



# Science and Technology Select Committee

## Corrected oral evidence: Science research funding in universities

Tuesday 18 June 2019

10.25 am

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Members present: Lord Patel (The Chairman); Lord Borwick; Lord Griffiths of Fforestfach; Lord Kakkar; Lord Mair; Baroness Manningham-Buller; Lord Maxton; Baroness Morgan of Huyton; Baroness Neville-Jones; Lord Oxburgh; Lord Renfrew of Kaimsthorn; Lord Vallance of Tummel; Baroness Young of Old Scone.

Evidence Session No. 7

Heard in Public

Questions 46 - 53

### Witnesses

David Sweeney, Executive Chair of Research England, UK Research and Innovation (UKRI); Dr Alex Marsh, Deputy Director of Strategy, UKRI.

### USE OF THE TRANSCRIPT

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## Examination of witnesses

David Sweeney and Dr Alex Marsh.

- Q46 **The Chairman:** Good morning, gentlemen. Thank you very much for coming today to help us with our inquiry. I apologise for the distance you are away from us. I can just about see you, but unfortunately our masters tell us that the room cannot be changed to bring you nearer. We are being live-streamed so that people outside can watch.

Before we start, I would be grateful if you could introduce yourselves for the record, and if you want to make a short statement before we start the questions, please feel free to do so.

**David Sweeney:** I am the executive chair of Research England, which is the UKRI council responsible for the block grant funding to English universities. Previous to that I worked as director in the Higher Education Funding Council, essentially with the same responsibilities as for the last 10 years. Before that, I was a university pro-vice-chancellor and vice-principal of research, where I was responsible for spending the money that I now hand out.

We read with interest the evidence given by previous witnesses, and you have had a rich summary, so we will not make opening statements and we look forward to answering your questions.

**Dr Alex Marsh:** Good morning. First, I thank you for the opportunity to give evidence to the Committee today. My role in UKRI is to lead the strategy unit at the centre of the organisation, and my team aims to work with the councils and engage with external stakeholders to look at cross-cutting elements of our strategy that span multiple councils.

Before this role I worked in the Treasury for quite some time. My final role there was in the spending team that looked across research, innovation and higher education funding. I was there during the 2015 spending review. Before that, I had experience with private sector and public sector strategy consulting, and prior to that I completed a PhD in physics.

**The Chairman:** Thank you very much. I suppose that in your case, Mr Sweeney, the correct analogy will now be poacher turned gamekeeper.

**David Sweeney:** That phrase is commonly used.

- Q47 **The Chairman:** Not the other way round: gamekeeper turned poacher.

I will ask the first question, which is about the Augar review and the cuts that it proposes in universities' fees. What assessment have you made of the effect on universities' ability to deliver on research, and will you subsidise or increase your funding to the universities to compensate for that?

**Dr Alex Marsh:** First, it is important to reinforce what the Committee has heard in previous evidence sessions, which is that we absolutely recognise the central, pivotal role that universities play, both in educating

individuals and in performing outstanding quality research and knowledge exchange to ensure that we can all reap the benefits of that, at both a local and a national level. The UK is privileged to benefit some of the strongest universities in the world. We have, by some rankings, four of the top 10 and nearly a fifth of the top 100, which is absolutely a strength that we need to hold on to.

Given all that, it is clear that if the recommendations of the Augar review are implemented in a way that does not protect universities' sustainability, that absolutely would have a damaging effect on universities' ability to continue to perform the missions that are so central to the industrial strategy and to delivering the 2.4% target.

We are therefore paying very close attention to the way the Augar review is considered, and as part of the spending review we are gathering evidence on the impact of different scenarios and ensuring that our proposals to the Treasury in the spending review take account of that and ensure that we can put the sector on the right footing so that it can play its fullest role in delivering the ambitions of the industrial strategy.

**The Chairman:** All that makes it seem to me that you hope you will get extra funding to compensate the universities. Is that correct?

**Dr Alex Marsh:** As you know, the Augar review is clear in recommending an offsetting increase in grant funding on the teaching side. We in UKRI are very clear that, because of the interconnectedness between the teaching and the research missions of universities, that is central to the recommendations.

**The Chairman:** If that does not happen, what will you do?

**Dr Alex Marsh:** If that does not happen, we will of course continue to make the strongest case that we can for R&D in the spending review. Once we know what the settlement is, we will continue to work with universities as partners to do whatever we can to prioritise the sustainability of the system and work to help universities to continue to invest confidently in research.

**David Sweeney:** Yes, it is a significant risk. It is not within the capability of UKRI to make up funds without further investment from the Government, and we will make that case very strongly indeed. However, we wait to see whether the Government respond to the full details of Augar, which do indeed suggest that that funding be made up in other ways.

**Lord Kakkar:** If, for some reason, the Government were not able to make up that funding, what approach would UKRI take to analysing the potential impact on the science base and responding to that with the resources that you have available?

**David Sweeney:** First, we can only make up that funding with the resources that we have. We would certainly consider different scenarios for the allocation of our resources, but all those scenarios would severely undermine the Government's commitment to 2.4% of R&D being invested in research and innovation.

I think we assume that a large part of the increase will come from the private sector, but one of the factors that will persuade private investment is collaboration with our universities and our universities being able to partner private business and others with funding of their own. If that funding is not available, that seriously limits universities' ability to stimulate that private funding and is a significant risk to the 2.4% commitment.

**Lord Vallance of Tummel:** May I ask you an opportunist question, as Dr Marsh is a former Treasury man and has been involved in this kind of thing before? One of the conclusions that I, at any rate, draw from this is that the Augar review's terms of reference were fundamentally flawed, in the sense that they looked solely at the teaching side and not at the knock-on effects on research, although it must have been pretty evident to the Department for Education that that was likely.

Does the Treasury have a role in that sort of thing before it ever gets off the ground? If it were in the commercial world and we were going to review our pricing of this, that and the other, somebody from the finance department would look at the terms of reference before it started. Does that happen with the Treasury in this kind of review?

**Dr Alex Marsh:** It is important that I emphasise that it is not just UKRI that understands the interconnectedness of research and teaching; so do BEIS and the Department for Education. Given that the higher education brief has moved to the DfE, it is more important than ever that there is a team in the Treasury that is able to look across the two.

Certainly, I can confirm that, when I was in the Treasury, my team looked at research, innovation and teaching for precisely that reason. It continues to be a really important role for the Treasury. As it now considers the recommendations of the Augar review, it is really important that it also considers the interdependency of those things, the implications of any scenario in which Augar is implemented and the consequence of that for the wider sustainability of the sector.

I would reinforce the point that UKRI has a really important role to play in making sure that we gather the intelligence by engaging with stakeholders, as well as working with the OfS and the DfE to build a really clear shared evidence base so that the Treasury is best able to understand those interdependencies.

**Lord Vallance of Tummel:** You are suggesting that the Treasury might have had the opportunity to look at the terms of reference before the review was launched.

**David Sweeney:** The terms of reference say explicitly that the recommendations should be guided by the need to support the role of universities and colleges in delivering the Government's objectives for science, R&D and the industrial strategy. Those things are there. Listening to Philip Augar at the Royal Society a couple of weeks ago, it was not clear how much the review focused on the broader role of universities and how much it was concerned about the very important recommendations relating to the education system.

**Baroness Young of Old Scone:** Are you at all worried by the idea that any substitute funding might be targeted specifically at particular courses, both from the point of view of whether that would cause imbalances in the system and because it gives government a stronger grip on what universities do? At the moment there is a happy fluidity—that perhaps is the word I am looking for—in terms of the cross-subsidy between teaching and research that allows universities to make flexible decisions about the support for research that they can offer. Am I seeing reds under the bed in suggesting that this kind of flexibility and cross-subsidy is being challenged by Augar’s recommendation?

**David Sweeney:** It is perhaps not so much for UKRI to comment on the way the education system is funded. We are very concerned that there should be a flow of highly skilled people into the research base. We are very concerned to ensure that technician numbers and the pipeline of students through to master’s and doctorates are maintained. I fall back on personal views about the way that university finances are run. Personally, I think that cross-subsidy is all part of running an efficient and effective institution. However, I am not so sure that UKRI has a strong view about that. I would view it as a concern to watch how the system went rather than as something that we were particularly worried about at present.

**Baroness Morgan of Huyton:** A quick question from me, following on from Lord Vallance’s question. Is UKRI talking to the Treasury about the effect if the gap is not made up?

**Dr Alex Marsh:** Yes, absolutely.

**Lord Griffiths of Fforestfach:** If there is a gap, I think it was you, Mr Sweeney, who said that you will then rely on the private sector to make up the difference. What sort of incentives do you think might be offered to the private sector to do that?

**David Sweeney:** I do not think that I quite said that. I think I was suggesting that our ability to work with the private sector to generate investment in R&D could be constrained if the ability of universities to work with those partners was decreased through having less money. Right now we are giving universities a number of incentives to work with business, and the evidence is that they are working quite effectively on building relationships. We have had some very big projects that depend on funding that comes through UKRI to universities. Over the last three years we have significantly increased the cash that universities have to enable engagement with business—the infrastructure for engagement. So I think we are in quite a positive position when it comes to interacting with businesses. On the other hand, it takes two to tango; you have to have some investment to lay alongside the private investment, and it is the potential shortfall in that that is our concern.

**Lord Griffiths of Fforestfach:** Let us assume that there is a shortfall in the Treasury’s decision of, say, 30%. You say to me now, “We have excellent relations with industry in the projects that we are doing”, and so on, but that in itself does not make up 30%. I am sorry to have misunderstood your response, but my question is still that, if there is a

gap like that, and despite how good the relations and the infrastructure between business and universities are, how will you go about getting the extra funding that is needed?

**David Sweeney:** I do not think there is any simple way to make up a gap of that scale. Universities have been very successful in generating income for investment for a number of purposes but it would be unreasonable to say that a gap of that size could be addressed by taking more international students, for example. A gap of that size is a big problem. Of course, the Government might choose to invest in the research base directly, in which case we would have a way forward. I do not like always to talk about worst scenarios, because we have to give everyone a chance to implement the Augar report in a wise way, but that risk is there.

**The Chairman:** Mr Sweeney, we are having technical problems here. For some reason the camera does not like where you are sitting. If you would not mind moving to your right, we will check that the camera picks you up. The world is not seeing you.

**David Sweeney:** That is a disaster. Is that helpful?

**The Chairman:** We will check in a minute. Please continue.

Q48 **Baroness Young of Old Scone:** Can we talk about QR? We have heard witnesses be very warm about the presence of QR because it is a kind of strategic pot for them and helps with the infrastructure. I was interested to hear you talk about investing so as to make sure that universities have the infrastructure to link with businesses. What seems to be happening, according to the Russell group report, is that QR has seen a real-terms fall in its value of 13% over the last seven years. It certainly accounts for a smaller proportion of research council funding than used to be the case.

Tell us about UKRI's stance on QR. Do you expect universities to make up that reduction in both proportion and real-terms value from elsewhere, and, if so, from where? Also, the Government feed more money into the system, particularly on the back of the industrial strategy, but it frequently covers only about 80% of the full economic cost. Therefore, QR is going down and more money is coming into research. Where are you expecting universities to go to make up that shortfall? The pips appear to be beginning to squeak.

**David Sweeney:** The pips are squeaking. The story is slightly more complicated than that. Yes, there has been a 13% decline in real terms—the Russell group numbers are right. That reflects flat-cash settlements from 2010 in core funding for my organisation, which includes QR. However, that core flat funding was from 2010 to 2015. The Government, now working with UKRI, identified in 2015 that this was a problem. Since then, additional sums allocated have meant that every £1 of research council funding has resulted in 65p of allocation to the Research England budget for funding universities. We reversed the flat nature in 2015. Until 2015, of course, we had extra funding going through the research councils, which was good, but there was no extra funding going through

QR. Since 2015, the two have been in direct relation, and that is the UKRI's current settled position going into the spending review period.

QR is essential for all the reasons you give, but it is a bit more complicated than a question of how you make it up. Universities have been successful at gaining additional funding, including from charities, business and Europe, but none of those funders funds the full amount, and the same applies in other countries and other systems.

Universities are not contract research organisations, being paid just to do the job; they are partners of the funders. For universities there is always the challenge of where to spend the discretionary money they have—the investment that is available not just from overseas students but from a range of other activity that generates a surplus. They have to choose between supporting work with other funders where they are partners and funding their own research with no other funding source.

The total envelope of work that universities do depends on the total envelope that they have. If there is less QR and they want to do more and more research, which generally they do, they have to source that from their own funds. However, that is a strategic decision for universities as major actors in the research and innovation base. They are not just the tools of a range of external funders delivering research; they are active in research directions themselves.

Yes, more QR would enable them to do more research, but, as other witnesses have suggested, I do not think that there can ever be an unlimited capacity to do research. There will be constraints from a number of areas, and it is for universities to use their own strategic decision-making in deciding how to address those constraints.

**Baroness Young of Old Scone:** So you do not think that the shortfall that was inadvertently created between 2010 and 2015 should be restored?

**David Sweeney:** I think we will make a strong case in the spending review for the importance of QR. It is the stable funding stream over seven years on which universities can build. The other sources of income that I referred to are not sustainable. More risk is involved when you have to go with some of the developments that depend on that. So, yes, I do think there is a strong case for QR, but right now we are seeing universities maintain a reasonable surplus across the system—not an enormous surplus but a reasonable one—and they are continuing to fund more research either of their own choice or aligned with partners.

Currently, the system appears to be sustainable, healthy and particularly efficient. We are looking at a number of threats with Augar, one of which we have already addressed, where the current positive view of the system might face considerable challenge.

**Lord Kakkar:** Do you think, then, that there is potentially the need to reassess completely the QR system? Clearly, in 2010 the decision was taken to not protect that as much as other elements of UKRI potential funding. The decision has now been taken to look at it again, but it just seems to run the risk of being a bit of a disincentive to universities in

terms of attracting large amounts of external funding. There might be other ways in which a research base can be secured in a more focused fashion to drive that attractiveness, taking funding from other sources in partnership.

**David Sweeney:** I would not characterise the issue as you suggest. The same decision was taken in 2010 about both sides of the so-called dual-support system—the research councils and the universities.

Subsequently, however, additional funding was produced for some really big initiatives. It is difficult to criticise those decisions. Thus far they have proved to be successful investments. I do not think that the system as a whole needs great revision. It is a system similar to those in many areas of global research. Our country appears to be particularly effective, mostly because of the strength of our universities in generating income, in deploying that investment. It is a particularly efficient and effective system.

The parameters of the system are what the UKRI board has to present to government as part of the spending review. The balance between investment in QR and in research council activity is one thing that we are asked for advice on.

- Q49 **Lord Kakkar:** What would the minimum level of QR capacity be for it to remain a viable contributor to securing the university science base? If it were to fall substantially more and institutions had to look elsewhere for 50% because QR was short in terms of research collaborations and grants, would that still be sustainable for our university system or is the current trajectory for QR funding at the limit of sustainability?

**David Sweeney:** Since coming together at UKRI, we have done a stream of work looking precisely at this issue. We conducted a survey of nearly 90 universities and, having had some detail of how they use QR, we have also held some war-gaming sessions, looking at different scenarios. The best part of 10 years ago, we deliberately made greater efficiency savings in research council funding by cutting the level of FEC in line with the Wakeham efficiencies. All that evidence suggests that we are in pretty much the right place at the moment, and were we to significantly cut the QR that supports all the rest of the funding, the outcomes would not be beneficial.

Equally, in the current state of play, before any of the changes take place in the research system, there is not much evidence that the public purse should pay more towards it. Universities are effective partners not just at the current level of QR but at the current level of income that they generate from other sources for investment. To say that we have done all this work and that it pretty much validates the current position might sound strange, but that is what the universities have told us in considerable detail.

**Lord Kakkar:** Do you think there may be the opportunity for some of that work to be shared so that this Committee, for instance, would have the capacity to understand how you reach those conclusions?

**David Sweeney:** Yes. We have not published that work yet because it is part of our work for the spending review but we can provide evidence. We know now, for example, how much of the QR money across the system is spent on making up shortfalls in matched funding. It is only 28%, actually. It is the biggest single element, but a substantial amount is used on universities' own research and a substantial amount on further funding of doctoral students, and then the largest amount is used for the general research infrastructure, which QR was always intended to fund. We have good evidence that the current system is working effectively and efficiently, but we are looking at potential scenarios that could be less attractive.

**Baroness Neville-Jones:** I confess that I do not recognise the picture you are painting of the adequacy of funding going into research. I should declare that I recently left the EPSRC. I do not think there is any doubt; we heard considerable concern from universities about their ability to continue with their research base due to the shortfalls in funding that they receive and questions over where they are to find the extra money. I put it to you that there is a serious danger here. We claim that our universities have a tremendous reputation internationally—that is why people want to come to them. However, there is a great danger—it is happening already—of universities living off intellectual fat because the shortfalls in funding take time to show through.

We are already in a situation where it will be very hard to continue the level of performance, particularly with all the other counter-winds that we face at the moment, not just Augar but the effect of Brexit on our universities. So I really worry. You paint the picture that this is all working well and that the universities are happy and satisfied. I do not believe it to be the case.

**David Sweeney:** Perhaps I could draw a distinction between where we are now and where we may be with many of the threats that you mention. I absolutely accept that those are real threats. If you look over the last few years at universities' financial performance and their contribution to research—indeed, I made a particular effort during that work stream—

**Baroness Neville-Jones:** The strain is greater and greater. That is the problem.

**David Sweeney:** I think it is, but thus far universities have responded well. It is a fair comment that, faced with a number of risks that the Committee has just discussed, we might find that the system is no longer effective.

**Baroness Neville-Jones:** I am afraid that a lot of the cuts that have been made do not constitute efficiencies. I am concerned by my understanding of the situation and the picture you paint.

**The Chairman:** Baroness Young, I cut you off. Do you want to come back to this?

**Baroness Young of Old Scone:** No. I just noticed that Dr Marsh was waving furiously and I assumed he was trying to attract our attention

rather than drowning.

**Dr Alex Marsh:** The point I was going to make has already been covered by David to some extent. I want to underline the point he was making that it is not just about us recognising the importance of the value of QR now—and we have tried to take action in the early days of UKRI in recognition of that. We see it as a central part of our preparations for the spending review, linking back to the discussion about the risks with Augar and exiting the EU.

I am keen to underscore the point that we are cognisant of these risks and it is really important that we share evidence with the Treasury not just on Augar scenarios but on what that would mean for the required level of investment, so that we can sustain universities' R&D missions as well.

Q50 **Lord Oxburgh:** On the same general subject, but perhaps being a little more specific and distinguishing between the different sources of funding coming from outside universities for them to prosecute research, the case has been made that major additional funds are needed to support charity grants, industry grants, and, indeed, research council grants. Are these figures that you recognise—roughly 39% to support charities?

**David Sweeney:** Yes. The numbers are right. The way they are presented is slightly wrong, but the message does not change. We have worked with the charities for a long time. They are a significant part of the UK system and, indeed, an advantage which the UK has over many other countries.

**Lord Oxburgh:** Absolutely.

**David Sweeney:** In 2004 the Government said, "We want to encourage the charities in this country in the research base", and gave extra money to help support the costs of charity-funded research, recognising that charities generally do not want to pay indirect costs.

That is a summary statement. We are committed to working with the charities as partners. You can look at this in two ways. The charities have considerably increased their funding in the UK research base, which is great, but we have not had the funds to considerably increase the match that we make. To work effectively with charities, it is true that universities have had to call more on their funds in addition to the support that they get through, for example, Research England.

In principle, this is a good thing. Whether we have got the balance right is something that we discuss with the charities, and that too will be part of the spending review discussion. But the whole research system works on the basis that universities are active in this as strategic actors. One thing I looked hard at as part of our work stream is whether we are consistently turning down proposals from the charities to invest in the research base in the UK, and whether that is losing out on investment. Although there are mutterings about that, I was unable to get any evidence of it happening at scale. Again, that is more of a future threat than a current practice.

**The Chairman:** If it is not happening at scale, it implies that it is happening. Does that not suggest that the trend will get worse?

**David Sweeney:** That may be the case, but the examples quoted to me were of such small scale that it seemed really to represent more of a strategic decision not to do it than a shortfall. Where you have enthusiastic funders such as the charities, if they keep investing there will always be the challenge of how you make up the cost when they are unwilling or unable to fund the full cost. If our charities continue to be successful, yes, that is a risk.

**Baroness Manningham-Buller:** The issue with your last point—I have nothing more than anecdotal evidence—is not that grants have failed but that there is a choice not to put in for a grant because the overheads would be too substantial. I think that is beginning to happen. I speak as chair of the Wellcome Trust.

**David Sweeney:** Again, I have not been able to find direct evidence of that, despite very explicit attempts to do so.

I go back to when I managed this in a university; you cannot possibly bid for every grant, on whatever terms, that is on offer. You have to take account of the cost of doing the work, the buyout that may be required from education.

I do not agree with the witness who said that on principle you should always be able to bid for grants. Some kind of attention to university financial sustainability is important for that, but it is jolly desirable that we encourage our charities to invest more, and the public purse is part of that equation. That has to be looked at in the light of the various other risks that we have talked about in the Committee.

**Baroness Neville-Jones:** I come back to what I said earlier. I do think that one of the dangers, which Baroness Manningham-Buller just pointed to, is that the universities will simply not bid for research work because they cannot fund it on a sustainable basis. That is the real risk: that the quality and quantity of research done in our universities will decline.

**David Sweeney:** I agree; that is a risk.

**Baroness Neville-Jones:** It is a real risk.

**David Sweeney:** It is one of the jobs of Research England, alongside our colleagues in UKRI, to look at the sustainability of the research system and of universities. Faced with the challenge to rise to 2.4% investment as a percentage of GPD, we do not want the amount of research to decrease. Equally, we do not want to accept research on terms where there is a gap, and you cannot always expect the public purse to make up the gap.

**Baroness Neville-Jones:** I am sure that is the lesser risk.

**David Sweeney:** That is one of our tasks—to monitor sustainability and work with universities—and it has been a significant part of what I have done since joining UKRI, supported by colleagues from across the organisation.

**Baroness Young of Old Scone:** As part of the work that you have done for the CSR preparation, have you totted up all the extra money that would be required if we were to hit the 2.4%? The bigger the research activity, the bigger the need for more QR and more of universities' own funding going in. We will have less European funding and there may well be an impact on business from Europe that will influence their R&D budgets. They are big numbers that we are talking about. Have you done that summary and are you prepared to share it with us?

**Dr Alex Marsh:** Absolutely. It is one of the priority pieces of work for all our preparation for the CSR. As has already been observed, the 2.4% target is very deliberately for the whole economy, both private and public sector. Of course, the charity sector plays an important part, and we think that is right for the outcomes that we are seeking to deliver with the target. It means, of course, that we need to be very sensitive to the needs of the private sector and build on what we have already been able to do to make as much as we can of the strengths of the UK in continuing to drive private sector investment.

In the course of our research and engagement with stakeholders, we also looked at international examples of where countries have succeeded, and where they have not succeeded, in achieving this kind of increase in R&D intensity. That corroborates the intuitive lesson that wishing for private investment is not sufficient. It is critical that this is accompanied by an increase in public investment in order to give the private sector the confidence to commit and to invest, particularly in the current climate of uncertainty.

We are absolutely gathering the evidence on what that trajectory for increased investment needs to look like. At the moment we are not able to share the details, because we are still refining the analysis and it is part of the preparation for the spending review. However, I can highlight some of the figures that were published earlier in the year by the Campaign for Science and Engineering, which point out that, at the moment, total R&D investment in the UK stands at £34.8 billion, which is about 1.7% of GDP.

Clearly that means that there is a significant gap between now and where we would like to be by 2027. To translate that into an order of magnitude of increase, we would need to see approximately a doubling of total R&D volumes in the UK, both public and private sector. The Campaign for Science and Engineering sets out estimates of the balance between what public and private might look like. I think the increase in investment by 2027 was £18 billion private and £12 billion public.

As I say, we are refining our own internal analysis and looking in particular at what we can do, in working with charities, universities, businesses and others as partners, to make our investment as effective as possible. Nevertheless, it is very clear that we will need a significant and sustained increase in public investment if we are to be credibly on a trajectory to delivering the target.

**Lord Mair:** Following on from the point about the engagement of the private sector and the big challenge to get to the 2.4%, can you say

something about the role of Innovate UK?

**Dr Alex Marsh:** Yes, absolutely. The role of Innovate UK is pivotal in UKRI, because while the research councils, and indeed Research England, are concerned with the business of private sector investment, it is Innovate UK's bread and butter. We absolutely need to be cognisant of that in the way we work with Innovate UK, ensuring that it is involved in all discussions about this agenda and recognising that by including Innovate UK in UKRI we benefit from a wealth of expertise that it has in its organisation.

Already in the early days of UKRI we have tried to make good on that potential. Innovate UK has played a leading role in designing and helping us to deliver the new industrial strategy challenge fund. In its first two waves, a total of £1.7 billion of investment has flowed through UKRI, and all the challenges that make up that total involve a partnership between Innovate UK and one or more of our research councils, because it is aimed explicitly at partnering with industry.

The role of Innovate UK is central to delivering the target.

**Lord Mair:** Do you think that the role of Innovate UK will become more important as we progress towards the 2.4% target?

**Dr Alex Marsh:** The short answer is yes. I would just pick up on some of the concerns and points expressed in previous evidence sessions. We need to continue to have a balanced approach to our strategy for investing in R&D. We have heard about the importance of QR and we will continue to need to build on our strengths in discovery research, because that is the only way we can have a strategy that is sustainable in the long term.

However, it is abundantly clear that we must also challenge ourselves and see how we can do more and go further in partnering with industry. We need to look at the future of the industrial strategy challenge fund and at what we can do through Innovate UK's collaborative R&D programmes. It also has programmes that are more in the early stages and are about supporting SMEs and other companies in accessing finance.

All these tools will be central to a successful approach.

**Lord Vallance of Tummel:** Drawing on your previous Treasury experience, do you see a potential role for further fiscal incentives to the private sector—particularly in relation to additional research, and additional research with universities in particular?

**Dr Alex Marsh:** Again, the answer is yes. We have already increased our financial support for this endeavour through the earlier years in the ways in which we are investing. There is the NPIF—the national productivity investment fund—uplift, including an uplift to the higher education investment fund, so financial incentives clearly have to be part of the picture. The ISCF—the industrial strategy challenge fund—has also been very successful.

Obviously it is too early to see what long-term outcomes will be delivered from that programme, but we are already beginning to see really powerful collaborations between the research base and businesses in rising to that challenge. More than £400 million of the ISCF is being routed through universities because of their central role in that.

Looking to the spending review and our approach to the 2.4%, we need to challenge ourselves on where we can go further. Part of that has to involve financial incentives in what we do, as does how we work with universities and businesses to make us as easy and transparent an organisation to work with as possible.

Then, of course, there are other, complementary levers for other parts of government that will be really important in supporting, incentivising, enabling and encouraging businesses to invest. It will be really important, for example, to have a supportive and competitive regime for R&D tax credits and the most open and supportive visa regime, and that our regulatory environment is supportive and enabling of innovation.

In effect, therefore, we and our partners in other parts of government need to take an holistic approach.

**Lord Vallance of Tummel:** It is the generic tax credits thing that I am particularly interested in.

**David Sweeney:** One of the big pluses about the establishment of UKRI has been the ease with which one can now work very effectively with Innovate UK. We in Research England, working with our partners in the devolved nations and Innovate UK, are delivering our place-based funding scheme, which we hope will stimulate research and innovation in parts of the country beyond the ones that are part of the traditional offer.

Of course that means more money, and it does not come at full economic cost, but in the current stretched system we are putting more money into QR—£88 million this year, although the details have not yet been announced, and more money next year—in addition to supporting more strongly the business engagement that underpins the joint work that we are doing with Innovate UK.

The system is getting more money in a number of places, and that includes QR, which covers the additional cost. I stand by what I said: we are in a positive situation, albeit with a range of risks to manage.

**Lord Griffiths of Fforestfach:** I just wondered about something, Dr Marsh, after your excellent answer to Lord Vallance's question. If we stand back a bit, the Augar review has a very specific list of things to look at. You listed a whole lot of things that could be done in a much larger picture. It strikes me that our universities are one of our remaining great nationalised industries, and I wonder whether, if I was a Treasury official, I would not say—particularly as there will be a new Prime Minister, and there may be new priorities for government spending and so on—that instead of looking at this just in terms of the Augar review's terms of reference, there is a case for a much more comprehensive approach before recommending specific proposals on funding and so on.

**Dr Alex Marsh:** Certainly I agree that the Treasury and No. 10 should take an holistic view when determining how to respond to the recommendations of the Augar review.

**The Chairman:** I think that that was diplomatic language.

**Lord Griffiths of Fforestfach:** I was going to say that it was a wonderfully diplomatic response.

- Q51 **Baroness Neville-Jones:** We have started getting into the territory of asking not how much research but what kind of research is going on. We heard from a number of members of the science community that they feel that increasingly the focus of the funding is going away from discovery research to applied research, in line with the industrial strategy. Do you agree with that analysis? Do you think that is happening? I would be interested in your comments. We have just heard about the importance of Innovate UK, which rather emphasises that side of the game, so it would be helpful to know where you think things stand now and where they are likely to go in terms of the balance.

**Dr Alex Marsh:** Absolutely. First, I emphasise that in UKRI we are very clear about the value of discovery research in any sensible overall strategy. One of the objectives writ large in our strategic prospectus published last year—and, I hope, in everything that we have said since—is that, yes, we are here to deliver economic, social and cultural value and impact but so too are we here to continue to push the frontiers of human knowledge. That is central to the first two objectives and it is valuable in its own right. We absolutely see the importance of that in our overall portfolio.

The additional £7 billion that has been committed to R&D has been a centrepiece of the industrial strategy, and the way it has been invested has reflected those priorities. UKRI has been closely involved in developing advice to Ministers on how they might choose to invest that in a balanced overall way. I recognise that a large proportion of it is being allocated to challenge-led and application-oriented research, particularly including the flagship industrial strategy challenge fund. The strength in places fund, which David mentioned, is bottom-up but it is also very much oriented towards the imperative to deliver economic growth at, in that case, a regional level.

We have been very careful in the preparation of our advice to and dialogue with Ministers and they have agreed that we need to continue to recognise the importance of discovery research in the overall balance. So we have also developed and are now implementing funds aimed more at that end of the spectrum. For example, we have designed what we are calling a strategic priorities fund, which aims to respond to Paul Nurse's vision of having a so-called common fund. It is all around interdisciplinary research and emerging research priorities, as well as helping the research and innovation base to respond to priorities in other parts of government. We have invested more than £350 million in that so far and we have aspirations to keep going with it.

We have had an uplift to QR, as we heard earlier. We have also, for example, designed a fund for international collaboration, which again aims to double down on our strengths in the research base and helps us to strengthen existing international collaborations, as well as building new ones. In the early years of UKRI, while respecting the industrial strategy objectives that are very much attached to that money, we have endeavoured to take a balanced approach.

Lastly, this is just the beginning. As we have heard, there is still quite a long way to go to get to the 2.4%. So, as we prepare advice on what more it would take to get to that target in the long term, we will also make the case for an approach that continues to balance the role for challenge-led and application-led research with a continuing strong place for discovery research.

**Baroness Neville-Jones:** One hears from business that in some ways they want universities to do what they cannot, which is discovery research. Do you feel that with the impact of what is, after all, a very strong stream of activity in government, you can maintain the strength of the discovery research base in this country?

**Dr Alex Marsh:** We recognise its importance. We know that one of the driving factors that attracts internationally mobile companies to the UK as a partner of choice—and that happens—is the world-class quality of our excellent research base, and we have compelling evidence to that effect. As we go into the spending review, we will make that case. The extent to which we are able to deliver on that objective, which we share, will depend on the outcome of the spending review.

**Baroness Neville-Jones:** I see. I hope very much that you can make it a strong part of your pitch and of your communications strategy.

**David Sweeney:** In the discussions that are at the heart of UKRI, particularly when the executive chairs get together, the focus is very strongly on what makes the UK a world leader. That is underpinned by the quality of our discovery science and it is what we talk about a lot. We are doing other stuff, as Alex has described, but one of our roles in the past year has been to visit other countries and build relations for how our research system will develop in a post-Brexit world. We find that other countries want to continue to work with us. Our universities are the partners of choice for researchers all over the world. Their main topic of conversation is discovery research and coming to work on it with us.

Clearly we have to address all the financial issues in a post-Brexit and post-spending review world, but at the heart of UKRI is a commitment to discovery research.

Q52 **Baroness Morgan of Huyton:** Can I ask you about PhD funding? Last time, we heard from the Universities Minister, and actually we will be having more evidence from him. He said that to stand a chance of reaching 2.4% of GDP being invested in R&D, we will need at least a quarter of a million more researchers. Broadly speaking, that figure is accepted, and it should mean many more people taking forward PhDs. What conversations are being had in UKRI about how that can be funded,

particularly the PhDs, and how that total can be met? We are also concerned to have heard about the gap in the economic cost recovery rate of PhDs, and in fact a lot of us have experience of that. Almost for the record, can you explain to us why that is the case. More crucially, how do you expect universities to fund that gap?

**Dr Alex Marsh:** We absolutely recognise the centrality of not just grant funding but investment in people as part of the 2.4%. Without people, none of this will work and we will simply bid up prices without achieving more in the real world. We have already tried to take steps to reflect this priority. UKRI supports the training of PhD students in many different ways. Our research councils support PhDs directly, of course. This year we are investing £422 million through the research councils to support approximately 22,000 PhDs, largely through doctoral training partnerships and centres for doctoral training. We aim to complement that with investment through Research England, which is aimed more at the broader costs associated with training PhDs. This year, that is around £260 million, and we estimate that it is supporting approximately 46,000 students.

Building on that, we have used some of the NPIF uplift to respond to this imperative. This year we are investing £30 million through the research councils in PhDs across a wide range of disciplines. We have also made a longer-term commitment to PhDs, specifically in artificial intelligence.

That is a good start, but it is clear that we have some way to go if we are to rise to what is objectively quite challenging in terms of what will be required to hit the 2.4% target. In order to do that, we are again building the evidence base. We need to make the case and secure a trajectory for increased public investment, but we also need to look at the overall system. We need to look at how we can retain the people we are training in PhDs in the R&D workforce, whether in academia or private sector research and innovation. Of course, the visa regime will also be incredibly important in determining our ability to continue to attract and retain the best talent in the country.

You also asked about the full economic costs associated with this. Of course, PhD training is a particular area where we work in partnership with universities. It is very much a mutually beneficial activity. It benefits universities, because it helps them to train the academic workforce of the future. It is absolutely integral to universities' mission. So, too, is it integral to our mission, because the whole UK is able to reap the benefits of the work of these skilled and talented individuals.

Absolutely, it is right and crucial that we provide investment through research councils and through Research England to fund this, but also that universities make strategic choices about how many PhDs in total to support, based on the best understanding of the sustainability situation, known uncertainties and risks. That is why we end up with the overall financial responsibility being shared between UKRI and universities.

**Baroness Morgan of Huyton:** In thinking about the risk, is there not a real danger that there will be an increasing skewing towards the needs of the industrial strategy and STEM subjects, and that arts, humanities and

social sciences will be starved?

**Dr Alex Marsh:** It is a risk if we do not make and win the case that we need to continue to have public investment alongside universities' partnership.

There is also a broader point about an approach, both to PhDs and to broader investment, which is balanced across a range of disciplines. One reason why UKRI was created was a recognition of the increasing role of interdisciplinarity. We absolutely accept the point that a strategy that focused only on STEM would not be able to succeed.

**Q53 Lord Renfrew of Kaimsthorn:** I turn again to Brexit. Do you feel that there really is capacity in the current system to support basic research or discovery research adequately? At present, funding from the European Union is so significant for our own UK efforts in that direction. Do you feel that our departure from the European Union, if and when it happens, will have an adverse effect on those basic research areas?

**Dr Alex Marsh:** We absolutely recognise the importance of the funding that UK universities and our research and innovation sector more broadly are able to secure from European programmes. On the latest figures, universities currently receive about £775 million from European programmes.

Of course, that is a reflection of the strength of our research base and something to be celebrated. It also represents a risk if we are not able to continue that. The Government have been clear that the objective is to ensure that our research and innovation ecosystem is able to continue to thrive after we exit the European Union. In the immediate term, that is why it is important that there has been an underwrite and then an extension of the underwrite for Horizon 2020.

In the longer term, we have a clear statement from the Government that our preference would be to associate with Horizon Europe as long as it accords with the principles of excellence, openness and value for money. Nevertheless, it is right and important that we prepare for any eventuality, that we gather the evidence on what the impacts would be, and that we look at how, if required, we would deliver alternatives to European programmes. That is why we welcome the appointment of Sir Adrian Smith to lead a review on that and we are engaging closely with it.

Given all that, it is clear that there are some real and significant financial risks associated with exiting the European Union if we cannot secure the investment that would be required to make up that gap. We are making sure that that, too, is part of our preparation for the spending review. But it is not only about the pounds. We know that some of the value of European programmes comes also from their ability to support collaborative networks for UK universities with partners. We have been engaging closely with funding partners in other parts of Europe as well as more broadly across the world to make sure that we can continue to benefit from strong relationships there.

**The Chairman:** We have heard that any shortfall will be made up, in the

short term at least. It was suggested to us by Lord Willetts, for instance, that what the Treasury might fund is what the UK Government put into the Horizon 2020 programme and not what we get out. That will mean there is a shortfall.

**Dr Alex Marsh:** It would, and we are very clear that what matters for our R&D system and for the outcomes that we seek to deliver is the amount of investment that we get out of the programmes. In all the evidence that we are gathering and the case that we are putting to the Treasury, we are absolutely focusing on the investment that we get out of the programmes for exactly that reason.

**Baroness Young of Old Scone:** The talk on the streets is that European collaborations are beginning to show signs of drying up in anticipation of Brexit. Do you have any evidence on this?

**Dr Alex Marsh:** We are certainly paying close attention to this, and we engage closely with universities to try to get a sense of what is going on. We have also heard this message. It is too soon to say whether we are seeing concrete evidence coming through in the data, but of course there could be a lag effect there. This is certainly a potential risk that we are alive to.

**Baroness Neville-Jones:** It is quite hard to track that kind of thing, is it not? It is likely to be the result of somebody not taking a decision to come. How does one track that? That is the difficulty with obtaining the evidence that reflects the situation.

**David Sweeney:** It is difficult to track that systematically without imposing a considerable burden on everyone, but we are seeing specific examples of people saying that they are stopped from bidding for grants, so we do take it seriously.

**Lord Griffiths of Fforestfach:** Dr Marsh, you mentioned a shortfall along the lines that David Willetts suggested. Do you have any numbers for what that might look like?

**Dr Alex Marsh:** I am afraid that I do not have the figures to hand, but we could provide our best estimates if that would be of interest to the Committee. I emphasise that this is material on the difference between our input and the outputs that we receive from the funds, precisely because we are so successful in the competitive mechanisms, so this is a material point that we are gathering evidence on.

**The Chairman:** We would be grateful to have that estimate if you can send it to us. We have come to the end of the session. Thank you very much for coming today. It has been most helpful.