



HOUSE OF LORDS

Revised transcript of evidence taken before

The Select Committee on Science and Technology

Inquiry on

**THE RELATIONSHIP BETWEEN EU MEMBERSHIP AND THE EFFECTIVENESS OF
SCIENCE, RESEARCH AND INNOVATION IN THE UK**

Evidence Session No. 2

Heard in Public

Questions 9 - 24

TUESDAY 15 DECEMBER 2015

11.45 am

Witnesses: Professor Paul Boyle, Professor Andrew Harrison
and Professor Dominic Tildesley

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 Cameron of Dillington
Lord Hennessy of Nympsfield
Lord Hunt of Chesterton
Lord Kakkar
Baroness Manningham-Buller
Lord Maxton
Baroness Morgan of Huyton
Baroness Neville-Jones
Lord Peston
Viscount Ridley
Lord Vallance of Tummel

Examination of Witnesses

Professor Paul Boyle, President and Vice-Chancellor, University of Leicester, **Professor Andrew Harrison**, Chief Executive, Diamond Light Source, and **Professor Dominic Tildesley**, President, Royal Society of Chemistry

Q9 The Chairman: Welcome to our second session. We are grateful to you for joining us today. We are being broadcast. For the record, please would you introduce yourselves? If you would like to make an introductory statement, please feel free to do so. Would Professor Tildesley like to start?

Professor Dominic Tildesley: My name is Dominic Tildesley. I have spent 18 years working as an academic in the UK, followed by 14 years in industry working as chief scientist for Unilever's home and personal care division. Currently, I am working in Switzerland for a pan-European organisation in the area of computational modelling in chemistry with 18 members. Today, I am representing the Royal Society of Chemistry as its president and its 53,000 members across the world.

Professor Paul Boyle: I am Paul Boyle, currently vice-chancellor at the University of Leicester. Previous to that, I was the ESRC chief executive for four years and, during that time, I was the international champion for all seven of the research councils in the UK. During that time, I also became the president of an organisation called Science Europe, which represents 52 of the funding agencies across Europe with an annual budget of around €30 billion. During that time I also sat on the board of the Global Research Council, which is an organisation set up to represent funding agencies across the world.

Professor Andrew Harrison: My name is Andrew Harrison. I was a professor of chemistry at the University of Edinburgh until 10 years ago, when I went to be a director of an international research institute in Grenoble that is co-owned by the UK, France and Germany. Two years ago, I came back to the UK to run the Diamond Light Source, which is a national research infrastructure with a very large international component. I am also one of

the two UK delegates on ESFRI, the European Strategic Forum for Research Infrastructures, which advises the Commission on strategy and policy for RIs.

Q10 The Chairman: Thank you very much. Perhaps I could start with a question about determining research funding priorities. To what extent do you feel that EU research funding priorities align with those of the United Kingdom? How much say does the United Kingdom have in deciding these priorities? What are the formal mechanisms?

Professor Dominic Tildesley: I will begin by saying that there is a good alignment between the major research priorities that you see in Europe and in the UK—for example, research into climate change, energy, antimicrobial resistance and healthcare. All these are strong priorities in the UK, but are equally strong in Europe. Although these are strong priorities, in some senses they only guide the programme; they do not determine the research programmes either in the UK or in Europe, which are determined essentially by the scientific excellence of the applications.

In relation to input into this, working as a scientist within Europe at the moment, I find myself working on a number of European commissions and committees to evaluate and think about the quality and direction of these kinds of programmes.

Professor Paul Boyle: I strongly agree with that. I think the priorities are aligned. Indeed, if you look outside Europe, similarly, you will find some of the big questions, such as antimicrobial resistance, energy and other things, matched in funding programmes in the United States, Australia, and elsewhere. It is not surprising that some of the key grand challenges are likely to be repeated across different funding regimes. It is also absolutely clear that the UK has had a strong role in helping to shape what those challenges should be in Europe. Our voice is very strong in the discussions prior to the decision-making around what the different priorities should be. We have had a very influential role in helping to shape those decisions.

Professor Andrew Harrison: I would echo that as well. In my experience, in ESFRI, we have a seat at the table and are very much part of the discussion. One of the results of this is that the UK has been remarkably successful in winning back funds from Europe, which again indicates a strong alignment between what the UK is doing in science and what the various instruments in Europe are funding.

The Chairman: The scientific community in the United Kingdom cherishes what is often described as the Haldane principle, although I think a historian would say one of the Haldane principles—in other words, scientists should ultimately determine the research programmes for themselves and not have politicians interfering. To what extent, at the EU level, where we are talking Council of Ministers or the European Parliament, about which you may have just heard some trenchant criticism, does this principle operate?

Professor Dominic Tildesley: I think it operates to about the same extent as it operates in the UK.

The Chairman: Do you mean it does not operate at all?

Professor Dominic Tildesley: I mean that positively. You can see this through the work of recent Universities Ministers and Science Ministers. You can see directions in research. For instance, you can see a strong push in computational infrastructure or in healthcare. That is very different from the day-to-day determining of the research programmes. What I do not

see in the UK is interference in the day-to-day determining of the research programmes and, frankly, I do not see that in Europe either.

Professor Paul Boyle: Thinking of my research council days I would say that the Haldane principle is something we all buy into, although defining and explaining what it is exactly is a bit of a challenge. Do not forget that in Europe, similar to the UK to an extent, individual DGs have their own research budgets to a degree, so things that they want to focus their research on, they can. Horizon 2020 and other pots are much more general pots designed to allow researchers to come together to bid. The allocation mechanisms are based, as they are in the UK, on peer review and excellence and, therefore, the decision-making about what will be funded in any particular programme, in the end, comes down to academic peer review, which helps us understand the quality of the work that is coming through.

The Chairman: Did you want to come in, Professor Harrison, otherwise I will move straight on?

Professor Andrew Harrison: Just very briefly to say in my experience with European RIs there have been one or two major funding decisions where the advice has been based on research excellence. I will give you one example of research excellence and the local climate that would support that. The example that springs to mind for me is the siting location for the European Spallation Source in Lund, where the recommendation came from an external body of scientists, and its recommendation was based primarily on where science would most thrive among the potential sites.

Lord Peston: Professor Tildesley, you gave us some examples of research priorities, and I think you mentioned climate change and health and medical. There was a third one, but I have forgotten it. Did you say they were good priorities?

Professor Dominic Tildesley: Yes, I think they are good priorities.

Q11 Lord Peston: I have two supplementary questions. Is not one problem with them that they are headline areas of research, they appeal to the public, and so on? I remember reading a research paper years ago saying we spend far too much research money on cancer. It was ridiculous how we overspent on cancer. Can you give us an example of where we have got our priorities wrong?

Professor Dominic Tildesley: Where we have got our priorities right?

Lord Peston: Wrong. My experience of life is you get some things right, you get some wrong. Can you give us an example of where we are wasting some money at the moment for some reason—maybe the Haldane principle not working—or is everything perfect at the moment in our research priorities?

Professor Dominic Tildesley: The first thing to say is that not everything is perfect. I believe that the kinds of strictures that we have, both in the UK and Europe, regarding peer review and making sizeable bets in good quality areas, mean that, on the whole, we do not do work that is rubbish. I am finding it difficult to think of a really good example of something that I would not have funded in the way you have just described.

Lord Peston: In my own subject I could give you a list a mile long.

Q12 Lord Hunt of Chesterton: Many people comment on the fact that, over the last 10 years, the number of companies owned by the UK has gone down. I visit France and other

places with an absolutely clear drive for research, for the French to have a rocket, the French to have airbus, and in Germany the same. We are not talking about the same approach at all. I used to run the Met Office at the time when research was important. Surely there is a big difference in how research has fed into technological projects and, finally, industrial products and industry. They are very different, are they not?

Professor Dominic Tildesley: I find the question slightly hard to answer because most of the companies that I know and have been involved with in the UK are not what you would call UK companies. There are small to medium-sized enterprises, which are primarily UK, but most of the big companies are really quite multinational and will have research bases in the Netherlands, in the UK, sometimes in the States, often in China and India, and they will pull on the best that they find in those countries to their benefit.

Q13 Baroness Manningham-Buller: I want to move to the question of scientific infrastructure. As you know, we are focusing on what damage or advantage there would be to science in the UK if we left the EU. All of you have been associated, or are currently, with big infrastructure projects. We heard in the earlier session about preferred access. May I ask Professor Harrison to begin with, at the synchrotron, who gets preferred access to the beamlines?

Professor Andrew Harrison: We allocate beam time purely on the basis of scientific excellence through peer-reviewed proposals.

Baroness Manningham-Buller: So nationality, membership of the EU, American, whatever, GSK, is not a consideration?

Professor Andrew Harrison: That is not a consideration. The reality is that about 80% of the beam time that we give out is to UK-based people and approximately 20% beyond the UK.

Baroness Manningham-Buller: That is as it happens?

Professor Andrew Harrison: That is as it happens.

Baroness Manningham-Buller: It is not a principle?

Professor Andrew Harrison: Our principle is based on scientific excellence. At that level we are all part of an international network and there is free movement of ideas, proposals, and so forth. There tends to be a bias towards the local facility, because people are most closely associated between universities and national facilities. However, where there is a strength internationally is in the flow of technological development. For example, Diamond is strong in a range of areas because it has imported technology, if you like, from other synchrotrons and there is a two-way flow in that, and in expert labour. That is absolutely crucial to the success of national enterprises.

Professor Paul Boyle: May I follow that up from a slightly different angle? In the social sciences, for which I was responsible, we also have what we would regard as infrastructure. The best example is the European Social Survey, a survey that is conducted across the whole of Europe which helps us understand economics, politics and a whole range of different areas. We would not be able to achieve that without collaboration across Europe. One country could not establish it financially, but there is also the question of getting the buy in from the various organisations that need to be involved. Similarly, if you are not one of the players, you do not shape and influence the survey questions to anywhere near the same degree as the countries that are contributing through the European collaboration. Although

we allow other countries to be involved, inevitably the influence on how that survey shapes up is challenging if you are not one of the funders through the European Community.

Baroness Manningham-Buller: Professor Tildesley, do you have any comments on this particular issue of to what extent we might be disadvantaged with access to infrastructure were we to leave the EU?

Professor Dominic Tildesley: I want to distinguish two cases here. There are some non-EU partners, such as Norway and Switzerland, where there is much more open access in the infrastructure that I am associated with, which is the PRACE infrastructure for European computing, than there is with the US and India in the actual allocation of resources.

Baroness Manningham-Buller: Could you just expand on that? Does that mean that India and the United States have much less access?

Professor Dominic Tildesley: I think that is fair to say, yes.

Baroness Manningham-Buller: In this case, it is not on the merits of their science; it is on their nationality.

Professor Dominic Tildesley: Essentially, the proposals that we get come from Europe, and not from outside. We are not international in the same sense that the synchrotron source is. CECAM is a much more European-based organisation.

Viscount Ridley: I want to clarify something. Both Professor Tildesley and Professor Boyle used the word Europe. Did you mean by that the European Union, or not? Professor Tildesley pointed out that Switzerland and Norway did have preferential access.

Professor Paul Boyle: It will depend, of course, on whether they want to be part of the particular infrastructural programme. You are right—it does depend on whether you mean Europe.

Viscount Ridley: You said the European Social Survey was a cross-Europe collaboration. Did you mean cross-EU or cross-Europe?

Professor Paul Boyle: It is a cross-EU collaboration, but there are some players from outside the EU who invest.

Q14 Lord Cameron of Dillington: I have to declare my interest, which I should have done in the previous session, but somehow failed. I am a trustee at Rothamsted. I am chair of the Strategy Advisory Board of the Global Food Security research programme. I am a chair of an advisory council of the Centre for Ecology and Hydrology. I am also a farmer in receipt of European Union funding, which may or may not be relevant. My question is: does the fact that it is easier to recruit EU scientists than non-EU scientists put non-EU scientists off from applying for research positions? There are all sorts of implications involved if it does. One of the bits of evidence we received was that the immigration policies that result in an effective bias towards EU scientists over others will weaken UK science. Do you have any comments about that?

Professor Paul Boyle: I am happy to comment. Around 12% of our workforce in academia is from outside the EU and about 15% comes from other EU countries. There is a fairly nice balance across the two. If I reflect on it anecdotally, I recruited an awful lot of Chinese research assistants, as it turned out, who worked in my field and we also, when necessary, recruited people from the EU. The UK is a brilliant research environment. People from all

over the world want to come and work here. When you advertise jobs you have a range of applications that comes in. Visa regulations, not just for researchers, but for our students, are serious issues, where clearly it is easier to attract the very best from within Europe than outside Europe.

Lord Cameron of Dillington: Would those percentages be the same under Brexit?

Professor Paul Boyle: It is difficult to judge, is it not? I would suspect that, if the barriers are put up a little we might see some more difficulties arising.

Professor Dominic Tildesley: At the RSC, our industrial members speak frequently about difficulties in recruiting from outside the EU in relation to visas, and also students, particularly at the Masters level, coming into the UK. That situation is difficult. I cannot predict how that would be under Brexit.

Professor Andrew Harrison: The numbers that we have are remarkably similar to those that Professor Boyle mentioned. One of the possible consequences of Brexit would be that we would find it harder to recruit expert scientists and engineers. I have about 15% non-UK staff who are expert scientists and who are from the EU. The skills that you are looking for are fairly rarefied, so necessarily we have to fish in an international market. One of the key things about mobility is that generally these people come not with the intention of coming for ever, but for a fixed period of time, often with a family or a spouse. It is equally important that people within the whole family can move and find jobs. The converse is true as well. The reason why many UK scientists are as trained and skilled as they are is that they have also gone abroad. I am in this position primarily because I spent seven years living in France. I would probably have found that much harder to do had the movement of labour between the UK and France, for my entire family and the ability to work, been harder.

Q15 Lord Kakkar: You might have heard our exchange with regard to the question of regulation in the European Union. To help us better understand that area in relation to the impact on science, innovation and technology, could you identify the most influential area of EU regulation in your own discipline or expertise? Can you help us understand how that might have been beneficial, how the UK standing alone, or developing regulation in that area, might have done it differently, and how the harmonisation achieved by this pan-European approach has been beneficial or caused some anxiety?

Professor Dominic Tildesley: Certainly for chemistry, REACH is probably the most important and influential of the regulations in the way that it affects the availability of chemicals. While REACH, like all regulations, imposes some constraints on us, there are clearly advantages to a unified regulatory system in this space. Let me take one of the examples you mentioned, which was animal testing for cosmetic uses. I cannot imagine having a separate regulatory position on that from a position where you were trying to sell into a market that was regulated using different legislation. For instance, can you imagine having a separate UK set of regulations for this, and then attempting to take the goods that you produce and put them into the most important marketplace for us in this respect—Europe—which is governed by a different set of regulations?

The point I want to make is that many of our members feel that having separate regulatory systems would not be effective in this chemical space.

Professor Paul Boyle: If I look to my field, the data protection legislation is probably that which I have been mostly closely aligned to. There is no question in my mind, and I think

most people in Europe would agree, that it is important to have consistent legislation across Europe, but it has also been a challenge to achieve that. We heard from Kurt about the problems with the Parliament compared to the European Commission. For example, just imagine trying to conduct cross-European research in an area where data protection rules were different. It makes it very challenging for survey work, including clinical studies, if the background legislation to the way that you interact with individuals and protect their information, which must be done, varies considerably. There is strong consensus that a consistent approach is important, but it is also essential that we make sure that the ability to conduct science in a rigorous way is protected. As we go forward with this, you will see that the UK voice has been extremely powerful. The lobbying that we have been able to put forward has been extremely influential. There is still some way to go, but we have had an influence.

Lord Kakkar: Do you think there is a risk in that specific example that research in Europe is stifled as a result of that particular regulation to the advantage of the European research base more generally?

Professor Paul Boyle: With any science-related legislation there is always going to be a risk. If you pay close attention to the debates that have been going on in Europe, you will see that the argument from the science community has been very powerful. I would be very surprised if, at the end of the process, we do not find data protection legislation which fits with what we need to do in science.

Professor Dominic Tildesley: In the area of animal testing, although you can imagine that this could be disadvantageous to companies that wish to market products, what it has done in many ways is to stimulate new areas of research in Europe, particularly the whole area of systems biology, to find non-invasive, non-animal ways of making the same tests on products. In some senses, it has been quite an inspiration in drawing forward areas of research to fit into this legislative framework. I might also add that one has to take into account public understanding of science. It is very important that we adhere to quite strong regulatory frameworks to give the public confidence in these areas.

Lord Kakkar: Just to be clear, is there not a view that the regulation that attends the conduct of scientific research in its European element could be improved if the United Kingdom had designed a regulatory framework itself?

Professor Dominic Tildesley: I would rather say that what needs to be improved is the regulatory framework as designed by Europe, as was discussed with you in the last session.

The Chairman: If we look specifically at REACH, which some would describe as ponderous in the extreme and lacking flexibility, are you really saying that REACH was the best of all possible directives for the purpose, accepting for the moment that a unified approach is clearly desirable? Surely we could have done a better job than REACH, could we not?

Professor Dominic Tildesley: Perhaps we could, but REACH is about achieving a balance between elements such as protection of the environment and human health, and, at the same time, avoiding ponderous impacts on research and innovation. I believe that the disadvantages of REACH can be mitigated by influencing decisions on how REACH is applied here, and that is where we have to concentrate.

Q16 Baroness Neville-Jones: I want to ask a supplementary, but, perhaps before I do that, I should declare an interest as a member of the Engineering and Physical Sciences Research

Council and the Foundation for Science and Technology. I want to pursue for a moment what has been said about regulation. In the last session, for which you may have been in the room, we heard rather a strong diatribe against the negative interference which occurs at the stage when the legislation reaches the European Parliament, where certainly it is true that lobby groups that have not been particularly active or influential when the Commission has been drafting come into play and have an effect on the outcome. My question to you is: do you share that analysis? Do you share the implication that if these drafts, which come from the Commission, were left alone and not interfered with, they would be perfectly okay? What view do you take of the quality of the regulatory drafts that come forward? Do you think—on the other thing that was said—that Ministers, when they get to the Council, should be tougher and are well briefed? Do you think more could be done to resist some of the insertions in the legislative process that are unhelpful and could be driven out again if member states and member states' Ministers were more focused and determined?

Professor Dominic Tildesley: I do not have a view on that in addition to the one that we heard in the first session.

Professor Paul Boyle: The nature of its democratic process means that there are checks and balances within it, which means the process of coming up with legislation goes through a series of stages, as it does through the UK. If you look to a number of examples, yes, it is true occasionally that the Parliament can come up with changes that do not suit science. Of course, they come up with proposals that suit other parts of our society perhaps. It is iterative, and during the iterative process we have seen that the Commission can be quite powerful, particularly because of the lobbying that we get from the national states in helping shape what good practice should be.

Baroness Neville-Jones: Does the Commission get it broadly right, in your view, for starters?

Professor Paul Boyle: In general, partly because we interact with the Commission prior to them coming to a view. It is not quite black box. It is not as if the Commission comes up with a view and we have to respond to it. We are very much involved in helping the Commission think about its policy. To be honest, the UK has been particularly influential in shaping areas related to science funding such as research integrity, peer review, open access and a whole range of areas where British science really punches above its weight in helping shape what happens in Europe.

Professor Andrew Harrison: I would echo that. Broadly speaking, at the consultative level that leads to the information or advice that goes to the Commission, the UK is widely respected. It is widely respected because it is seen to run many areas of science well and to punch above its weight.

This is not perhaps quite the same thing. I strongly welcome the recent move to strengthen the nature of the advisory bodies at a high level. In Europe, this science advisory mechanism, this new high-level group, has been established. The stronger and more prominent the advice given in the decision-making process, the better.

The Chairman: We will come back to advice in a moment.

Q17 Lord Maxton: I should have declared my interests—I do not have any. It is quite simple. It seems to me, on data protection regulation, that the real problem is that the technology does not allow access across the board. If you attend even a local hospital in this country, you will find that they do not have records of you on their data files between different

departments of the same hospital. To what extent is technology involved in this? To what extent are the changes in technology, which are taking place all the time, affecting how we regulate and do things?

Professor Paul Boyle: You are absolutely right and your point is well made. A major reason for the need to be very careful about data protection is the growing ability to start linking records across different systems. As we link more and more data together, whether we are doing that for scientific purposes or other purposes of government, it is important to make sure that we can protect people's confidentiality. That can be done, and it is important, therefore, that the data protection legislation recognises that. We could get quite technical, but it is around how you pseudonymise data rather than having to rely entirely on anonymisation. There are very good practices in place in the UK especially for managing that sort of approach, which we need to make sure are included within the data protection legislation.

Viscount Ridley: May I follow up on Lord Kakkar's question and challenge what I think is a little complacency about the effect of regulation with the example of genetic modification? I know it is not your field of expertise, but, none the less, we have seen an evaporation of a very strong field of research in Europe, which we were the leaders in when it started, largely because of opposition across the continent. We have just had an inquiry in this Committee into genetically modified insects, which made it clear that the problem at the moment comes from Europe, essentially. In other words, in Britain there would probably be much greater positivity about this now, but European regulation is not fit for purpose in this area and is discouraging experiments and trials.

Professor Dominic Tildesley: One of the issues I would raise here would be the point of getting really good advice into the European Union and European Commission about these issues. One of the things that we support very strongly is evidence-based decision-making in spaces such as genetically modified organisms and many other areas of science. You have to get the right people advising and supporting the politicians in Europe—indeed, in Strasbourg—when it comes to decision-making in areas of this kind. They need to be informed. I very much welcome the move which has occurred recently in Europe towards broadening out from the influence of one scientific adviser to a panel of scientific advisers. It was good to see David King, our former chief scientist, in a key role in helping to make the decisions about that board. It was good to see the head of the Met Office, Dame Julia Slingo, being moved into a position where she can give advice on climate, which is another sometimes controversial issue.

Viscount Ridley: The person who lost her job in that respect did so partly because she was so adamantly in favour of trying to improve the regulation on genetically modified crops.

Professor Dominic Tildesley: I could not comment on that. I do not know.

Q18 Lord Peston: To reveal my ignorance, I have a question for Professor Boyle. I misunderstood what you were talking about when you were talking about data protection. I thought you were talking about stealing other people's data, but that was not what you were talking about, was it?

Professor Paul Boyle: No.

Lord Peston: The Rosalind Franklin case is the one that one always bears in mind. She was the one who did not get the Nobel Prize. You are talking about individual people wanting to know when they respond to a survey that people will not know it is them.

Professor Paul Boyle: Yes.

Lord Peston: As someone who has not been terribly well in recent years, I do not give a damn about whether my data are protected or not, because I am much keener for the research to succeed. Do you have much information on what the public at large think about protecting data in your sense?

Professor Paul Boyle: There is an awful lot of research going on at the moment. There are discussions at both the UK and European level about how we may implement legislation which would help allow for exactly the sort of thing you have identified, using individual-level data to help us understand more about disease and other things. Doing it in a protected environment means you can have the added advantage of being able to use people's individual records, but you do not need to know their individual name, address, date of birth, and so on, which allows you to go out and identify people. That is an important principle. We can look back in history at times when individual-level databases have been used for rather daunting reasons. It is important to protect confidentiality, but it can be done. That is exactly the debate we are having in Europe at the moment.

Q19 Lord Vallance of Tummel: I have a general question and then a specific example. The general question is, how does our membership of the European Union affect collaboration with industrial partners? Perhaps you could distinguish between an industrial partner that might be headquartered in the European Union and one that might not, perhaps in the States or wherever. The specific is, what might we learn from a public-private partnership, such as the Innovative Medicines Initiative?

Professor Dominic Tildesley: I will distinguish between those two cases that you mention. Let me take a simple example of Unilever as a company that is established within the European Union. Companies of that kind get a great deal from being able to collaborate easily and well with the partnerships that are set up across the Union. Partnerships between France, Switzerland, Germany and Unilever are common and much welcomed by those companies, I am sure, and prove very stimulating in taking ideas across from the pure academic area into the applications field. For companies such as Dow Chemical, established in the States, with some key European presence, some research in Europe, where those American companies have a research base in Europe they can gain some access into that, but, on the whole, I think they find that more difficult. Getting those kinds of collaborations is not as well established in the States. That way of working between industry and academy is not as well established in the States as it is in Europe.

Lord Vallance of Tummel: Do you have anything specific on the Innovative Medicines Initiative?

Professor Dominic Tildesley: For me, this is a very good example of a first-class public-private partnership. We have been able to leverage about €1 billion from companies associated with the European Federation of Pharmaceutical Industries and Associations. It is one of many good examples in this space. Another one would be the sustainable processing and resource efficiency initiative, the so-called SPIRE. This anticipated an impact of a reduction of about 30% in fossil energy and a 20% reduction in non-renewables. This is

across eight industry sectors, involving partners right across Europe. These are good examples of how EU membership affects collaboration with industrial partnerships to their advantage.

Lord Vallance of Tummel: The bottom line is that EU membership does not constrain such partnerships elsewhere, but is beneficial, is that right?

Professor Dominic Tildesley: To be balanced, I am sure there must be some examples of where a constraint has occurred, but, on the whole, I see this as beneficial.

Lord Hunt of Chesterton: Would you agree that this comment extends well beyond industry partners to government departments? For example, the use of weather radar across Europe did not happen until an EU project was funded to do that. There are many other examples. Do you have any thoughts as to whether that can be done more effectively and what the effect might be of the UK departing from the EU?

Professor Dominic Tildesley: The only thought I would offer on that is I have seen this work to very good effect in the UK in establishing infrastructures in computational science, which can be used both by Government, academy and industry to very good effect. It is a model that has worked well here in the UK; I am trying to see whether it can be established in Europe at present through my organisation.

Lord Hunt of Chesterton: They exist strongly in Europe in my experience.

Q20 Baroness Neville-Jones: I wonder if we could move towards innovation. We have touched on industrial partnerships. Innovation is very much a preoccupation of government policy and a strong focus of the research councils these days. I would be interested to know what the panel thinks about the proposals that have been put forward by Commissioner Carlos Moedas for a European innovation council. Do you think that is likely to be an effective vehicle? How well could it be made to tie up with existing sources of funding for innovation, which occur in some of the other funds open to European institutions for research purposes? Is this moving in the right direction? Does it have the right sort of structure to have a fruitful future?

Professor Paul Boyle: Personally, I think it is early days, because we do not yet know what the proposal is from the Commission, and probably will not know for at least another year or two, so we are a little bit ahead of ourselves. On the other hand, the concept, the idea of embedding innovation more strongly, and aligning that with the research agenda, is something that the UK has been at the forefront of, so inevitably we are going to be very positive about that. There is no question that Horizon 2020 has already embedded innovation much more strongly than the FP7 did, and the UK's voice in that was very powerful.

Baroness Neville-Jones: You can waste money in this area.

Professor Paul Boyle: You can, that is absolutely true. I am not going to pretend that this is an easy area. We can look to the UK with Innovate UK, and now some proposals to bring that into the research councils, so you can see some similar discussion going on about how best to do this. It is not a simple area. However, I believe that we need to be pushing forward in that area and thinking more about that gap between industry and research.

Baroness Neville-Jones: Do you think the UK is well equipped to take advantage of that, or do you think that is something other countries might be better at?

Professor Paul Boyle: Inevitably, we are well equipped. There is no question but that the UK is ahead compared to most countries in Europe in the way that it is now integrating innovation alongside research.

Baroness Neville-Jones: Germany?

Lord Hunt of Chesteron: Or Italy?

Professor Paul Boyle: Less so. Germany is doing very well, but the UK is ahead of the game. If you look at the Global Innovation Index, the UK is second in the world, which is all about how well we manage to take our research ideas and then put them out into industry.

Q21 The Chairman: If you look at the level of investment from the commercial sector in research in this country and compare it with our European competitors, you will note that we are at a disadvantage in that respect. We have a poor investment record from commerce. Does that not mean that we are likely to be at a disadvantage in this respect of innovation or transferring technology?

Professor Paul Boyle: There are two parts to that question. There is how much we invest as a nation, and you can also make the strong case that we invest too little in publicly funded research in the UK. There is how much we invest, but there is also how well we do it and engage in it for that which we fund. The UK has very good examples. If you look at the funding from HEFCE, it has been extremely successful in leveraging funding from the private sector into projects that are funded through central government. We have lots of good experience of this, more so than most countries in Europe. To be fair, I take Germany as another good example. It is absolutely right that we probably need more funding in that area, but that is a slightly different question from how well we do once the funding is made available.

Professor Andrew Harrison: If you look at areas such as advanced manufacturing and aerospace, where support has been provided on both sides, clearly productivity has increased in those areas. There are very good examples where this has been done well. Sometimes we beat ourselves up about innovation. I do not wish to sound remotely complacent, because I am not, but in some areas we have done all right. There is far more to be done.

Working closer to the coalface, as it were, in research institutes in Europe and then coming back to the UK, I felt there was a sea change when I came back to the UK two years ago. In academia and more publicly funded labs the culture has changed very widely in the last eight years, in my experience, in that academics genuinely get innovation now. At least, they understand that it is necessary, it is vital to work closely with industry. In that respect, we are ahead of a lot of the rest of Europe. There are exceptions. I am using Europe now in the geographic sense: Germany and Switzerland are notable examples, as are some of the Scandinavian countries.

Lord Peston: You seem to be arguing that productivity could off-set lack of expenditure. Wearing my economics hat, is it not logical that where you are most productive is where you ought to spend most, but the reverse is the case?

Professor Andrew Harrison: The point I was trying to make is that where there has been strategic investment, particularly in infrastructure—I mean that in the broadest sense—you

can see that the industries in those sectors, such as certain areas of advanced manufacturing, have really gained.

Professor Dominic Tildesley: In relation to EU innovation, I am pleased by the innovation in the small to medium enterprises stream, which we find in the Horizon 2020 programme. That is already helping a considerable number of UK companies to develop interesting technologies. My example would be the Cambridge-based company Abcodia, which has received considerable funding to develop its early diagnosis for pancreatic cancer. There are interesting examples where companies are benefiting from loans from the European Investment Bank, which is important.

To return to your original question, the proposal by Commissioner Moedas in July to create a one-stop shop to bring together the various European mechanisms is very welcome. In general, for us, the principle links existing mechanisms, so there is strong potential for avoiding duplication and for minimising complexity to applicants. I want to echo that this is early days. I look forward very much to seeing how that develops.

Q22 Lord Hunt of Chesterton: I have a question about science advice. Do you think that the somewhat different approach to science advice in the EU compared to the UK is good or bad? Does it pose a problem? Could you illustrate your point with the difficult science policy issues? We have talked about animal testing, but there are other areas, such as environmental pollution, where there are horrendous difficulties and embarrassments. GMOs have been mentioned as have carbon emissions, nuclear and exchange of scientific data. Do you think these issues are being tackled well in the EU? How is this related to our potential exit?

Professor Andrew Harrison: It comes back to the issue we mentioned 10 or 15 minutes ago about re-establishing a proper advisory presence at the highest levels post-Anne Glover. It was recognised that there was a strong need for high-profile, transparent advice. It is early days again, but there is a real step in the right direction here within Europe. I hate to say this, but I think we have to wait and see, because I do not know if they have formally met yet, having just been appointed.

Lord Hunt of Chesterton: If you look back on these issues, do you think in science policy the EU has mechanisms or attitudes that are good for solving those problems?

Professor Andrew Harrison: I think it recognises that there are things that should have been improved.

Professor Dominic Tildesley: There has generally been a weakness of putting too much pressure and emphasis on one individual as a single chief scientist. I look forward to seeing how this well-established, interesting and diverse group of seven that has been set up will work. It is not that different in the UK. Although we have always enjoyed a government chief scientist, many of the government departments have chief scientists of their own, so the load is spread. For me, the important thing is that I am not so worried about how you do it, as long as all policymakers in the country can take the time and have the opportunity to understand the scientific evidence on a particular question. When a parliament anywhere—here, Scotland—rushes to a decision without taking the evidence first, that is when really serious problems can occur.

Professor Paul Boyle: Just to follow up on that, it was not as if there was a vacuum of scientific advice prior to Anne Glover being put into her position. The European Commission took advice from a range of different areas.

Lord Hunt of Chesterton: The European Parliament, too.

Professor Paul Boyle: The European Parliament, too. Anne was put in a particularly difficult position. The model we use in the UK is to have a single CSA who sits above other structures, but Anne was put in with very little resource, and it was not very easy for her to influence in the way that she needed to. What we have seen with the SAM is not only a group of people, which may have a little bit more weight, but also the fact that there is resource attached to that, a secretariat and so on. All the signs are that they have recognised there is a need for scientific evidence. We all know scientific evidence is one part of the debate, but we need to make sure that goes into the debate.

Q23 Lord Kakkar: Do you think that there is a greater risk of political interference as the scientific advice is made available at European level compared to what happens in the UK?

Professor Dominic Tildesley: I do not. I cannot see why there would be a greater risk.

Professor Paul Boyle: You used the term “political interference”. We have a democracy that has to take decisions and it will base its decisions on advice from a range of quarters, including public opinion; scientific advice is one part of that. As scientists, we like to think it ought to be a particularly important part of the advice, but that does not necessarily equate to everyone’s views. It is essential that whatever system is in place is properly set up to take on board the various pieces of advice that should be presented. There are certain topics that particularly require scientific advice, of course, and in those especially we would hope that that advice is taken seriously. We can point to examples in the UK where you could argue that scientific advice has not been taken by government as strongly as perhaps scientists think that it should. In any democratic system that will inevitably happen. We hope on average, and in the main, scientific advice will be taken seriously and acted on.

Baroness Neville-Jones: I have a point of clarification, Lord Chairman, and please forgive my ignorance. Obviously, the panel has the advantage over one person of having a range of expertise, but to which institutions is it mandated to give advice, and will that advice be public?

Professor Paul Boyle: We have not yet seen the proposals around the governance, and so on, precisely. We can all guess. I think you will find that the advice, if we look at any of these bodies that exist already in nations, is made publicly available. It is independent scientific evidence and, therefore, should be treated as publicly available. As I say, we do not yet know exactly the governance arrangements for how this panel will work.

Baroness Neville-Jones: You do not know if it is mandated to give it not just to the European Commission but also to the other institutions, the Parliament and Council?

Professor Paul Boyle: I am not sure.

Lord Cameron of Dillington: As I understand it, they will only be able to advise only on questions they are asked; they are not allowed to advise on policy. That is what I have read.

The Chairman: We can probably get a brief on this.

Baroness Neville-Jones: I think it would be quite helpful to have a brief.

Professor Dominic Tildesley: May I mention something we talked about earlier, which is, apart from these seven wise individuals advising, the Commission takes advice from a large number of scientists right across Europe, at the stage of the refereeing of proposals, which is often on scientific quality, and at the stage of bringing people into groups—groups around biology, computational science, mathematics, physics—to advise the Commission on the direction of research. In those regular meetings, a great deal of advice is given by ordinary scientists; they give their opinions on how the programmes should be shaped. Apart from this top-down approach, there is also a bottom-up approach to feeding in advice to Europe.

Q24 Lord Maxton: Is there a difference between what I would call computer technologies and science in this field? It seems that the major computer companies are from the USA, not from Europe. They may have a European base, but they are from the USA. Secondly, science is based very much on the research that is done, whereas I remember someone from Microsoft telling me many years ago that the next big breakthrough in computer science would probably be done by some 19 year-old working in his bedroom on his laptop. The major companies may buy him up, but that is where the next idea will come. Is there a difference between these two fields?

Professor Dominic Tildesley: You are right that Intel, IBM and most of the large companies have an American base. France has tried, through the introduction of Bull, to have a French base, and this has been a very interesting experiment in high-performance computing. I think others on the panel would agree that high-performance computing is now so intimately wound up with the way that we do science that it is no longer something I could even think about as being separate. The computational sciences, and the methods of using computers in science to test theories and experiments and to give us new ideas, are now so involved in what we do that I find it very difficult to pull those apart.

The Chairman: Thank you very much. We have come to the end of the questions we wanted to put to you. We are most grateful to you for the patient way you have addressed the issues. There will be a transcript sent to you for any minor corrections. If there is any supplementary evidence you would like to send in to elaborate on any of your answers, please feel free to do so. On behalf of the Committee, thank you very much, Professor Boyle, Professor Harrison, and Professor Tildesley, for your help today.