money from the Rainbow Seed Fund and a lot of private sector money, so is a good example. I was thinking hard about what I could say that is good about this proposal, so I began to think of all the proposals I have had to make. I am involved with colleagues at the moment, and we have had to imagine who would find some important research on waves useful. You might put in your grant and somebody criticises you for not having contacted them. This is an area where it seems to me on the input side Innovate UK in its integrated form could do more at the proposal stage.

The second point is that when the research is done there is also a role for the digitalisation of research or the marketing of research or connecting to other countries, for example. That is not done at the moment. None of those things happens when you finish a research grant. If you had some integration between Innovate UK and the research councils, that might work, but I have not seen those remarks in the case made. Is that part of your justification?

Dr Ruth McKernan: That is very interesting. You expressed that by looking from the perspective of research and how that work moves to business. We start at completely the other end, at the business end. The first benefit that I can see is that it may give the researchers or academics a closer view of what business needs, so they might choose under the Haldane principle to do more applied research that will ultimately benefit the UK. Secondly, the common research and innovation fund may encourage more interdisciplinary research and more applied research between business and academia. Thirdly, by having a common grants system and common database of businesses and academic institutions in the future as we move into the new economy where data is rich and we can do a lot of things with it, we will be able to get more robust information about how companies benefit from interactions with business, how many grants they have, what they have done with that money, how quickly they have grown, and instead of having impact case studies we could have more robust quantitative measures of how businesses benefit from interactions with research. That would be a positive. For me it is about more visibility of research into business. From where I am looking at the business end back at research, it is about what we can pull from research, not what we can push from research into business.

Q21 Lord Hennessy of Nympsfield: I was very struck by the paragraph in Sir Paul Nurse's report on page 31 on the integration of Innovate UK, because it is very caveat laden. He points out that he was not asked to look at it in depth and he has real anxieties about what might be lost in two areas. The first is the ring-fencing of the money and the second is the loss of the business interface. Do you think the Government in their perhaps excessive tidy-minded search for structure, which is what the Treasury goes in for and the way it operates, has not taken account of Paul Nurse's caveats? Are you worried by that?

Dr Ruth McKernan: There are some very good things in there, which have been put into the White Paper and the Bill since Sir Paul Nurse's report. The things that I see as very positive include the fact that the Innovate UK name has been retained. Businesses absolutely want to deal with one simplified organisation. I understand that the hypothecated budget and our allocation letter—the process by which Innovate UK gets its funding—will not change, although of course it is decided in the CSR and by the Secretary of State. There is the opportunity for the chief executive and the chair to influence what is done. That might be positive or it might not. There are some very good things in there. The last one, which I think is very important, is the recommendation that somebody sits on the board with a view to protecting particularly the interests of Innovate UK and making sure the business focus is not lost. That is a very useful addition.

The Chairman: Should that be the chairman?

Dr Ruth McKernan: It could be. I would not want to say who it should be, but I absolutely agree that there should be somebody.

Baroness Morgan of Huyton: Dr McKernan, listening to you speaking it felt to me—I do not know enough about this, so I may be wrong—that these are all mitigations that mean that it is not as bad as it might be, and it did not sound like a ringing endorsement that this was necessarily a good idea. Would you like to comment on that?

Dr Ruth McKernan: There are also risks that I have not gone into. There are some other areas of mitigation where I still have concerns. For example, Innovate UK does a lot of work with many government departments. We manage about £300 million of funds in partnership with other government departments, for example the Aerospace Technology Institute through BIS, and we do a lot of work with DECC and DCMS. It is really important to safeguard those relationships and not feel the need to create something else because we have created a fracture in putting Innovate UK within UKRI. We have already touched on whether we are a tech-transfer part of the universities. We need to find a way of making sure that the business-led programmes are still there. There are many different ways to get things to work. We are talking only about structure. We also have to consider behaviour incentives. There are other elements that are just as important as, if not more important than, the structure that you start with.

Professor Jackie Hunter: I agree. The Committee makes the very good point that there is a risk that Innovate will lose its business focus. In the Nesta report, one recommendation for an effective and successful innovation agency vehicle is independence and autonomy. What we are seeing here is a lack of clarity in the Bill and uncertainty around this issue, which I think other evidence-givers to this Committee have highlighted. Although Innovate's budget process has been protected, its budget is outside the science ring-fence. Will there be two ring fences: an Innovate ring-fence and a science ring-fence? It is important that that budget is not eroded. Since 20% of R&D funding comes from outside the UK, unlike in the USA and

Germany, getting clarity on some of these issues is important. The last thing you want is for businesses to disinvest because of the lack of clarity. It is very hard to get businesses to come back to a country once they have left. This is absolutely critical. One way is to ring-fence a certain amount of the budget for Innovate for business-led programmes to ensure that business focus remains.

Q22 Lord Oxburgh: We have covered many of the points that I was going to raise, but the topic focuses on the risks and opportunities of the plans to integrate Innovate UK with UKRI. More than a decade ago, I was involved in the discussions that led to the establishment of the TSB. One of the key issues we came across at that time was that business was not happy with the way in which academia was approaching these matters. I remember the comment, “A lot of universities think they know about how business works, but in fact they don’t”, and their orientation and priorities are different. Would you like to comment on that and on the extent to which you think the Higher Education and Research Bill going through Parliament does enough to protect these interests?

The Chairman: Lord Oxburgh, do you want to declare an interest, as this is your first meeting?

Lord Oxburgh: I am not sure that I have any direct interests to declare.

The Chairman: Fair enough. Sorry.

Dr Ruth McKernan: I have covered quite a lot of what I see as the risks and benefits. I always look for the opportunities. I come from the pharmaceutical sector where we have consolidated 57 companies down to fewer than 10, and I am very familiar with consolidation and putting multiple companies together. In my view, you have to put your energy into the new opportunities that are presented, because looking at reducing costs or making things simpler never really bears out as much as you would want. I see opportunities in being more ambitious in the programmes that we run that are business led and to which universities can contribute. There are some huge challenges that we can work on together. We launched our very first competition this year, which includes all the research councils and Innovate UK, and is based on cities and how to improve them for urban living. We can be much more ambitious if we are in one organisation.

Let us look at the things that Innovate UK does not do. We do not major on skills. We are a business-facing organisation. We have 11 catapult centres that are developing skills. We could look at new opportunities to educate and train within some of our institutes. There are 217 research and innovation centres that are managed by the research councils, and there are 11 catapult centres. We could look more globally at what should be a research institute or a growing information and knowledge centre that could be a catapult centre and business-facing, or at existing institutions that could be more catapult-like and business focused and help us pull that science through. We are just at the stage of beginning to think of the opportunities that can be created by forming UKRI. Instead of worrying about the mitigations, let us take a bit of time and look at the big opportunities and focus on those.

Lord Oxburgh: You commented a few minutes ago that the way people work together in an organisation is much more important than the organisation itself, and I would agree with that. On the other hand, if you get an organisation right it can also protect interests, and it is a question of whether that is there.

Lord Mair: I would like to return to the point that you raised, Dr McKernan, on risks to the all-important business focus that Innovate UK is all about. What is your view of the Royal Academy of Engineering's response in the consultation, where they said that there is considerable doubt within the engineering community that this business-led focus will in fact be properly maintained under the new arrangements?

Dr Ruth McKernan: That was probably written before some of the mitigations that we have talked about had been introduced. There is still an opportunity to make sure that we safeguard business interests as we go through the construction of the board, the chair, the chief executive and the details of the Bill. I absolutely recognise what the Royal Academy of Engineering has said and I have spoken to it. I was at its event last night. I think it is really helpful, because it helps to shape this properly to get the best possible advantage and opportunity out of it.

Baroness Neville-Jones: I declare an interest as a member of the EPSRC. TSB and Innovate UK have been notably lively and independent organisations. They have not apparently needed "protection". How do you see the relationship with Innovate, as now formed, as one of the councils under—and as far as I can see it is under—UKRI? Will that be beneficial? What is the point of that, and how could that be helpful?

Dr Ruth McKernan: It could be helpful in the way that I have just described. We could be more ambitious in some of the cross-cutting programmes that we run.

Baroness Neville-Jones: Do you not have your own views on how you do your job? Why do you need somebody else to help you?

Dr Ruth McKernan: If we get it right, our businesses would notice no difference. In fact, they might see that things are better. Innovate UK has its own culture, brand and relationship with businesses. That is not structural, that is a behavioural way of operating, and I see no reason why our relationship with businesses should change. We would not change the nature and style of our organisation. In fact, everything we are trying to put in place should be to avoid that happening.

Baroness Neville-Jones: It is very difficult to see the point of it.

Stian Westlake: Might I offer an historical perspective? Before Dr McKernan took over at Innovate UK, we saw some examples of a potential failure mode for an innovation agency. We have already identified that if an innovation agency is sucked too much into the academic world that is problematic for business reasons. The other challenge is being sucked into the world of government and becoming too subject to direct political control. One of the things we saw when we looked at successful innovation agencies, such as Israel's, is that they had a fairly significant degree of independence from government and therefore the ability to pursue projects without direct interference.

If I think back to some of the challenges that Innovate UK faced in early 2010s, before Dr McKernan took over, it was challenging because occasionally it was asked by the Government to take on short-term, potentially glamorous projects that were rather difficult to form into a coherent strategy. One of the things that the Treasury has said about its new plans is that, at least within UKRI, Innovate UK would have some protection from government. I am not convinced that that outweighs the concerns about being too far from business that we have talked about, but that is part of the narrative.

Baroness Neville-Jones: One could argue the opposite is likely to be the effect.

Dr Ruth McKernan: I would add that I do not feel that I had any direction or instruction or indirect pressure on what we should fund. I want that to be clear.

Stian Westlake: I agree things have got much better recently.

Professor Jackie Hunter: The important point here is about financial autonomy. One of the important things that I felt personally about the research councils was that being an accounting officer gave you a certain degree of financial autonomy. In this new body there will be a single accounting officer, so how the delegated powers of authority and the ring-fencing of budgets is maintained will be critical, because otherwise—I agree with you—it will be worse than Innovate not being in UKRI. That is a personal point of view.

Q23 Lord Cameron of Dillington: I am concerned about the change of financing arrangements within Innovate UK and putting one-third of your money from grants into loans. How are these loans going to work? Are they there to save the Government money? Will Innovate UK be tempted to lend to later stages of innovation rather than to the true start-ups? Also, in the extremely risky environment of innovation and SMEs, will they discourage private equity investment in this way? Have they been tried elsewhere? There are a lot of questions there.

Dr Ruth McKernan: On the first question, absolutely they have been tried elsewhere. I am going to defer to Stian to answer that, because he has done a lot of work comparing different systems. Innovate UK has only given matched grant funding. Most other innovation agencies provide other sources of financial support, either loans or equity, and of various types—and that includes Scottish Enterprise and Enterprise Northern Ireland. This is in no way a new initiative.

When I took over as chief executive of Innovate UK, we looked holistically at what we do and we came out with our five-point plan. It is there on our website and I share it with people all the time. First, we work with research entities and government departments to help pull science into business. The second point is about scaling businesses, where I think loans have a part to play. Medium-sized businesses are the ones that pay tax and create the most jobs. We fund micro and small businesses, but we measure the growth to medium-sized business, because that is a very successful way of improving productivity and economic growth. The third point in the five-point plan is that we also take account of the regions and help to encourage the growth of businesses in regional clusters so that they are globally competitive. Having very active clusters takes the risk away from any one company and allows the cluster to grow and be strong. Point four is having our network of catapults work better across each other and with research entities so that they help develop the supply chain. Our fifth point is one that we created for ourselves, which is to evolve our funding models, recognising that other innovation agencies across the world use different tools. When we came up with evolving our funding models, we were enthusiastic about looking at things in a cautious and measured way. The allocation in the comprehensive spending review of £165 million of our funds to alternative finance products by 2020 is a very ambitious target for us. This is public money, so we need to know that we are developing the principles and the policy that allow us to do that properly.

That work is rightly being led by the Department for Business, Innovation and Skills. We are working closely with them. My financial experts are working closely with them, as is the British Business Bank, to try and ensure that the financial products that we develop are the

sorts of things that businesses will use. That will be done in a very robust way. Anecdotally, the technologists who work in Innovate UK have relationships with many of the 7,600 companies I mentioned earlier, and I have been out and spoken to quite a few since I took over. Part of what I wanted to do was to understand what people thought about Innovate UK. We have asked them, "What sort of loans would work for you?" The type of feedback that we have had is that businesses that are growing want access to funds that they cannot easily get through a bank. If they could get bank money very easily, they would not come to us to grow their businesses. If you are a small company, you are growing very quickly and you need to borrow money for bespoke equipment, and you are young and have no collateral, a bank will not be inclined to lend you money for that. That is the sort of thing where Innovate UK could be very useful and could provide an equipment loan.

Some products, such as some of the new diagnostic products, take an awfully long time to make, particularly in health and life sciences. Even in biotech, new medicines might take more than 10 years to make. Other countries such as the United States have innovation loans that last for a decade, with an interest-free period at the beginning. To be able to provide that sort of patient capital would be a very good thing. We should look at whether we can provide equity to businesses that are really risky and thus encourage more risk to be taken. These are things that venture capitalists might not want to invest in. There are many areas where alternative financial products would be useful.

We absolutely must not lose sight of grants, because they are critical for very high-risk feasibility early-stage work and for encouraging collaborative research and development between businesses, big and medium-sized, SMEs and academics. There is always going to be a place for matched grants. We should look at what else we can do to help businesses grow and be successful.

Stian Westlake: The short answer is that some other countries do this. There are some successful innovation agencies such as Tekes in Finland and the OCS in Israel that have repayable loan programmes. There are some large caveats which Dr McKernan mentioned. First, these tend to be project-based loans rather than loans secured against the assets of the firm as a whole. If your technological project does not work out, the loan is typically forgiven, so these are very generous and rather soft loans.

Secondly, they work for specific funding of projects rather than some of these more systemic interventions, where you try to fund a cluster or a big collaboration between companies simply because there is no principal to lend to in those.

Thirdly, we find that on the whole big businesses are not interested in this, partly because they are not capital constrained, but to the extent that they are it is typically said to be too much hassle to get it through their treasury departments, given that they already have sources of capital.

We also see that agencies that offer loans offer grants too, and typically they are much bigger relative to the size of the economy than the UK. If the Government are trying to do this as a way of saving a big chunk of money, it probably will not work. If this is a growth option and a way to do more, it might be a better option, but this is probably not going to save the taxpayer vast amounts of the money spent in Innovate UK.

Q24 Lord Borwick: First, I declare an interest as the chairman of the GATEway autonomous vehicle advisory board. One of the difficulties that I foresee with loans is the negotiation of

the terms of the loans, because BIS surely already has the power under the Industrial Development Act to give loans to various companies, but its history is, at best, mixed. One of the difficulties is that when the company is a success and wants to refinance the loan, the new financier immediately takes the terms that have already been negotiated by BIS but that were negotiated when the company was very young and very much more vulnerable. Those aggressive terms become the standard for the future financing of that company. Do you foresee that as a reason why companies would not take these loans in the future, or, alternatively, why they would get themselves very bad financing terms in the distant future?

Dr Ruth McKernan: The terms and conditions under which the loans are offered are critical. We need to bear the purpose of the loan in mind. That is why it is going to take us quite a long time to get the appropriate vehicles. We are going to have to test out a few things and see what appetite there is from businesses. If we keep the purpose in mind and create the loan product that fits that purpose, we may avoid some of those pitfalls that you have identified. There are a lot of things to be considered in how we write those terms and conditions. It could be something very simple such as, “We give you a grant, but if your company is incredibly successful you pay it back”. We did not have a set of conditions in the grant that we gave to SwiftKey, for example, but if they had to pay back twice their grant when they sold for £250 million they probably would not have minded. There are some things that we could do that are very simple and there are some much more complicated products that would help companies to grow, but we need to bear in mind the specific purpose, and it is not all-comers just apply for a loan.

Lord Borwick: Will you be recruiting people with banking experience to make the decisions on whether or not to make a loan, or will this be people with grant-giving experience or people who are afraid of giving loans?

Dr Ruth McKernan: We are handling public money and we absolutely have to have the best experts who understand the credit and the terms and conditions of the loan. My organisation is very familiar and expert at the technical evaluation and the process, but we do not currently have that skillset, and we will have to share, borrow or build that skillset. It has to be done properly.

Lord Vallance of Tummel: I am delighted that you have said that you will also look to equity, because that means that you will have the full range of financial options, but it does make you much more like a financial services institution, a venture capitalist or otherwise, and that in turn means that your ethos is going to be even more different from the rest of the research councils, and I would say probably argues for you being separate, but you may not wish to comment on that.

You said earlier that you make a fantastic return and that every £1 invested gets a return of £7.30. That is tremendous. You have also said that there is a market failure somewhere, because you have a huge oversubscription and you could easily deal with twice as much money as you have now, which means that you ought to have access to twice as much money as you have now. That can come from one of two sources: the public source, which might be robbing Peter—the research councils—to pay Paul, or it might be private money. Would it not be sensible to think about private money as well?

Dr Ruth McKernan: There are many sources of private money. Interestingly, once we started talking about evolving our funding model from grants to loans, we had a lot of approaches from the private sector saying, “Could we come alongside you and look at a way in which we

could share?" So far we have not engaged very far down that route, but I can see where that might work.

I would like to give you a specific example. We have now got to the point on the biomedical catalyst programme that Jackie spoke about earlier at which some of those companies have got to proof of concept and we are showcasing them to private investors and venture capitalists. I am sitting in that meeting saying, "We funded this project with public money and now it is successful and we are offering it for private sector investment. Why are we not getting a return back to the UK?" Could we think of a way of converting what has been a grant to a very small piece of equity in the company so that, as it grows and does well, some of that money is returned to public coffers to allow us to recirculate the money that we have spent? That is one way in which we could use equity very thoughtfully. We do not yet have a programme to do that, but it is in our minds.

Professor Jackie Hunter: One thing that I wanted to raise on the question of expertise is that at the moment, as I understand it, Innovate is not as constrained as the research councils are in being able to offer competitive salaries. That would need to be looked at if Innovate were incorporated into UKRI, because trying to attract business people of the required calibre would require perhaps a different mode of funding salaries.

Q25 Lord Fox: Coming back to this international comparison, Mr Westlake, you have mentioned examples, but who are the best and where is the best practice?

Stian Westlake: I would highlight the Office of the Chief Scientist in Israel, which is extremely good. It has spent 50 years building the Israeli high-tech sector. It is pretty independent from government. It uses a mixture of grants, loans and royalty-type agreements, where it has a potential share, up to the amount of money that it spent on the company. It has quite a broad mission to make the Israeli economy more high-tech oriented. Tekes in Finland is very good. It played a significant role in the development of the Finnish mobile phone industry. It provides grants and direct loans and is more transactional in some ways than the OCS. It is more into the process of making individual project loans than having a bigger vision for the industry, but it has been very successful. It is worth noting that both of those are between five and eight times the size of Innovate UK relative to the economies that they are in, so they are spending a lot more money on those things.

The first of the other two I would highlight, which are very different types of organisations from Innovate UK, is ITRI in Taiwan, which is much more of a sectoral-based organisation. ITRI is the government research organisation that built the Taiwanese semiconductor industry and spun off.

Lord Fox: So more like DARPA?

Stian Westlake: DARPA is the other organisation I would mention, which is the black projects research agency of the US defence establishment. I am often asked by government officials whether the UK should have a DARPA, and my typical answer is, "We can't afford one". DARPA works because it spends \$3 billion a year and it has the pull-through of \$600 billion of the US procurement budget, which has as its aspiration to be very high tech.

One of the lessons that we can learn, which comes back to Professor Hunter's point, is that DARPA has very skilled project managers. Being a project manager at DARPA is one of the best jobs in American science. You get a seven-year job to fund all the most exciting projects that you can. You are paid reasonably well and you have a lot of resources behind you. That

ability to get experts into place, make them independent and give them discretion is something that we could perhaps learn from.

The Chairman: Unless the other two witnesses have anything to add, I must now bring this very informative session to a close. You will gather from the inquiries that this Committee rates as enormously important the role Innovate UK has in the governance of innovation ecosystems. We have heard from you very clearly that very different skills and expertise are required to manage and champion such innovation from the governing of science. I am sure it is possible to put the two together in a way that is mutually advantageous, but equally, there are many pitfalls, and I hope that our report can help steer a way through all that. Thank you very much to our three witnesses for helping us so much today.