HOUSE OF LORDS

Science and Technology Committee

Corrected oral evidence: Delivering a UK science and technology strategy

Tuesday 22 February 2022

11.20 am

Watch the meeting

Members present: Baroness Brown of Cambridge (The Chair); Baroness Blackwood of North Oxford; Viscount Hanworth; Lord Holmes of Richmond; Lord Krebs; Baroness Manningham-Buller; Lord Mitchell; Lord Patel (co-opted); Lord Rees of Ludlow; Lord Sarfraz; Baroness Sheehan; Baroness Walmsley; Baroness Warwick of Undercliffe.

Evidence Session No. 2 Virtual Proceeding Questions 9 - 15

Witnesses

Professor Sarah Main, Executive Director, Campaign for Science and Engineering (CaSE); Gavin Costigan, Chief Executive, the Foundation for Science and Technology; Professor Graeme Reid, Chair of Science and Research Policy, University College London.

Examination of witnesses

Professor Sarah Main, Gavin Costigan and Professor Graeme Reid.

Q9 **The Chair:** Good morning and welcome to our second panel of witnesses. Thank you very much indeed for joining us today.

Before we start the questions, I remind you that the session is being broadcast on the internet. A transcript of today's session will be sent to you in a few days' time for you to check and make minor corrections. If there is anything that you would like to have said but did not get a chance to, or something that you want to put in or to clarify, we would be delighted to receive supplementary evidence from you in writing after the meeting.

If that is all clear for our witnesses, we will start with the questions. I will kick off with a very broad question.

I would like to understand what you think are the strengths and weaknesses of our increasingly complex research, development and innovation landscape in the UK. I would be particularly interested to hear what you think we might learn from what goes on overseas, and whether there are particularly good science and innovation policies that we should be picking up from overseas. Let me start with Professor Reid.

Professor Graeme Reid: Thank you very much for inviting me today. I am a professor of science and research policy at UCL. I also chair the board of the National Physical Laboratory and I am a member of the council of Research England within UKRI.

First, I think this country has considerable strengths in its policy framework, and we should not lose sight of them when we explore areas of improvement. The relentless focus on excellence has stood this country very well indeed and has allowed us to deliver a highly and widely respected performance, often from comparatively modest levels of public spending.

As science gets bigger in scale in this country and secures a more prominent place in public life, we start to encounter some obstacles that may not have attracted much attention in the past. In particular, interfaces between science policy and other areas of policy are becoming limiting factors in progress. For example, the relationship between science policy and immigration policy, which has already been touched on, affects this country's ability to attract talent. The relationship with taxation policy affects our attractiveness to business investors in R&D. The relationship with education and skills policy affects the long-term pipeline and attitudes to science in an emerging generation.

You could even say that we are beginning to bump into issues relating to transport policy. The ability to collaborate between institutions in different parts of the country is influenced by the effectiveness, or otherwise, of our transport networks. We see that, for example, in north and south

Wales. I would point to those, as well as the many excellent points that we heard in the previous session.

The Chair: Do you think that the new Cabinet committee can be a solution to that?

Professor Graeme Reid: A new Cabinet committee at least creates the administrative machinery for discussing those issues in the round. One of the problems in the past has been that we have not even had the mechanisms to discuss these issues. I think that this Cabinet committee is a very good move. It does not solve it in itself, but it creates prospects for addressing these issues that we have not had before.

Professor Sarah Main: Good morning. Thank you very much for inviting me to the evidence session today. I am the executive director of the Campaign for Science and Engineering, otherwise known as CaSE, an independent advocacy organisation looking to create an environment in the UK in which science and engineering can thrive. We are supported by over 100 member organisations, as well as individual scientists and engineers, and those organisations span businesses, the private sector, universities, research institutes and the academic sector, charities and public engagement centres and philanthropic organisations. To give you a sense of that membership, they employ directly just over 300,000 people in the science economy in the UK, and our charity and business members invest just over £30 billion globally in R&D. Much of what I might say today is informed by the views of those organisations and individuals whom we speak to on a regular basis.

Thank you for your opening question, Chair. I am sure you will hear through the course of your evidence-gathering many metrics on which the UK is counted to perform well, and to perform perhaps above its level of investment. Those are well documented.

To characterise some of the strengths that we hear from members across the business and academic community about what makes the UK an attractive place for them to do science and engineering activity, some of the things that we hear very frequently are the strength of the academic research base, which is attractive for businesses. It attracts investment and it creates a reassurance of a talent of skilled people whom those businesses can employ.

Time and again we hear about the strength that the UK has in its breadth of expertise, which was mentioned in the previous session. It is a characteristic of the UK that it performs very well across a very wide range of activities and disciplines. I think that gives it agility in the ability to pivot to areas of emerging interest, whether in a pandemic, as we have just seen, or in an area of emerging academic interest.

Finally, I would add that the research capability of the UK is of course underpinned by the people who are here and doing that work—the skills base we have in academia and in industry across the UK.

There are a number of weaknesses that we could explore, but the one word I would use is that it is underpowered. It is underpowered by any number of metrics that you might wish to see, and, Chair, you have

asked about international comparisons. To give some detail on that, which we can provide more in writing afterwards, CaSE has recently done a range of analysis, just prior to the comprehensive spending review, looking at R&D investment by comparator countries.

I want to say two things about that. The UK's current goal of transforming its economy and culture to become much more intense in research and innovation to a level of representing 2.4% of GDP is a transformative goal for the UK. May I illustrate this with my hands for the committee? The UK's gross expenditure on R&D over 20 years has been almost completely flat at 1.6% to 1.7% of GDP since 1999, and we are looking at really transforming that into a 45-degree angle uptick on that graph in the space of 10 years. This objective was set out in 2016. At that time, gross expenditure on R&D was 1.67%, so, give or take, 1.7% of GDP. At the last count it was just about 1.8%. In 2019 it was 1.74%. In the first few years of this strategy it has risen a little, but there is a very long way to go.

Only a small number of countries have achieved that kind of economic transformation. UKRI has looked at this and we have published some work looking at acceleration of research intensity over that 20-year period. Countries such as South Korea, China, Germany and the USA have increased their R&D intensity over the last 20 years by anywhere between 0.5% of GDP, for the USA, to 2.6% of GDP, for South Korea, with others in between. The UK over that time, as I have said, has increased by 0.1% of GDP.

There is much to be learned from other countries. I would say the main messages that I have seen from some examination of that work is the setting of ambitious goals that stand for the long term. Those goals must be held over long timeframes and successive Governments need to be persistent about the pursuit of those goals. You can see in closer examination of the progress of some of those countries that they may have had multiple strategies and multiple attempts over that period to achieve that goal, but they have persisted with the goal.

We hear from our business members that the rhetoric given by the Government on their ambitions is really important to give them confidence to invest, but, more than all else, that stability and long-term planning and long-term budgets are what really help the business community to have the confidence to invest. I will stop there, but I am happy to expand further later.

Gavin Costigan: Thank you very much for the invitation to speak. I am the chief executive of the Foundation for Science and Technology.

You talked in your opening question about the complexity of science. To answer the question about the strengths and weaknesses, I think you need to step back and ask: what is science for? The reason that I put it rather bluntly is that it is for several different things, and they have slightly different judgements of how well we are doing. For example, in a straight measure of developing new knowledge, we can talk about citations and impact and all that, and that is great. When we are talking about helping to address challenges in society, there are a whole lot of

different issues, some of which are the quality of science, some of which are the volume of science, some of which, of course, are the way science interacts with other government departments, which is what Graeme was talking about, and the whole science advisory system.

There are pluses and minuses, and let us not beat ourselves up: there are some quite good examples within that kind of space. One of the areas is wealth creation. For at least 30 years, we have been saying that we do not have quite the right answer in converting science into wealth creation, but, again, I do not think we do too badly.

On specific negatives, when you say that, you start from saying that we are in a positive place. All these things have to be reflected against a pretty good story. I think there is an issue of diversity within the science community—within the science and technology workforce. Work by the Royal Society and others has looked at how people from ethnic minorities and women are represented in science, and how that changes as their careers go up. It is a weakness in the UK system and it therefore affects the things we can do.

I do not think that we have quite got to grips with top down versus bottom up and exactly what that balance is and how we decide it. I also think we have set up a body, UKRI, and we have asked it to do a large number of things, some of which are not completely contradictory but certainly pull it in slightly different directions. We may get on to that a bit later and on to whether more money should flow through government departments and so on. "Weaknesses" is a strong word, but there are certainly challenges in the system there.

The Chair: Thank you very much. Let me move on to Baroness Warwick.

Q10 **Baroness Warwick of Undercliffe:** I have only one interest to declare in that I am a member of the council of Nottingham Trent University board, but I have been involved with universities previously.

The next question follows on rather well from the comments that you have all made because we are in the rather fortunate position now of having a Government who are committed to providing substantially more research and development funding. The question then arises of how that increase in public funding will be allocated between the various different organisations that you have all mentioned so far, including the public sector research establishments, universities, obviously, and government departments, and who should make the decisions.

Perhaps I could also bring in ARIA, which has been set up with rather different principles of high risk, low bureaucracy and low oversight. There is a lot of ambition for it to do great things, but should those principles be applied more widely to other ways in which we look at the innovation ecosystem? Perhaps I can start with Professor Reid.

Professor Graeme Reid: I feel a bit apprehensive about defining the budget allocation process by institutional type. I am uncomfortable with the notion that you can weigh a bucket of universities against a bucket of

PSREs and try to get the balance right. There is too much complexity and nuance in the system for that to work. Some prominent research institutes are actually consortia of universities and other funders. Universities and research institutes are not distinct populations, but they have different capabilities.

Who should decide and what should the decision be? At a high level the decision is made by the Treasury as the paymaster. Indeed, in last October's spending review there was a degree of specification on how the funding should be balanced between UKRI and government departments.

When it comes to government departments—I will come back to universities in a moment—we are dealing with funding that goes to different people for profoundly different purposes. Some departments might indeed act as funding agencies and be commissioning research from universities or others. Other parts of government departments need research to develop their own policy and public service capability. They may have in-house research laboratories to enable them to do that. That research budget can take on quite different flavours in different bits of government.

What is more, some departments, such as Health and Defence, have a long history of managing sizeable research budgets. In the spending review last year I was rather pleased to see departments that do not have such a distinguished history in research being named as the recipients of research funding, so they are going to have to develop, one imagines, entirely new capabilities to decide on whether to do research in-house or commission it externally, and how to manage a research budget when they have no experience of that.

I would add all that up together by saying that, instead of using institutional definitions as the device for allocating money, I would focus on the purpose of the research, and then try to find a portfolio of applications that best serves that purpose, rather than starting with the institutions themselves.

Baroness Warwick of Undercliffe: Who would you think in those circumstances should make that decision?

Professor Graeme Reid: My guess is that it will not be a national master plan. I do not think that a national master plan is the way it would work in this country. There will be layers to it. The new Cabinet committee provides at least a mechanism for having a debate about the balance of resources within government departments. There is already machinery in place to determine the balance of resources within, let us call it, the UKRI community. My guess is that we will see a hierarchy of decisions. The reality is that the Treasury is at the top of that hierarchy, but the Treasury decision is at a very high level. There is a lot of important consideration to be given in the layers beneath that.

Professor Sarah Main: In our view, and from what we hear from members, we should not be afraid to experiment with how R&D is funded. We hear that a diversity of funding models and criteria can help a wider set of researchers and innovators to flourish. I think that some of the

review of bureaucracy is trying to widen the accessibility of funding streams to different organisations.

I agree with Professor Reid about the different nature of the types of work funded through government departments and different institutions. CaSE has done some work over the last year that we are due to publish soon, working with and listening to PSREs across the UK to map their contribution and highlight the role they currently play and could play in the future. We would be pleased to share the preliminary findings of that if the committee was interested. We see that there is capacity for government departments to make much greater use of PSREs to serve their public duty.

It is important to think not just about the flow of the budget itself but the capability of the institutions to use that budget. For example, we know that in the period of what might be called the austerity years—2010 onwards for about five years—R&D spending by civil departments fell by, on average, 30% over those five years. I think that it is reasonable to assume that there was some loss of people capability with that reduction in activity. We see in the comprehensive spending review, as Graeme has just mentioned, that there is now a trend towards more money going across government departments, and there is oversight by the committee in thinking about that. It is crucial that there is a forum in government for thinking about the talent and capability in those departments for using their budgets well and commissioning as intelligent customers.

The thrust of the question is also around the whole portfolio of different types of institution within the landscape. It is a strength—I have seen it and I have heard it from other organisations—that the UK has a really interconnected ecosystem in its science economy, and that some of our most valuable and strategically important science and research and innovation activities happen at the interfaces of that system. During the pandemic phase, we saw some particular disruptions where some parts of industry were very heavily hit and had to pull back from some of their R&D activities, putting public-private interfaces in some instability. The same also happened in the charity sector.

From our point of view, it is trying to think about the richness and diversity of the whole of the UK science and innovation ecosystem. I would encourage the committee to think about how the whole of the system can be supported, rather than the jewels in the crown and how to support individual sections of it. The interfaces between them are crucial, too.

Gavin Costigan: Certainly, compared with other countries we might find that the UK has a greater percentage of its research carried out in its university sector than in its PSREs, and a greater percentage of funding that is supporting research going through its national funding agencies, which are also supporting all sorts of research, rather than through government departments.

Looking back at history to the *Realising our Potential* White Paper and many other things—the setting up of the research councils in their present form—there was definitely an idea that money would flow

through government departments for research that was targeted at their needs, and research councils would be funding research that was more generic across the piece. It has been very difficult for government departments to maintain their research budgets over that time. As Professor Main was describing, in the austerity years they went down again, but they had already gone down some while before then.

In theory, it should make a lot of sense to have a greater amount of R&D budget in government departments because quite often the research that is needed is not quite the research that UKRI was set up to deliver. UKRI was set up to deliver the most innovative research and research of the highest quality, and that is exactly what you want.

Quite often for a government department, however, that is not necessarily what you want. You might want something delivered faster, or something that is delivering a really important dataset for a set of activities but is not the most highly competitive and innovative piece of research.

There are different needs in the system and it is interesting that our system has morphed a little to create so much of that funding through UKRI and so much of that funding into the university system.

I would hope to see a greater percentage coming through the PSREs in future as we grow up, but I certainly agree with the comments of Professor Reid and Professor Main that these things are all interconnected. It is not you do this and this happens; it is a whole system.

Baroness Warwick of Undercliffe: We have not covered private sector investment but perhaps that can be picked up elsewhere.

The Chair: May I gently remind our witnesses to be as concise as possible? We move to Baroness Walmsley.

Q11 **Baroness Walmsley:** I do not have any interests to declare. It is not the first time we have attempted to co-ordinate science and technology policy in the UK. Could you tell us what we might have learned from previous attempts? What worked and what did not, in other words? Professor Reid, you might want to mention anything we have learned from the devolved Governments when you are answering that.

While you are answering that question, will you also reflect on the consequences of a frequently changing science and technology strategy, and how the UK could seek to achieve a more consistent and long-term technology strategy? Indeed, is it desirable? I suspect from what Professor Main said a few minutes earlier that you think that it is desirable, but perhaps you will elaborate on that. Perhaps we may start with Professor Reid.

Professor Graeme Reid: Strategies are quite popular, are they not? There seem to be a lot of them around. I would offer a few suggestions about how we could learn from the past and have strategies that leave more of an imprint on our lives.

Baroness Walmsley: That is what we want.

Professor Graeme Reid: There seems to be a desire for each strategy to appear to be entirely new, when, actually, many of them are set against a history and a context that may not have changed as much as the authors would like us to believe.

A good strategy should, first, recognise its forebears and describe the incremental advance—because that is what it will be—that is contained in the strategy rather than present something that is devoid of history.

My second observation is that I really do not see the point in having a strategy unless there is a delivery plan embedded in it. Every strategy should include a sizeable proportion of the document given to delivery. If there are areas of delivery that are not yet developed, or are unclear, then let us say that, and we can start to devote our energies to working out how to deliver the ambition.

My third and final point, and I am going to sneak in an answer to Baroness Warwick's business R&D point, is that we should recognise that the readership includes businesses from all over the world, and the UK competes to attract investment from businesses all over the world. Sometimes strategies take on a rather internal UK flavour when, actually, we are trying to compete with other nations to make this country more attractive to business investors. I think it would be good if strategies reflected that a bit more.

Baroness Walmsley: If you have any examples—you might want to write to us about this—of where there has been a good implementation plan embedded and it has worked, and areas where perhaps it has not worked so well, the committee will be interested in hearing about them.

Professor Sarah Main: Yes, indeed, there have been a number of strategies, I am sure going back longer than I can remember, but there are some that certainly I have been part of thinking about, and many people in this committee will have as well.

I reiterate the point that I made earlier that what we hear from business organisations and universities is that the most important factor is that stability and long-term goal. While I appreciate that politics is as it is and that new Administrations often have a new strategy, or a new concept perhaps, the attribute I mentioned earlier of persistence is really important. You can see this with other countries. They may not have had the same strategy over 20 years, but they have had a number of strategies working towards broadly the same purpose that have resulted in uplifts, in some cases. Israel is an example of that.

I agree with Professor Reid about how to frame strategies as incremental, and building on what has been done successfully in the past. The committee might look at the industrial strategy of 2016 and its evolution, if you like, into what we have today, as an example.

Our members and organisations tell us that the signalling in the strategy is important, to give them confidence to invest, and to give them a sense of continuity. The R&D targets we have at the moment are doubly

valuable as they set out a quantum and a budgetary increase, but they also create confidence from investors. That is really welcome.

In recent decades, and under different Governments, there have been other strategies. What is important, which we could learn from at this time, is that the scale of ambition that has been set out, literally to transform the UK's economy and culture to be more research and innovation-intensive, must work for this Government and successive Governments, because this outcome will have an effect over generations. It must work for the research and innovation sector—the science economy, however you want to define that—but, critically, it really must work for the public. We have heard witnesses talk about that this morning, about the importance of what it is all for and, as Gavin said, who it is all for. This strategy is not just about trying to achieve those economic numbers I mentioned earlier, although they are useful metrics and ways to compare our position to the rest of the world. They are about making a meaningful and material transformation in people's prosperity and livelihoods.

The critical thing to learn from how previous strategies have been addressed and what we could do differently this time is to involve those different communities and stakeholders from the beginning and in the creation of those strategies, so that people feel ownership and engagement in a keystone of the future of the nature of what the UK will become.

Baroness Walmsley: I am also taking from what you said that it is very important to have that long-term consistency for the confidence of both the research field and business investment. Is that right?

Professor Sarah Main: It is critically important. Some businesses, and we have heard about defence in the earlier session, will talk about 70-plus-year planning horizons. The space industry might be one. Submarines is another. You can talk to companies that work in those areas that are working on multi-decade planning horizons.

I will be brief, but because you asked for a specific example, you might want to look at the pact for research and innovation, which is an initiative Germany has held since 2005. It sets out an annual increase in research and development budgets of 3% a year, and it is running until 2030. That is a cross-party, stable commitment that has worked successfully in Germany.

Baroness Walmsley: Thank you very much. Mr Costigan, do you agree with that?

Gavin Costigan: I agree with everything that my fellow panellists have said. I do not have much to add, except that when a strategy is rapidly unwound like the industrial strategy, it has a feeling of, "What was that all about? Why did you get us excited about all of that? How do we fit that into things?" There is a sense in which science and technology needs its own strategy, but it is an important contributor to many other government strategies, and that is what we have seen.

It is interesting when you get two documents in a short period, one of which is the integrated review and one of which is the levelling-up White Paper, and they both talk about the importance of science. You look at them together and think, "Can we do both?" The answer is you probably can, but you need to be intelligent about it, because if you just read it as it is written, you would think you were being pulled in different directions.

Baroness Walmsley: You want some cross-referencing.

Gavin Costigan: Cross-referencing—also, I go back to my very first comment: what are we doing it for? We are not doing it for its own sake; we are doing it for other things, and the other things have their own strategies, and that is how it needs to integrate together.

The Chair: I am afraid we are going to have to speed up a bit, but please may I hand over to Lord Holmes?

Q12 **Lord Holmes of Richmond:** Good morning to our witnesses. Thank you for taking the time. My declaration of interests: I am adviser to three technology companies that are set out in the register.

The UK Government have set out or expressed an ambition for the UK to become a science superpower. What do you think this phrase should mean and how should we go about measuring its success? May I start with Mr Costigan, please?

Gavin Costigan: I will be honest; I do not know what it means. I find it slightly uncomfortable as a phrase, and that is perhaps because I have more of a background in collaboration than the concept of a superpower. There are certain things that you can measure. You can measure the R&D level, but, as you say, at the moment we are aiming to get to what was in 2018 the average of the OECD. Does getting to an old average make you a superpower in science? I am not sure that it does.

I am repeating myself a little. I am interested in what we are trying to achieve with science. Some of that is in the integrated review, and you can see the different things, but I find the phrase "science superpower" unhelpful and unconvincing, personally.

Professor Sarah Main: We could ask the question: what do the Government think science superpower means? We have heard the phrase used in a number of speeches and documents. I do not think that we have seen a coherent vision set out yet for what the Government consider that phrase means.

Beyond the economic metric of reaching an economy with 2.4% of GDP spent on R&D—I will let my colleague Graeme add to this point—Graeme and I, rather independently of our day jobs, as it were, have had this conversation a number of times and have dared to think about how we might gather some views from people in different parts of the science, research and innovation economy on what a science superpower means, with the intent of trying to illustrate and set out the fact that you could reach the econometric goal of 2.4% of GDP in a number of different ways, and the UK, its society and economy would look and feel and be

very different in each of those different ways depending on how you went about it.

We have begun thinking about that and thinking about convening discussions with a range of others, and we would be very happy to share some preliminary thoughts with the committee once we have a little more information from the work we are doing.

Lord Holmes of Richmond: Thank you very much. You have been nicely teed up, Professor Reid.

Professor Graeme Reid: Professor Main has laid the ground here. She and I have been thinking about this very question for a few months and we are convening some discussions.

To add a little illustration to the options that we are thinking about, there is a version of 2.4% that is reached by keeping the shape of the research community intact and having every bit of it expand in equal proportion.

There is another version of 2.4% where you keep the academic research base as it stands right now and concentrate all the expansion into higher levels of business investment.

There is another version where you put all the emphasis on the Government's policy priorities, be it net zero, public health or cybersecurity, and drive it that way.

These take you to three profoundly different versions of 2.4%. Assuming that there is a link between 2.4% and scientific superpower, it implies different versions of a scientific superpower. Starting with these three caricatures—they are all extremes—we thought we would provoke a little bit of debate, very much about the question that we have just been asked to answer. I would echo Sarah's point that we would be delighted to come back to the committee when we are a little further down this road.

Lord Holmes of Richmond: One follow-up for you Professor Reid. How do you see this shaping up as regards the difficulties, if you will, between the fact of the current shape of the British economy being largely services and how science tends to operate? What are your thoughts on that current situation?

Professor Graeme Reid: First, I think that a heavily service-based economy is highly innovative by its very nature. I have a table in front of me that comes from European Union statistics showing that three of the UK's top 10 business R&D investors are banks. The film industry, which is now expanding in scale at quite a dramatic pace in this country, is highly technology-intensive, so my sense is that we are going through some quite profound changes in the relationship between research and business.

In some cases, the research community is ahead of the policy narrative. Researchers are doing far more collaboration than policy documents recognise. In other cases, I think that we will have to accelerate the pace of university-business collaboration in some sectors.

The Chair: Thank you for keeping us on track, Lord Holmes. May I move to Baroness Sheehan?

Q13 **Baroness Sheehan:** I would like to move on to something Professor Reid raised in his introductory remarks—the challenges of working across different areas that have to be brought together if we are going to have a successful science and research and development base. These are the challenges of transport issues, education, immigration policy and taxation policy. Do you think that the Cabinet sub-committee and its supporting body, the Office for Science and Technology Strategy, will help to co-ordinate science and research across departments more successfully?

Professor Graeme Reid: We cannot tell until we see how this operates. The administrative design feels right. It sounds to me like it is a good way of getting more time for research and innovation policy at Cabinet level and across departments.

Will it make a difference to the way in which government departments incorporate research and innovation into their own policies, and will it make a difference to the way policy is joined across government? I simply cannot tell that from the administrative design alone. I think that the intent is there, but I hope that committees such as this one will keep feet to the fire and monitor progress down the path that has been set out in the strategies and policy documents. I just do not think I can sit here and give a level of confidence or scepticism in the effectiveness of the administrative structure.

Professor Sarah Main: It is a rather similar point to Professor Reid's, but I am fully supportive of the intent to co-ordinate across government, and for the UK to make the most of its science capability in the most holistic way possible, with all government departments able to execute their public duty with the benefit of good-quality research and innovation to help them deliver public services.

I am somewhat agnostic about how that is done, in the same sense as Professor Reid was referring to: the construction of the Cabinet committee itself does not ensure that. It seems like a good start. I am no expert in government structures, but it seems like a helpful way to bring together the leadership of those departments.

However it is achieved, the overall outcome or goal is one that I fully support, in that we move from the idea of science and research being contained within a pocket of one part of the department to it being an asset that the whole of government and UK society can benefit from. We are seeing encouraging signs of that, as Gavin mentioned earlier, with R&D being so prominent in some flagship White Papers recently in areas outside what you might call traditional research and innovation.

I would give a specific example to illustrate why I think it is so important that we have better join-up between departments and their briefs. It remains a concern to us at CaSE, and to many of our members, that the higher education and science briefs have been decoupled through the loss of the joint DfE-BEIS ministerial link. If the Cabinet committee can bring together greater integration of thought and action on some of the things

that we will need to deliver the transformation we are talking about, represented by the 2.4%—an economic and cultural transformation—that would be very beneficial.

For example, universities obviously mix in their activities both research and teaching, and we need that to be thought of in an integrated, coherent way as between the 2.4% university mission. In our education sector, if we are going to have a 2.4% R&D economy we want to ensure that the young people of today in 5-to-19 education are equipped and enthused and able to create benefit from that new economy.

Gavin Costigan: Very briefly, because I agree with my fellow panellists, I think it is a good start. Anything that helps government departments to focus on science and technology and the challenges across has to be a good thing.

A couple of really interesting relationships need to work. One is the relationship between that body and UKRI as the main funding agency. The other one is the relationship between that body and the Government Office for Science. That is an interesting set of dynamics where the Government Office for Science is primarily about scientific advice. Actually, it is about more than scientific advice. It has done a lot to pull government departments together to think about issues of science. How successful that body is will be determined, partly at least, by how those three bodies can work together.

Baroness Sheehan: This Cabinet sub-committee will, we hope, help cross-departmental working. Do you think that it will help vertical working and the different layers of government—central, devolved, regional and local government—to work together to develop a good, healthy base?

Professor Graeme Reid: I do not see any explicit remit in the Cabinet sub-committee, but if I turn to the other part of your question of how important that is, I think that, as greater levels of policy responsibility are devolved to regional and local levels, scientific capability takes on an entirely new purpose at regional and local levels. That is true of scientific advice. If you devolve responsibility to local level for policy-making, how does the local government layer acquire scientific expertise to inform policy at that level?

If we take the levelling-up White Paper at its word, it includes an important R&D dimension, and I would favour more regionalised decision-making, but do regional and local government have the expertise required to make decisions on science and research priorities? I think that you are pointing to an emerging area of considerable importance.

Professor Sarah Main: I would add, as regards function, that there is an opportunity for this Cabinet sub-committee to be well connected with the external R&D environment, which might help in the challenge that you have set out. My understanding of the structure of these committees is that it does not have to be. It is a ministerial committee and it could be entirely internally focused to government. I, and many others in the community, would really like to see it looking outward and using

expertise from across the UK and internationally, and civic and local leadership as well as academic and business expertise, to support its work.

Q14 **Lord Rees of Ludlow:** My interests are: I am a member of Cambridge University and the Royal Society, and I should perhaps say that I am on the advisory board of both CaSE and the FST.

I would like to ask about the integrated review. It sets out a framework where, internationally, the UK should seek to decide whether to own, collaborate or negotiate access to different areas. Do you feel that this sort of prioritisation is sensible, and how would it work? Is there a risk of our taking on too much?

I would add a footnote to that. What about the question of whether we become a magnet to foreign talent, an earlier mantra that was regarded as serious in the UK? Graeme, do you want to start?

Professor Graeme Reid: First, I thought that Lord Willetts made some very good observations about the origins of this thinking in the security and defence domain, and the caution that we should exercise as that way of thinking starts to pervade science and research more widely. I will not repeat what he said.

I struggle with the notion of the UK owning domains of science. I just cannot work out how that operates. On the other hand, if we are talking about the UK having the ability to harvest scientific expertise from around the world and convert it into economic impact in this country, I think we can definitely learn from others and do better ourselves. I think it was Beth Thompson who emphasised that science, if anything, is becoming more internationalised and that many of the great challenges that humanity faces can really be tackled only through even more extensive international collaboration. I do not think that precludes the harvesting of research impact for the UK, but I find it difficult to work out how it turns into owning science.

Lord Rees of Ludlow: Professor Main, can you interpret these words?

Professor Sarah Main: I will try to be really brief. I wanted also to say how interesting I thought Lord Willetts's comments were earlier.

I can add a couple of different comments. Certainly, a unilateral approach would seem to need quite some thought, as co-operative efforts by other nations would be likely to overtake what we might do unilaterally, although perhaps there are security reasons for pursuing that in some areas.

Maintaining the UK's approach as a collaborative and reliable partner is important. We saw with the changes to the overseas development aid budget a year ago that, in fact, the UK's reputation as a reliable partner internationally was damaged as a result of those changes in the budget. We need to pursue a collaborative and open agenda, and we need to be a reliable partner in that.

I will make another point, and I know you have heard it already, about the importance of pursuing the Horizon Europe agreement, which is ready to be signed and is being held up for other reasons. It seems that the negotiating team and the scientific communities in Europe and the UK have worked extremely hard to get to the point that they are at, and it would be a great asset to all if political agreement could be reached on that as soon as possible.

The final thought that I would like to offer on this subject is that, in my view, there are two different strategic discussions going on, one about the UK's place as global Britain and its security and international agenda—it is completely legitimate for the Government to be thinking about that—and another one as regards what the UK wants from its academic and its business research capability.

That research capability, particularly in academia, is driven by incentive and reward, which is set up through strategic thinking in government. The impact agenda has for many years rewarded the attraction of third-stream income and the creation of research that results in changes to public policy, for example.

Universities and academic researchers are pursuing work that has been incentivised by government, and it seems me that the two conversations are diverging somewhat at the moment. I am not aware of a forum for discussion between the stakeholders in those conversations to really bottom out thinking between the two agendas. I do not know whether this committee is an appropriate place for this discussion, or whether there are places in government where that discussion is being held, but I am not aware of them, and I think it is really important that those discussions are had.

I know you talked earlier about the Haldane principle, but the UK science endeavour does not work on the Haldane principle alone. There are strategic levers, and rewards and incentives in the system, and they need to be aligned and work together in everyone's public and national interest.

Gavin Costigan: I agree with everything that my fellow panellists have said. The only thing I would add is that in some areas there is a perception that the UK has a little bit of repairing of relationships to be done, given what has happened with the cut in ODA and GCRF funding, and given the uncertainty about Horizon Europe. It is fine to have a strategic document such as the integrated review that talks about a science superpower, but if we are talking about international collaboration, we also need to find a way of talking about collaboration and being a reliable partner. There are certain issues with some of the language and the way we do that that we might want to think about.

Lord Rees of Ludlow: That might be a salutary point on which to end.

The Chair: I need to move on to Viscount Hanworth, who has not had a chance to ask his question yet.

Q15 **Viscount Hanworth:** The Haldane principle has just been mentioned. Is

there a danger that the Government are becoming too prescriptive in science policy? What should be the balance between a top-down policy and a hands-off approach?

Professor Graeme Reid: I think that the answer will vary between different parts of the research base. I would expect government departments to be more prescriptive about the use of their budgets for public policy development and public service delivery, whereas in the university community I think that the greatest value to the taxpayer comes from releasing the curiosity and expertise of the academics. That is why you do the research there.

To get to the balance you need to differentiate the distinct purposes of different parts of the funding.

I think that the Haldane principle should be a cherished part of our research community. It underpins the extraordinary performance that we get from modest levels of investment. It makes the most of the expertise that is in the research community. It does not mean that researchers just get lots of money and they can do whatever they want; that is a complete misreading of Haldane. There are many ways of ensuring quality and testing ideas and putting them into competition with one another before public money can be accessed.

Viscount Hanworth: That sounds very wise to me. Sarah Main, do you have a contribution, briefly?

Professor Sarah Main: I will not add much more to that. As has been mentioned in the previous session, we are talking about this in the sense of rising budgets, which is a much more comfortable place in which to talk about diversity of funding models and building out a portfolio that supports different types of research and innovation, so that is welcome.

I think that the dual funding model is an asset for the UK and that should be recognised. It is about that principle of funding, but it is about the accountability and the ways in which the research is assessed either at application or retrospectively by QR. It is a combination of the principle of freedom of academic inquiry and the accountability of public money.

I know that we did not really cover the question about ARIA that you asked, but there are distinctions there, and I think that the system of freedom of application of idea and accountability of use of public money has served the UK extremely well. I think I will stop there.

Viscount Hanworth: Gavin Costigan, do you have anything to add?

Gavin Costigan: I agree. It is perfectly right that the Government should spend some of their R&D money specifically targeting the issues and problems they want to. It would be perfectly wrong to spend all their money doing that. The question therefore is how to get the balance and, as Professor Reid was saying, have sufficient structures in place that people are relatively comfortable with different sources of money being spent in different ways.

The Chair: Thank you very much indeed. I am afraid that we do not have time for any follow-up questions, but that was a really interesting

session. Thank you very much for talking to us today. You have made a number of offers to submit additional information to us, which sounds very interesting and we would be very keen to have that. If we can encourage you to submit further evidence as you have it available, that would be great. For now I say again thank you very much and goodbye.