

Science, Innovation and Technology Committee

Oral evidence: Budget 2024, HC 382

Tuesday 12 November 2024

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Members present: Chi Onwurah (Chair); Emily Darlington; Tom Gordon; Kit Malthouse; Steve Race; Josh Simons; Dr Lauren Sullivan; Adam Thompson; Martin Wrigley.

Questions 1-41

Witnesses

I: Professor Sir Adrian Smith, President at Royal Society, Professor Dame Karen Holford, Vice-Chancellor and Universities UK Board Member at Cranfield University, and Professor Richard Jones, Vice-President for Regional Innovation and Civic Engagement at University of Manchester.

II: Dr Alicia Greated, Executive Director at Campaign for Science and Engineering, Stephen Phipson CBE, Chief Executive Officer at Make UK, and Dom Hallas, Executive Director at Startup Coalition.

Examination of witnesses

Witnesses: Professor Sir Adrian Smith, Professor Dame Karen Holford and Professor Richard Jones.

Chair: The Science, Innovation and Technology Committee is now in session. It is the Select Committee's first session of this new Parliament, so I am very pleased and happy to welcome everybody here, and I would particularly like to welcome our witnesses.

Today, we are conducting a one-off evidence session to scrutinise the new Budget—the first Budget of the new Government, which was elected, as we know, on a platform of change and with a mission to grow the economy. With the help of our expert witnesses, we are seeking to assess the impact of the Budget on UK science, innovation and technology and to consider what the Budget reveals about the Government's ambitions for the Department for Science, Innovation and Technology, where science spend is being directed, how the success of that spend can be measured and whether the Budget represents change for the Department and the sector more broadly.

On our first panel of witnesses, we are joined by Professor Sir Adrian Smith, president of the Royal Society; Professor Dame Karen Holford, chief executive and vice-chancellor of Cranfield University, and Universities UK board member; and Professor Richard Jones, vice-president for regional innovation and civic engagement at the University of Manchester. I shall ask each witness to introduce themselves before we move on to questions. Professor Sir Adrian Smith, could you introduce yourself first?

Professor Sir Adrian Smith: Well, you have just introduced me. I am Adrian Smith; I am currently the president of the Royal Society. I have a background of 30 years as a jobbing academic, 16 years trying to run universities and, for my sins, four years in government as director general for science and research, from 2008 to 2012—I think my first day was when the world financial system collapsed.

Chair: That is an auspicious beginning. Dame Karen Holford?

Professor Dame Karen Holford: It's nice to meet you all. I am Karen Holford; I am an engineer by background. I have been vice-chancellor at Cranfield University for the last three years. Cranfield is a world-leading specialist institution—a postgraduate-only university—specialising in STEM and business and management. Also, of course, I am representing Universities UK. Prior to my post at Cranfield University, I was deputy vice-chancellor at Cardiff University, and I have spent my whole career working with industry as an academic who does experimental work, so my whole focus has been the industry-academia partnership world.

Chair: Thank you, Dame Karen. As an engineer myself, I am very pleased to welcome you to this session. Professor Richard Jones?



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Professor Jones: I am Richard Jones; I am an experimental physicist by training. I have taken an interest in innovation policy, particularly over the last few years. I work with the University of Manchester, where I look after the relationship between the university and the city and its region. I have a particular interest in how we can use science and technology to drive regional economic growth.

Q1 **Chair:** Thank you, Professor Jones; that is a question the Committee is very interested in as well.

This is my first session as Chair of the new Committee, and I think it is appropriate that my first question—I will ask the first questions—should be to Sir Adrian; witnesses and Committee members can of course come in as appropriate. Sir Adrian, I am sure you would agree that the UK has a world-leading science and research sector that is punching well above its weight, according to all measures. In your view, does this Budget demonstrate a commitment by the Government to advancing research and science in the UK?

Professor Sir Adrian Smith: The short answer is yes; I think the signals in that first Budget are very positive. We have a Science Minister who recently said that discovery science is basically the goose that lays the golden eggs, and those kinds of signals are really welcome. But as we go forward, and not to be complacent, you are right to say that the UK has punched well above its weight, and we have many threats and stresses coming up.

Science, and the competition for talent in science and engineering, is international, so regarding international positioning, we always have to keep an eye on what other countries are doing. Even with the positive signals in the Budget, we still remain about 11th in the OECD in terms of investment in R&D, and—I am sure you will come on to this topic—80% of our public R&D goes through the university sector. We have world-leading universities, but as you know—I am sure Karen and others will pick up on this—there is angst in that sector about financial stability. So the basic context is that we are still not up there with the biggest investors and we have to keep an eye on the talent pool.

Is the mood music in the UK open to international collaboration—to international talent? We have had, in the political sphere over recent years, some perhaps negative feelings about migration—about overseas visitors and overseas students.

So there is a whole holistic thing: the news is very welcome, and we are looking forward to it being even better, of course, in the spending review, but we have some outstanding issues that are not entirely resolved. I think DSIT still has three reports on its books that the Government have not fully responded to, including the Nurse review, looking at the landscape—the ecosystem—of where we put research money into universities, institutes and public sector research establishments. Will the Government take a view on whether we have got those balances right?



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And we have the issue of talent, whether it is international or home-grown. I think we still have major issues in the education system with STEM education, inequalities and the mad system where roughly 50% of kids give up science and mathematics at the age of 16. So I think there are wider issues, but the short answer is that the Budget statement was very welcome.

Q2 Chair: You have raised a number of issues there, Sir Adrian, which we will come on to. In this session and future sessions, the Committee will take a great interest in talent and investment and in the structure of research funding.

Coming back to the Budget, the science spend in it is £20.4 billion. That is a little over half of what Google spends and a quarter of what Amazon spends. It is 1.5% of public spending. Do you think that is the right figure? And coming to the Government's manifesto for change, do you think this is a Budget for change? If so, what change can we expect?

Professor Sir Adrian Smith: In terms of bandying about percentage numbers, some comparisons are quite difficult because people count things in different ways. But I would come back to the fact that being 11th in terms of investment in the OECD is not where you want to be if you want to be a leading science nation.

In terms of the change agenda, the mantra—I am sure you will agree—is growth. Underpinning that growth in a fundamental way is scientific research. As I said, the Science Minister said science is the goose that lays the golden eggs. There are problems about hatching the eggs and so on, but that is a slightly different issue; I am going to be unrelentingly positive in the short term.

Q3 Chair: Excellent. Thank you very much. Let's come to Dame Karen and Professor Richard. Sir Adrian has already raised the issues around university research funding. How will the Budget allocation and tuition fee policies impact the university sector and its ability to sustain scientific research? In her letter of 4 November, in which she mentioned tuition fees, the Education Secretary also said universities should make a stronger contribution to economic growth and particularly to regional economic growth. How do you see that succeeding?

Professor Dame Karen Holford: Universities welcome the rise in tuition fees. Of course, that is really stopping the decline; it is not nearly enough, but it is a good signal going forward.

Equally, we welcome the Budget and the commitments to R&D, but we have to remember that the whole ecosystem of research and development relies on universities. As we have heard, universities do the majority of the research in this country, and the ecosystem has been finely balanced with a lot of cross-subsidies. Our ability to drive economic growth, as we do, relies on that ecosystem being fully supported.

Policy changes such as visa changes, visa costs and so on have had a huge impact on universities, and we are not recovering from that yet. The

decline in international students not only affects our talent pool; it affects our ability to drive growth locally as well. This ecosystem has been working so well, but my feeling is that the foundations on which it is built are crumbling now, and we need to address that. The impact of some policies on the funding is fundamental to that.

The Chancellor had difficult decisions to make and, given the context, we were largely very pleased with the R&D elements of the Budget. The mission-based funding is absolutely critical to economic growth, and universities are keen to support that and to drive those missions. If you look across the five missions, there is no university in the UK that would not say that they contribute to those missions in various ways. So we are poised and ready to go.

Chair: Fantastic. Thank you. Professor Jones?

Professor Jones: Let me emphasise a couple of points. The UK is an unusual country; it is an international outlier in terms of how much of public sector research takes place in universities. In many other countries, a lot of research takes place in free-standing research institutes.

The way our system has evolved puts particular emphasis on the universities, and we have funded it in such a way that research in universities relies on cross-subsidies from other activities, which have generally involved teaching overseas students. We have got ourselves into a state where the national research base relies on those cross-subsidies. The Budget was a very good stabilising Budget, in that it locked in, essentially, the increases we saw in the science Budget in the previous Government. The fee issue does help to stabilise the system, but questions remain.

Making the question about the amount of money as a percentage of GDP is maybe not the right way of thinking about it. The right way of thinking about it is to ask whether it is delivering the results that we want. The bigger economic picture remains one of productivity growth that has stagnated since the global financial crisis—it is about 25% down from where it would have been. We also have very large regional inequality in productivity.

In a sense, therefore, I think I can be positive about the fact that the Budget stabilises the situation, but I would not say that by their fruits ye shall know them. The outcome in terms of what the economy is currently doing says that we are not really doing enough science or connecting it enough to economic growth to deliver the results we want to see for the country.

Chair: That is excellent. I think I am hearing a welcome for the Budget and the commitments in the Budget, but concerns about how we assess the return we are getting for our science investment, and also about the sustainability of the cross-subsidy for the UK research ecosystem.

Q4 **Kit Malthouse:** I have a few questions. First, Sir Adrian, I hear what you



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say about the OECD ranking table, but there is an argument about quality over quantity. I think it is still the case that Trinity College Cambridge has more Nobel prizes for science than the whole of continental Europe put together. How would we deal with the argument that these other countries might be throwing more money at it, but they are not producing what we produce?

Then, I have a question for Dame Karen. On the five missions, I am old enough to remember the eight great technologies—every iteration of Government comes up with five, eight, seven, 13 and all the rest of it. I understand why universities and researchers would co-operate with a Government if that is the way the funding goes, but is that actually the right way to do it? Does that skew research in a way that is productive overall for general UK science, or should the Government be broadly mission-neutral?

Professor Sir Adrian Smith: Looking at percentages of spends is not the end of the story at all, but you have to watch what is happening with investments elsewhere and at the environment that that creates for internationally mobile talent. There is also an issue that we have not quite touched on yet: having a long-term commitment that this is a fundamentally important area of investment, rather than a series of short-term policy switches and so on.

To emphasise a point I did not emphasise earlier, long-term stability of whatever the levels of funding are gives confidence in terms of individual researchers and their careers, and also gives confidence to inward investment. I agree that you cannot just look at those input figures, but there is a danger of smugness. If you look at what is going on scientifically in China, we used to say, "They can't think. They just copy," but now they are a leading scientific nation in many, many areas.

Professor Dame Karen Holford: I agree with you that, over many years, Government say something and we say, "Yes, that is a good idea" and we rush towards it. But I genuinely think there is a balance between directed research funding and research funding that is unhypothecated—it is discovery funding. We have to maintain that balance.

I feel strongly about the five mission lenses, though, because there is no doubt that we have to kick-start economic growth, and universities are the engines of economic growth. They have a core role, in terms of not only working with industry—driving the economy with new technology and new investments—but the skills piece. So, absolutely, universities are at the centre of kick-starting economic growth.

If you think about the technological advances we are making in clean energy and net zero, nobody can argue about the need to get to net zero—it is existential for the planet. Many universities have been driving their technologies towards that; if you look at the work we are doing at Cranfield with green energy, net zero, jet zero and the use of hydrogen, it is all directed towards that.

So to have a Government that actually seems to be tuned in to where the universities are directing their technology is really good. Even in terms of a technological university, there is the mission to have an NHS fit for the future; everybody wants a good NHS—it is the cornerstone of the UK.

In terms of universities and training, I have to bring up the level 7 apprenticeships. One of the level 7 apprenticeships we are doing is training NHS leadership to deliver leadership better. It is probably not the remit of your Committee, but if those level 7 apprenticeships go, it will destroy part of creating an NHS fit for the future.

So there are a lot of aspects of policy that all need to be drawn together by this Government. Talking to the Government, I think that that is the focus; there is a lot more cross-departmental understanding and willingness to talk, which is very welcome.

Q5 Chair: Indeed, that is the mission of the missions, as it were. One of the Committee's interests will be to see how we assess those. I am going to bring in Richard, and then Adam and Lauren.

Professor Jones: I agree with Karen. First, I remember the eight great technologies. It has not been helpful that the average lifetime of a technology priority over the last 14 years has been about two and a half years.

We can argue about whether "mission" language is the right language, but it seems inarguable that the state has lasting priorities. Generating economic growth is clearly one of them; making the health system sustainable and humane is one; increasingly, defending the country in an increasingly hostile world is another; and securing energy security in this transition to net zero is another. Those are just big, strategic goals that the state has. I should have thought everybody would agree that those are really important and that there should be a certain amount of direction of the more applied end of science and technology to support those goals.

There absolutely is an important place for undirected scientific research, because that gives you resilience against unexpected changes in the future and the basis for entirely new things. But on having strategic goals that the science enterprise supports, I would be surprised if anyone would disagree with that.

Chair: I agree with what you are saying. It also gives the public an understanding of the return we are getting for our investment in science, which is important. Adam, did you want to come in on the balance in terms of core research?

Q6 Adam Thompson: Thanks, Chair. Good morning, all, and thank you for coming. The Department for Science, Innovation and Technology has allocated £6.1 billion for core research. In your three opinions, what should be contained within core research as a concept?

Professor Sir Adrian Smith: The whole point of discovery research is that it is undirected, so saying that it should consist of x, y or z is in some

ways counterfactual. A predecessor of mine as president of the Royal Society once said that there are two types of research: applied and not yet applied. We should bear that in mind.

Professor Dame Karen Holford: What I understood by core research is research directed through UKRI and so on—through the research funding system we have at the moment.

Q7 **Chair:** Which, effectively, leaves Innovate UK outside of that.

Professor Jones: That is right. It is a term of art—the research councils, Research England, corresponding bits from the devolved Administrations and the national academies. It is not entirely coincident with undirected research, because there is research supported by the research councils that falls into supporting priorities or missions, or whatever we want to call them.

The bigger question of how much would you carve out for purely undirected research is an interesting one. European funding does it more explicitly, in the sense that the European Research Council would look like blue-skies research and, in that other system, that gives you a balance. I think they are two slightly different questions: the core research budget as a term of art in our current system and how much you think the balance should be between totally undirected and more mission driven.

Q8 **Adam Thompson:** Brilliant; thank you very much. Related to those points that you have made and with reference to the UKRI impact frameworks and the necessity for demonstrating impact, how do we ensure we have that low technology readiness level stuff, that blue-sky stuff, still happening within the core research framework?

Professor Jones: I think that is an important purpose of the UKRI and the research councils. It is for the research councils to make their decisions and for UKRI, in assessing how they spend money, to get that balance right.

Q9 **Chair:** It is a big subject, but do you see a need for change in the way in which UKRI makes those assessments?

Professor Jones: There was a recent review of UKRI that had a number of recommendations about how it should do things. I think there are places where UKRI could change, such as in the balance between the amount of interdisciplinary research and the way that research across those boundaries is supported. I think UKRI is still a work in progress—it has not been going for very long—and I think there is room for things to change.

Chair: I will bring in Lauren at this point on the structure of funding.

Q10 **Dr Sullivan:** I would like to bring up one thing about education. Sir Adrian, you mentioned the education system and the talent pipeline. Do you think that there is an issue about opportunity and access to project work, so coursework at A-level or GCSE, which does not expose children to project based thinking and practical skills? That may be having an



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impact on them choosing a wet lab science or engineering.

Professor Sir Adrian Smith: Can I start with the big-picture education issues and the link through to skills? We have not really talked about skills and people. In the broadbrush system, you have a cleavage at the age of 16 where half the population is giving up on stuff.

Working back through the system, there has been a decline in school laboratories and the ability to do projects, and that is certainly something that needs addressing. Even though you might say it is DFE business, I think this Committee should take a great interest in the educational system, and look at the inequalities—regional and otherwise—of people getting a STEM education and the skills base that then drives.

The skills thing is important. We recently produced a report in the Royal Society on maths futures, which notes that if you look at the curriculum for mathematics in schools, it is as though computers and data did not exist, yet they are the real drivers of everything, as it were, in a digital age. There is a massive need for a rethink, and it is of as much interest to DSIT and this Committee as it is to education per se. The things you have mentioned are part of a much wider malaise.

- Q11 **Dr Sullivan:** I couldn't agree more. My main question is about the proposed 10-year funding model for R&D. I would like to hear your thoughts about how it should be structured. Also, what kind of factors do you think we need to take into account as long-term priorities for R&D?

Professor Dame Karen Holford: I absolutely welcome long-term funding, which gives stability. It will support investment and co-investment from industry, if people know that something will not be cut halfway through, and that is absolutely welcome. It is something we have been asking for for a long time, and clearly people have been listening.

Universities UK will obviously be keen to work with Government on that. We need to look at the policy around it and the potential budgets that it supports, and mitigate against unintended consequences. One of the unintended consequences of long-term funding is, of course, things changing through the duration of that funding—that could be inflation, costs going up, or national insurance perhaps going up again. Those sorts of things come to bite you when you have a fixed budget.

As long as those 10-year budgets can be flexibly applied—I understand that it is about setting ringfenced budgets, not necessarily setting 10-year project budgets—I think it is good. The 10-year horizon enables us to imagine the art of the possible in those funding programmes, which is really helpful. The big thing for me is that it will prompt co-investment and enable us to get co-investment, which is a good thing.

Professor Jones: I think it is very important. There have been too many examples of short-term projects, where we have not let things run long enough. To give one example in the Budget, it was a very good thing that the innovation accelerator programme was extended—that is a rare example of a place-focused funding intervention and the previous

Government had given it essentially just two years. It is impossible to demonstrate that things are actually working if you are constantly chopping and changing them.

- Q12 **Dr Sullivan:** Finally, on the place-based issue, how do we ensure not just that the money is spread to the institutions that may be currently benefiting from a lot of money—even though they are doing lots of great things—but that it gets further afield to other institutions and universities across the country?

Professor Jones: To step back, we have big discrepancies in how much public R&D money is spent across the country. More than half of the R&D money is spent in what is essentially the greater south-east. In parts of the country such as the west midlands, the east midlands and the north-west, there is proportionately less public sector R&D than there is private sector R&D. There is a need, I think, to increase the research capacity, so that absolutely involves what you are saying and means spreading out research into other kinds of institutions. I think that is best done collaboratively, in the sense of collaboration between national organisations such as UKRI and Innovate UK, which clearly has a very important role in translational research.

With the emerging picture of regional government, with city regions and mayoral combined authorities, universities need to come together and collaborate more—for example, universities within a city. In Greater Manchester we have five universities, which are increasingly collaborating. That allows us to spread the capacity to do good research to those other places. That then allows us to respond to the needs of local industry and local economies better. Collaboration, co-creation—these are the words that we should be emphasising.

Professor Dame Karen Holford: To build on that, we should not forget the role of the Royal Academy of Engineering. It has done some fantastic work with industry to push out funds away from the south-east. I think that the Royal Society and the Royal Academy have a key role to play in this as well.

Professor Sir Adrian Smith: Can I make one further point on the long-term thing? We have not talked about it explicitly, but part of the research ecosystem and landscape is big pieces of kit—facilities, synchrotrons and so on. We have a habit of starting up something new and glossy—the capital goes in—then the running costs do not follow. It is the “batteries not included” syndrome. There is an issue there to be thought about.

Chair: To summarise on long-term funding models and the infrastructure issue that Sir Adrian raised, what I am hearing from Dame Karen and Professor Jones is that there should not be a conflict between long-term funding models and diversity of destination when it comes to that funding. It must not be the case that 10-year funding models mean that the money is going to the same establishments and the same places regardless of excellence or subject matter. What you are saying to the Committee is that you do not think there is necessarily a conflict there, but it is

something we need to be aware of.

- Q13 **Emily Darlington:** Thank you, Professor Smith, for raising the Diamond synchrotron; it would have been remiss of you to be here without mentioning it. My question relates to what you said about long-term collaboration and international competitiveness. We left the Horizon programme due to Brexit. What do you think about the impact of leaving Horizon? Now that the Government are absolutely committed to rejoining Horizon, what do we need to do to rebuild those relationships? What is Horizon's impact on the UK?

Professor Dame Karen Holford: The impact of leaving Horizon was devastating on partnerships, collaboration and advancing science. We all know that if you work in collaboration, it is greater than the sum of its parts. So it is very welcome that we have rejoined it. Early indications show that applications have increased. There was a pent-up enthusiasm for applications. It is a fantastic thing, and anything the Government can do to support our participation is welcome. We are right behind this. The universities want to play a constructive role to maximise the huge benefit of FP10. We have some offers to make to the principals there.

Professor Sir Adrian Smith: The only thing I would add is to put that in a slightly broader context. We really need at some point to get our heads around whether we have an international strategy in the context of science and research, of which Horizon is a part. But massive things go on outside Horizon.

Chair: That is an excellent point.

- Q14 **Steve Race:** I have a couple of questions to follow up. First, we are catching up on funding for Horizon as part of the current Budget. What is your view on the impact of that within the current Budget?

Chair: To put that in context, there were significant rumours before the Budget about how Horizon funding would be accounted for and that it would be cut, but the Budget showed a separate allocation for it.

Professor Sir Adrian Smith: There was a commitment at an earlier stage a few years ago that it would be paid for in a particular way. The concern was that that would be torn up and it would be cut out of UKRI. That was the rumour that was going around. I did not spread that rumour myself.

- Q15 **Steve Race:** What is your view on how we measure the impact of our participation in Horizon? Obviously, it is complicated—it is through EU and European institutions. How do we make sure that we maximise both our participation and the outputs of participating in the programmes?

Professor Sir Adrian Smith: Karen might want to comment, but at the end of the day we maximise the value of the participation by applying for and winning grants and forming networks and co-operations that we otherwise would not be able to. The rejoining has been fairly recent. There is now an upward trend in participation, and hopefully that will continue. The big and terrible question that we can never answer is: how do you



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measure the value of the return on investment in the short term? You cannot, because it is long term.

Professor Jones: There is a very important question of talent attraction that comes with Horizon. Horizon funding is very portable, and we were already starting to see people, particularly those holding ERC grants, saying, "Well, I'm off somewhere else, wherever seems more congenial." The UK was exceptionally successful in winning those grants, and the ERC was a particular case in point. Part of that is actually getting the most talented scientists to move to the UK and take those opportunities. That ability to attract top people is a very important part of that.

Professor Dame Karen Holford: Can I reinforce that? The exodus of international researchers when we left Horizon was palpable. People were leaving, saying that was the reason why, and taking their grants with them because the UK was not a place to do world-leading science any more. It is stunning for a researcher to tell you that they no longer feel that they are in a place where we can do world-leading science. It is about world-leading science and the research outputs that we produce from those. It is also about the impact of those people on those around them in any university. They have an uplifting effect on all the scientists around them.

Q16 **Emily Darlington:** Have this Government done enough to rebuild our reputation as a place for world-leading research and to attract back that talent we lost during those years? If not, what should they be doing?

Professor Sir Adrian Smith: It is somewhat early days to judge this Government—if by "this Government", you mean this Labour Government. The important point is that it signals that it is about not just cash but the cultural cross-referencing and all the rest of it. There is still work to do on the narrative that we are a country open to talent.

Q17 **Steve Race:** We have talked tangentially about the skills base and getting people into the country. Clearly, the funnel through secondary schools is not good enough, and with our removal from Horizon, we have wrecked that for a few years at least. What are some of the other challenges that you face in getting researchers and people to come here to participate in science programmes in this country?

Professor Sir Adrian Smith: It is implicit in some of the things we have said; a long-term commitment that we care and that we regard this scientific investment as fundamental to the future of the UK sends the right kind of signals. There are micro-level things that are very irritating, such as visa costs and the rest, but we ought to be able to fix those. I think it is about the overall mood music and narrative.

Q18 **Chair:** Do you anticipate that the UK will be able to return to the level of Horizon participation and successful grant awarding that we had when the UK was part of the European Union?

Professor Sir Adrian Smith: Are you asking for predictions?

Chair: Not for a predication, but an assessment of the likelihood.



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Professor Sir Adrian Smith: I would say, why not?

Chair: Excellent. Thank you, Sir Adrian.

Professor Dame Karen Holford: I would say it is possible but there needs to be an awful lot of rebuilding of trust. The relationships that we lost when we were out take a long time to rebuild. Yes, I would agree that it is possible, but there is some work to be done.

Chair: Great.

Professor Jones: I agree. Those networks take time, but if there is a sense that the UK is in this for the long term, people will invite us back into those networks again. We can then be influencing the shape of those calls and the way in which the programme evolves.

Chair: We look forward to making our contribution to supporting that.

Q19 **Josh Simons:** I will ask this question as a bundle, and you can each pick off the bit that is most relevant. I would like to look ahead towards the spending review and pick up on a few of the things that you have said about what the Department should be thinking about in that spending review.

The top-line question is, what should its priorities be? There are two elements I would like to specifically hear about. The first is to pick up on your point about skills, Sir Adrian, and the Department playing more of a role in that.

I went on a tour of a local technical college in Wigan. They do some fantastic work, but both their maths and computer science programmes are about 20 years out of date. They are not data-driven, statistics, statistical analysis—the core skills that you need.

What role do you think the Department should play? You say more of a role, but what role and how should it go about doing that, and does that have implications for what it should be pushing for in the spending review? That is the first part.

Secondly, more broadly, the CDDO, Incubator for AI and Government Digital Service have all now been brought under the Department for Science, Innovation and Technology. It is not clear how much budget has been allocated to underpin those, but of course better co-ordination by the Government of data is a vital part of the future of research in scientific progress more generally. What else would you like to see, both from the Department and again, in terms of implications for the spending review, in bringing together that more strategic, coherent way of thinking about the future of data in and around Government?

Professor Sir Adrian Smith: A more embracing word than “data” is “infrastructure”. We need a careful look at the competitiveness of infrastructure and the long-term investments, batteries included, to go with that.

Q20 **Chair:** Can you give us some specific examples of infrastructure?

Professor Sir Adrian Smith: Since I mentioned the synchrotron, I will mention it again. At Harwell, we have X-ray sources, we have neutron sources, we have molecular biology laboratories and so on. There is part of that landscape where, to be at the cutting edge of science and to attract the brightest and the best, they have to have the facilities. That is, again, part of the internationally competitive point. Are we up there? If we are not, people will not come here to work—they will go elsewhere.

It has not been traditional to see data as part of that infrastructure debate. That would be my main contribution. Data is a fundamental part of the infrastructure going forward, and is all-pervasive. There is work to do there to underpin and invest in the right kind of ways.

We have got fantastic resources that we were in the first in the world to do—things like the Biobank and so on and so forth—but there should be a lot more attention to data as a fundamental asset in a digital age.

Professor Dame Karen Holford: For me, what universities will be looking for is a sustained commitment to increased R&D funding and a sustained commitment to increasing QR funding.

I do not know whether you have all come across the Universities UK blueprint, which was published a few months ago. There are quite a lot of suggestions in there of what we would like and what we would do for that.

One of the things I would alert you to is the recommendation for mission innovation funding, to stimulate research and innovation towards addressing the Government missions and the industrial strategy. I think the industrial strategy paper will be published around the same time. I would urge you to link up the sustained investment in R&D with the industrial strategy, because they have got to be interconnected, haven't they?

Professor Jones: The skills point is really important. There is a long history of failure to join up innovation policy and skills policy. If we are going to get innovation-led growth in places like Wigan, or the north-east, or Greater Manchester, we are going to need skilled people, not just at PhD levels, but with technical skills that come from the FE sector. Historically, we have done very badly at connecting up what the FE sector does with what universities do.

In Greater Manchester, Innovate UK gave us a one-year pilot programme to do a further education innovation fund. That was very helpful in terms of getting more connections. Wigan & Leigh college is actually a pretty good college, and Anna Dawe is an excellent leader, but that has allowed us to connect the FE sector with the universities in Greater Manchester in very practical ways. We are currently training PhD students to be able to go to colleges and help them with these all-important digital skills where they find it difficult to find people to do that training.

I think that if we take a holistic view of regional industrial strategy, which brings together the fundamental R&D that provides the seedcorn for more



applied, translational research and brings together the university sector and the FE sector in a place, and build that into a national picture through meshing regional industrial strategies with the national industrial strategy, that is how we can get that full translation of scientific excellence into private sector R&D, into highly productive companies that are giving good-quality jobs at all levels to people in places all across the country.

Chair: That is a really important point and something that we want to see—that integration reaping the benefits of research and development, and spillover effects across our country. We are coming to the last 10 minutes, so I am going to bring Josh in quickly. Then Martin has a point to make, and Emily is going to come in on institutions.

- Q21 **Josh Simons:** Just to underscore that point, Professor Jones, it is helpful to think of Greater Manchester as a case study in what works well. In my area, we have Wigan & Leigh college and St John Rigby college, and both are fantastic educators in exactly the sort of skills that are not generally looked at because they are below PhD level but that actually, in terms of growth, and growth being widely distributed, are super-important.

I have just one quick follow-up question for Sir Adrian Smith. This may be looking ahead too much, but the data Bill is being brought back to Parliament and is something we will be looking at. Data as infrastructure is one way to describe the core conceptual framing of that Bill and the many different things that it does. I don't know whether you have had a chance to look at it, but if you have, I would be interested in whether you think the Bill as currently published does that in a satisfactory way.

Professor Sir Adrian Smith: No, I don't feel competent to say I have pored over such words as I have seen, but there is a whole host of stuff in and around data. It has to be collected; it has to be stored; and it has to be processed. There is an ecosystem around data, and I am not sure all angles of that are captured in what is being talked about at the moment. And that is not to speak of the skillsets required to exploit it.

Chair: Yes—in both the private and the public sector.

- Q22 **Martin Wrigley:** Professor Jones, you mentioned a couple of times things that intrigued me. You talked about the productivity problems in the Army. You talked about the gap in technical skills to follow up and embed innovation. Are we missing a trick, in that we are not looking at what you might regard as basic hygiene? A bit like the NHS not having an electronic patient record but looking at AI and twiddly bits to investigate high-end stuff, are we focused too much like a squirrel on the latest shiny thing and not actually embedding the innovation and research that we have in this country anyway?

Professor Jones: That is a really important point. There is a lot of focus now on the diffusion of innovation, and it was a welcome announcement in the Budget that Dame Angela McLean would be doing a review of innovation diffusion. That is good. Yes, we have not built institutions that focus enough on diffusion. We have the Catapult centres, and they were a good innovation. In places like Sheffield, Coventry and Teesside, they



have been valuable additions to the landscape, but they were set up with rather a narrow view. They were to do translational research in technology, in terms of technology readiness levels 4 to 7, if I remember rightly, which is quite a narrow view. There is a case to be made, and I wrote a paper with Eoin O'Sullivan from Cambridge's Institute for Manufacturing, arguing that other, international examples have a much more explicit mandate to build manufacturing and innovation capacity in a regional economy. Actually, some of the Catapult centres have done that. They have been addressing skills, translation or diffusion of innovation—all those sorts of things. However, the Catapult centres that have done it have done it despite the fact it's not actually in their mandate. They have done it because they think it's important.

There is room for us to think about the institutions. We can build institutions that have a more explicit mandate to link up to skills, to provide technology and intelligence—all the things that you would do to build supply chains, and support companies to enter supply chains and move up the value chain to get higher value business. I think there is room for institutional development.

Chair: Thank you, Professor Jones. That is interesting.

Q23 **Adam Thompson:** That was a great point, Professor Jones. I agree. I assume that the international institutes referred to are the Fraunhofer institutes and suchlike. How do you see that mandate changing for the Catapults, to bring them more in line with some of those, maybe more successful international examples?

Professor Jones: They have an important national mandate, and they should not lose that. It is important that they retain a technology niche where they are absolutely at the frontier, but I think there is a place for them to work more closely with their local business base. I think this is particularly important in places like Greater Manchester, which is a good example. It is an SME-driven economy. It is about what we do to support those SMEs to find higher value niches to operate in, and the skills and innovations we need.

This is thinking about the whole ecosystem. It is partly to do with thinking about how we can scale up spin-outs more. I think there is a widely held view that we are quite good at producing spin-outs, but there is a tendency for them to leave the country when they scale up. We should think about what environment we need to have around a spin-out that wanted to scale up. That is part of the thinking in Greater Manchester—we launched a collaboration with Cambridge on this issue. There is so much fantastic stuff to learn from Cambridge about how to make a great, deep tech innovation system but the missing link seems to be; how do we get those people to build their first factory, not in Leipzig, but in Rotherham, or Wigan, or Stoke?

Chair: Thank you. We will be looking at those challenges in our next evidence panel. I will ask Emily to come in briefly. This will also give you an opportunity for any closing thoughts. I think we have two minutes.

Emily Darlington: Given the time, I am going to resist the debate about catapults.

Chair: Well done.

Q24 **Emily Darlington:** We will be visiting Milton Keynes, and will look at the impact of Catapults on the SMEs within Milton Keynes, and the important collaboration with Cranfield and other institutions. Perhaps we will discuss that afterwards, Professor Jones.

I really wanted to come back to the big picture, and the Government missions. We have talked more broadly about the missions, which are outcome-based, as opposed to specific choices of technologies or research areas. How do you see the framework of UK institutions and how can they help and align around our UK missions? I am talking about not just growth but security and health—all of that.

Chair: Excellent. Any closing thoughts would be helpful. I will also add to Emily's question, regarding place and our discussion around the integration of research and development and regional economics. Would you devolve research and development funding?

Professor Sir Adrian Smith: The question on R&D missions leads into my closing remark. Both the missions and the stuff we were talking about—including skills and a holistic approach to data—fundamentally depend on cross-departmental working in Government. I think that has always been the issue of the age. Announcing the missions is great, but with the actual mechanisms we do not want to go back to square one and say, "Now we have the missions, let's work out the R&D agenda for each mission."

Basically, the R&D landscape can map on to missions in various ways, but how are we going to deliver? My particular bugbear, in terms of the education system and our maths futures report from the Royal Society, is that we have to get a totally different focus on data, the understanding of data, awareness of data. How do you do that when the curriculum review is owned by a particular Department? We need a lot more effort, and DSIT should be involved in practically everything.

Professor Dame Karen Holford: My closing remark is that I would like the Committee to be aware that the research funding system in universities is structurally unsustainable. Universities incur deficit in their research activities, which we cross-subsidise through other things, which has been taken away.

In answer to your question, Chi, on whether to devolve R&D funding: devolve to whom? At the moment, the system of UKRI and the royal academies distributing funding is well known. It is peer reviewed, and is a funding allocation based on excellence and judgment. Who would you give the funding to and how would they make that judgment? That is a key question.

Q25 **Chair:** I think your answer is no, then. Thank you. Finally, Professor Jones.

Professor Jones: The principle of excellence is the foundation for our upstream blue-skies research. That is really important, and should still be run nationally. I would add that one could influence where excellent research takes place by where you put the infrastructure. The fact that the synchrotron is in Harwell made quite a big difference. That has been demonstrated by a very nice paper by Henry Overman. Had you put the synchrotron somewhere else, that would have attracted excellence to those other places.

The question is probably different for translational research or more applied research, where it needs to be connected with an industrial base that does have a regional element. There, there is more of a case, maybe not for devolution but for co-creation, with people who understand the local economy. The innovation accelerator actually worked out to be quite a good example of how that might happen, with collaboration between Innovate UK and a mayoral combined authority.

Chair: Thank you to our witnesses. We have covered a lot of ground. I have failed to bring it to a conclusion within the allotted hour—we are two minutes over—but that is a reflection of the interest of the Committee and the wide nature of the subjects and issues you have raised. I thank you so much for being an excellent first panel.

Examination of witnesses

Witnesses: Dr Alicia Greated, Stephen Phipson CBE and Dom Hallas.

Chair: For the second panel of the Science, Innovation and Technology Committee's public evidence session on scrutinising the Budget, I am pleased to welcome Dr Alicia Greated, executive director of the Campaign for Science and Engineering; Stephen Phipson CBE, chief executive officer at Make UK; and Dom Hallas, executive director of the Startup Coalition. I will ask each of you to give a short introduction to yourself and your organisation, then we will proceed to questions focusing on the impact of the Budget on R&D-intensive businesses.

Stephen Phipson: A very good morning to you. I am Stephen Phipson, chief executive of Make UK, which has been around for 125 years. We are the national business representative organisation for manufacturing. We represent about 20,000 manufacturing businesses across all sectors, which employ about 1 million out of the 2.6 million people manufacturing in this country. We have 72 trade bodies and 32 universities among our membership, so we are a broad church that has been around for quite a long time.

Chair: And which reflects our country's great heritage in the industry.

Stephen Phipson: Absolutely.

Dr Greated: Hi, everyone. My name is Alicia Greated; I am the executive director of CaSE. We are the UK's independent leading advocates for R&D. Our members include a lot of universities, businesses, charities and professional bodies. We feel that we are the voice across R&D, which is a



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really privileged place to be. I have worked in research and innovation funding and strategy my whole life. I have done that in the UK for UKRI, and I also head up something called KTN, which is an innovation agency. I also spend a significant amount of time overseas, building UK overseas partnerships in research and development.

Chair: CaSE is the Campaign for Science and Engineering, which does what it says on the tin.

Dom Hallas: My name is Dom Hallas. I am the executive director of the Startup Coalition, a lobby group for tech start-ups and scale-ups in the UK. We have a community of 3,000-plus entrepreneurs and investors focused on building the best technology-driven start-ups in the United Kingdom.

Chair: In the previous session, we discussed the impact of the Budget on the science, innovation and technology communities that are focusing on research-intensive businesses. It was said that the Government and the Minister for Science recognise that research and development is the goose that lays the golden eggs, but we may have challenges in hatching those eggs, as I think Sir Adrian put it. That is what we are here to look at in more detail in this session.

Q26 **Martin Wrigley:** I come from a background of working with tech start-ups for the last 10 years or so and doing similar sorts of things. My first question is pretty similar to one we asked the first panel: is this Budget doing enough? Where should it be doing more? What could it be doing more? Is it going in the right directions?

Stephen Hipson: What we welcome in the Budget is the commitment to the long-term industrial strategy. That is really important to the manufacturing sector in this country, particularly looking at a 10-year framework and bearing in mind that average investments in manufacturing in this country are between seven and 30 years. Inward investment in particular is looking at that long-term commitment to the plan. As the Chancellor reiterated in her Budget speech, that is very important.

We also very much liked the commitment to digital adoption support through Made Smarter, which the Chancellor announced in the Budget. In an otherwise quite difficult Budget, that was very important. We have had several thousand businesses going through the pilot schemes. The next phase is the national adoption.

Digitisation for manufacturing in this country is absolutely vital. We are still behind in our robot population, for example. To compare ourselves with other countries, at the moment we have 111 robots per 10,000 employees in manufacturing, which puts us at about No. 24 in the world. We need to get more and more companies adopting those digital technologies in the manufacturing sector—particularly SMEs, which is where the Made Smarter programme is focused. Manufacturing in this country is made up of about 800 large companies and 200,000 SMEs—that

is the structure of it—so the Made Smarter support and the focus on the diffusion and adoption of technology within that 200,000-strong community is really welcome.

To give some balance, we have some challenges around the increase in pre-profit taxes, and we will see the effect of that in the short term, but we were very pleased about the long-term commitments that came out of the Budget.

Dr Greated: I reiterate everything that everybody has said. For our members and our community, this was a good outcome for R&D in terms of both the financial commitments and the narrative, which was important to us. When we were listening to the Chancellor's speech, it was clear that R&D was seen as underpinning all the big strategic priorities and growth of the UK. To reiterate what other people have said, that strategic stability and direction is really positive.

However, the devil is in the detail. First, CaSE is looking at what will happen with the DSIT allocations themselves, so what will happen with UKRI, and we did not hear Innovate UK being mentioned at all. It was interesting to hear your questions about core research funding. One thing I want to reiterate very strongly is that R&D is dependent on an ecosystem, and core research will never sit in isolation. Business does not sit in isolation, and charities do not sit in isolation; they are all dependent on each other. That is one example.

The second example relates to the £20.4 billion that you mentioned at the beginning, Chi. We now have a departmental breakdown, but we do not know the comparable figures year on year. When we looked at it in more detail, we found what we feel is a cut from £3 billion to £1.7 billion in defence R&D, but is that a real cut? We do not know whether that is comparable. Those are the questions we would be asking.

But it feels very positive. It places us in a great position for the spring spending review. I will also add to what Adrian Smith said about the UK's position. He said we are 11th in OECD, which is correct based on public and private investment, but if you look at just public investment in the same report he referred to, we are 27th. I think that is interesting and important for us to think about.

I will make one final comment, which is not about business; it is about taxpayers and the public. I want to reiterate that CaSE is doing a lot of work on public attitudes to R&D, and there is great support—70% of the public want to support R&D. They feel it is important, and business is a critical part of that. So we are in a good place, but we definitely cannot sit on our laurels. There is a lot more work to do.

Chair: Thank you both. We will be raising questions on the specifics of science budgets, particularly on departmental spend. A theme of our discussion already has been how we measure success, whether it is about the £20.4 billion or something else, and how we measure what we are achieving with science spend and what the right parameters should be. On

your point about us being lower when it comes to public and private spend—

Dr Greated: To public.

Chair: To public spend. We are lower when it comes to public spend alone than when it comes to public and private spend. My understanding is that we are also lower in the rankings when it comes to attracting private R&D investment, so we will also want to look at that relationship. Dom?

Dom Hallas: The Budget was not good for tech start-ups; it also wasn't disastrous. The bald reality is that when taxes go up on your business, it is never a good thing for you, whether it is the NIC increases or capital gains tax going up. The capital gains issue is really important for tech employees, as much as it is for founders. Share options in particular play a role in incentivising people into early-stage businesses.

There are also things like carried interest that materially impact the venture capital ecosystem that funds all the companies in the technology start-up ecosystem. Then there are things like BADR, the artist formerly known as entrepreneurs' relief, which obviously really impacts on entrepreneurs. They are not good—we have to be honest. We were super candid with the Treasury about that.

Entrepreneurs were pretty scared ahead of this Budget, but I don't think the most disastrous predictions about the ecosystem came true. I think we would have seen significantly worse outcomes if that had been the case.

There are two lessons from that. The first is that what it tells us is that founders' disastrous predictions—"Is everyone going to flee this country? Is this all going to be terrifying?"—are not the case. Ultimately, entrepreneurs are hardy enough not to be scared off by a 2% or 3% increase in their marginal tax rate. At the same time, there is now a story that needs to be told to entrepreneurs about why they should stay here and build their businesses here, particularly given how mobile those entrepreneurs are in comparison with the businesses of the past. That is a critical part of the story for this Government in moving forward in a post-Budget world.

I agree with the two other panellists about the positives. The public R&D budget protected is really important. The other thing that is really important for our businesses is the protection of R&D tax credits and the generosity of tax credits, which have been cut significantly in recent years but will be retained through the cycle.

There are positives to tell the story about, but ultimately for our businesses it was pretty choppy.

Q27 **Emily Darlington:** We heard from the previous panel, and there has been a big discussion within our team, about the productivity gap, the challenges of economic growth and other issues, and the interplay between the R&D budget and the industrial strategy Green Paper—how they work together to create that environment. Is there enough read-



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across between those two strategies? What elements may be missing that would ensure that we are creating the right environment, as Dom says? As we know, it is about much more than just R&D and tax; there is a whole ecosystem. What are the elements that are good? What elements are missing between those two strategies and the Budget allocations?

Stephen Phipson: Industrial strategy is absolutely vital to bring together all the resources against some clear long-term objectives. That is what inward investors in particular crave, if you look at large manufacturing investments in this country. We also need to be clear about linking together the R&D programme and the education programme.

The most important thing, which we have to keep an absolute rifle focus on, is the skills shortage problem. That is what I talk to most Ministers about at the moment, and it is not going away. If we look at our manufacturing and engineering resources in this country, the average age of our workforce is 52, and 20% of them will retire in the next seven to 10 years. If we look at that timeframe, we currently have 62,000 vacancies, which is the highest number there has ever been. We have an apprentice programme that is declining each year: as of last year, our apprentice starts were down 42% since the levy was introduced in 2016. It is not working. We are not getting the right vocational skills.

If you ask any of the chief executives of any of the large manufacturing organisations, the No. 1 issue on their agenda over the next 10 years is having the right skills for all the new technologies and all the great opportunities we have, particularly the ones that we can bring together in an industrial strategy.

We are calling for what has to be a skills revolution, if we are to sustain the growth that we are talking about. If there is something that there is not enough emphasis on yet, it is the skills agenda and how critical it is.

Chair: It was emphasised to us in the earlier session that skills are something that this Committee should look at, so thank you for that. Alicia?

Dr Greated: I'll go last, because I have all these academicky things to say. I've got a long, long list.

Chair: Maybe you can think about how to summarise it. Dom?

Dom Hallas: When it comes to the industrial strategy, tech is one of the core strands, as identified by DBT. The way we think about technology is, "Should it be a vertical part of one of five strands in a strategy, or should it be a kind of enabler across the entire industrial strategy?" From our perspective, it is about how you thread that throughout the conversation. If you do not do that when it comes to technology, you do not have a 21st-century industrial strategy; you have a 20th-century industrial strategy. It is quite obvious that that will have to be a core part of it.

When it comes to how we can leverage the R&D budget and the different programmes that the Government run among the coterie of quangos and



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the support on offer, for us it is really a question of how you identify the biggest-priority technologies—the previous Government would have called them the five key technologies—and ultimately support companies and innovators, from conception of idea all the way through the journey of building a business. What role does the Government play in some of those areas?

Take climate tech, for example, where we have done an awful lot of work. There is a clear funding gap at a certain point, at what is called the valley of death. Ultimately, the question is how we drill down on that and say, “If you are building an industrial strategy that focuses on climate”—as this Government wants to do—“how do you solve that problem at that stage in the process?” You might have a different problem when it comes to deep tech companies, where the journey will be similar but there may be a longer gestation period for the business and going to market may be more challenging. How do the Government home in on that and understand what it means?

It is about leveraging the whole journey of Government support. One of the challenges at the moment is that that can be quite bitty. You have research funding agencies and the big pot of £20 billion-plus of funding, but that feels quite detached from the support that Government might provide in different areas, say for access to markets or for supporting overseas international trade.

It is about saying, “Okay, you have to work holistically together and unify the different parts of Government to say, ‘This is the mission.’” In many ways, that is the point of an industrial strategy: to say, “This is the plan—how do we align everyone behind it and drive towards it?” If we do not have that level of co-ordination, the risk is that we will have lots of different plans in lots of different places, and lots of civil servants running off in lots of different directions—in a very worthy way, but not ultimately achieving an awful lot. Making sure that there is that level of alignment and that the ideas are all pushing in the same direction is really important.

Chair: Perhaps one question for us would be where responsibility for that alignment should lie within Government and how we can track and assess it. Alicia?

Dr Greated: I agree with all the points made. When we speak to business, one of the biggest issues is consistency of strategy and policy—all the things you were talking about—and the other is funding, including that journey of funding. There are gaps; it is very bitty.

On the strategy, at the moment we have the missions, the industrial strategy and the science and technology framework, if we keep it. How do we make that really clear when you look at it all together? I don’t mean that it is messy; it is just about ensuring a consistent picture that we are monitoring and keeping an eye on as things progress. What businesses want, as everybody has said, is consistency of both strategy and policy. Whatever the policy is—R&D tax credits or whatever—it needs to be consistent.



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I was really excited to see the industrial strategy, for lots of reasons. The growth-driving sectors are really interesting; they are much broader than we have seen in the past. The inclusion of the service sectors, such as financial services and professional and business services, is really interesting.

In that journey—this brings us back to points made by the other panel—we absolutely need not to just think about tech. Tech is super-important, but things like economics and social sciences—all the things that align with the big growth-driving sectors—are really important, as is having that underpinning research to feed into those drivers.

On skills, which are probably the biggest issue that our members bring up, I agree with everything that Stephen said.

I want to go back to something that was made into quite a small point, but that I think is an enormous point, which is about visas and visa costs. I will give you one example, because it makes me feel sad that we are in this situation.

Take a family of four coming to the UK on a global talent visa. Somebody who is potentially very good, who might have two young children, is paying over £20,000 up front to come from another country into the UK. The Royal Society did some work on this. If we compare the global talent visa costs for the UK with the international average—this is the lower end, because it is including the UK figure—we are 719% higher. If we want to bring businesses or people, it is not just about the narrative; it is about the money as well. That is not a cost I would want to be paying, however much I wanted a job. We do need to take that into consideration. But I think all the points that have been made are correct and good.

Q28 Tom Gordon: One of the big implications of the Budget is employer NICs. When you are seeing increases in the minimum wage for staff who might be supporting R&D too, what is the potential impact and how is that going to change R&D for business?

Dom Hallas: I can take that one. Our companies, ultimately, are mostly loss-making until they scale. They raise investment, usually through venture capital, and then they build their businesses, and they are burning through that cash as they go. When you increase the costs on business—in this case, when you increase the cost of hiring and retaining staff—that runway becomes shorter, because they are spending more money on paying the NICs. I had texts from our founders on Budget day saying, “That’s cost me £200,000, £300,000, £400,000.” It means that they have to raise investment quicker, potentially; they have to understand that it changes the lifecycle of their business materially. So yes, it is a cost to bear.

The strange thing about working with entrepreneurs sometimes is that they feel like Government policy just kind of happens to them, if we are honest. They have so many difficulties in running their businesses that sometimes when you ask them, “How much will this impact you?” they will



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say, "Oh, well, it'll cost our business this much time and this much money, but we'll just have to get on with it." Our job, and I would hope the job of policymakers—as best as possible within all the balances people try to make—is to make it as easy as possible for them to build their business. But yes, look, it hurts.

One of the other things that is really material, particularly for our companies—I touched on it at the start—is capital gains tax. You see this challenge: how do you incentivise employees into these early-stage, very risky technology businesses? One of the core ways you do that is by providing them with share options that will ultimately turn into equity in the business. One of things that upset a bunch of founders was when the Prime Minister was talking about his definition of working people and said that people who own shares do not count as working people. I understood what he was trying to say—everyone here in politics appreciates the balance and that when you are in that box being talked to by a journalist it is always tricky—but a huge number of the employees of our businesses are compensated in that way and it is an important part of their compensation. Crucially, it is what makes them go and work for a British tech company that is scaling as opposed to taking a higher base salary to go and work at Google. How do we tell the story to those kinds of people that we want them to do that, and how do we tell the story to entrepreneurs that despite these potential additional barriers—whether it is NICs or something else—we still want them to build and scale their businesses here?

Stephen Hipson: Shall I have a go at some of this? In manufacturing, if you look at the SME community in particular, one of the challenges is that companies are often locked into the supply chain; they are often on 12-month fixed contracts. There is not much opportunity to raise prices. You are talking about an average additional cost of about £1,000 an employee from what came through the Budget. A lot of those operations are kind of break-even, or very low margins, and I worry about how they are going to cope with it, to be honest with you. One of the reactions will be cutting back on some of their R&D and not employing as many people as they could have done. We have yet to see the data—we do survey, and over the next couple of months we will have some hard data we can publish around what actions people are going to take to mitigate the cost—but it is that community of people locked into the supply chain that I am more concerned about at this stage.

Q29 **Tom Gordon:** Are you aware of anyone already taking steps, like looking at not extending contracts?

Stephen Hipson: They are all talking about it. If you have 400 people, it is £400,000, and if you are a break-even business that is a lot to find, so they are thinking, "Do we scale back on what we were spending on R&D? Do we employ fewer people?" They are all going through that decision-making process as we speak. I think the dust will settle in the next couple of weeks or so and we will have some good data, which we will publish, showing what people's reaction to this is going to be.



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Dr Greated: We have not seen the impact either. Again, I would talk about the whole supply chain and everyone involved, including the universities, because it is going to affect all parts of that ecosystem.

I just want to build on a point that Dom made, which is a more general point: it is a real challenge to hear the voice of SMEs. I think that is something I would be thinking about on this Committee, and we all need to be thinking about it—you do it as your day job. How do you get that voice? They are really busy and they are trying to save money, so it is quite hard to get that voice. I think we need to be working as a whole community. When we are thinking about R&D, we should be thinking about how we make sure that the SME voice is heard when we are developing priorities, policies or anything collectively.

Chair: That is absolutely right. Given the Government's commitment to growth and the role of start-ups and scale-ups in driving that growth, we need to hear the voice, and we also need to understand the impact of policy measures. To some of the points that Dom was making, we need to be seeing more start-ups and scale-ups, and we need to be encouraging founders from diverse backgrounds—whether or not they want to be called “working people”, I am sure we agree that they are working very hard. We need to be rewarding them in a way that gives the greatest incentives and makes the most sense economically for the long term.

Q30 **Steve Race:** Turning to the Government's future commitments, what do you think are the long-term ambitions for R&D investment? Are there any particular areas that you think need to be prioritised over the longer term?

Stephen Hipson: I am probably going to support a little bit of what Dom's brief is here, but a really important thing we need to change in this country is the ability to scale up a lot of the innovation that we have. We track quite a lot of start-up companies that end up at the moment going off to the United States, or being bought by American PE or venture capital companies, being moved to the US under the Inflation Reduction Act and taking advantage of scale-up capital there. I welcome the Chancellor's comments on pension fund reform, freeing up pension funds to help us with this scale-up challenge, but in the longer term, that is something we really do have to solve. It has been with us for a long time. We are definitely the most innovative country in the world when it comes to advanced manufacturing, which is why we are regularly in the top 10 in the world. There are so many opportunities right now around the net zero agenda with the technologies that are coming out. We do not want to lose those to other countries that are offering greater incentives for scaling up. Scaling up for the longer term, trying to solve that problem and the efforts the Chancellor is making around that are really important for the long term.

Q31 **Chair:** Could you just clarify something? You said that we are definitely the most innovative country in the world when it comes to manufacturing. I was not aware of that.



Stephen Phipson: We are. I could give you lists of where we are world leaders in different technologies. I took part in a very interesting roundtable with our counterparts in America recently. We had a group of very senior chief executives around the table, and their comment to me was: "You have all the ideas in the United Kingdom. We're so jealous of your innovation structure. We don't have anything like that in the United States. We've got all the money, so we take your ideas and we scale them up."

Q32 **Emily Darlington:** What are the particular things that create that environment in Britain versus the US?

Stephen Phipson: I think we have a culture of it, to be honest. One of the reflections is that the United Kingdom has not had a lot of money, so we actually end up being very innovative as a result. Engineers in particular are quite clever at finding ways to be world leading without much money.

Dr Greated: Can you give us more money, though?

Stephen Phipson: But if we had more money, we could amplify it—exactly.

Chair: If we had more money in the right way and in the right places.

Dr Greated: My top point is the same—the scale-up point. Another point is access to infrastructure. We talked about this in the morning. There is a big requirement from the businesses we speak to for specialised space for early-stage businesses that require a larger space as they grow and scale up. At the final stages of product development, when they want to take their product ahead, we find that some SMEs are moving abroad. It is the same issue: people are leaving. The changes to planning regulation might help with that.

The other point is about regulation. We have taken some really positive steps on that, but we could be really innovative in the way we think about regulation. We have some brilliant examples, particularly from the financial sector, of regulation sandboxes where regulation can be tested on a small scale. We have heard from businesses that it would be brilliant to do more of that to reduce the risk to innovators.

The final point—I don't know whether it is okay to say this—is about bureaucracy and the lack of a culture of risk within the public sector. That could be about procurement or civil servants making decisions, and really encouraging a more innovative culture within the public sector. We have heard that across the board from businesses and from academia. The drive for DSIT to become the AI centre of Government is definitely a step in the right direction, but there is a lot more we could do there.

Q33 **Chair:** Okay, that is interesting. Obviously, the consequences of failure in the public sector are different from the consequences of failure in the private sector.

Dr Greated: That is true.

Chair: So we need to understand what a changing risk type would mean, and how we can drive that through DSIT in a way that is not—

Dr Greated: So you are not wasting money.

Chair: Not wasting money is a very good point.

Dr Greated: Yes, and businesses where the Government can procure cutting-edge innovation are also a really exciting opportunity.

Q34 **Chair:** That is a very good point. Despite the fact that there is less of a risk appetite in the public sector, we nevertheless manage to fail in procurement in pretty spectacular ways on occasion. Thank you very much for that. Dom?

Dom Hallas: It is worth reflecting on how much progress we have made in the past 10 years before we move on to the next 10. In 2014, we raised less venture capital for technology companies in the UK than we did in May this year. The amount of progress we have made, in terms of the growth of this ecosystem, is absolutely massive. We are the third largest venture capital-backed technology ecosystem in the world, behind the US and China. The growth of this ecosystem and the funding that has gone into it have really improved.

There have been a few challenges. The first is, as Stephen briefly mentioned, getting the scale-up capital. That is not just for companies, because as you scale quite often you can raise the capital; you are just not raising it from British firms. You are often going to the US to raise the capital. Sometimes, even if you do raise it from British firms, the beneficiaries of that, such as the pension funds putting money into the venture capital firms, are not British LPs—limited partnerships. The real beneficiaries of the tech boom in the past decade in the United Kingdom have been not my grandma's pension, but teachers in Ontario, because the Canadian teachers' funds have been the ones putting the money in. A material change to the way we think about how the institutional investor infrastructure and the pension fund infrastructure deploy capital in this space is really important. That is the funding side of this.

The other funding side of this is the public R&D funding. As has been mentioned—and, I think, greeted happily by all of us here—we have seen a commitment to this for the long run, but I would say that the continuous funding, which has increased significantly over the past decade, now has to be joined with a close look at the institutions and whether they are really delivering what we want them to deliver.

Chair: Absolutely.

Dom Hallas: Because in reality, the running joke in the sector is that eight out of 10 start-ups have a bad opinion of Innovate UK, and the other two took money from it and still have a bad opinion of Innovate UK. Obviously, to some extent, bidding for public funding is always going to be



challenging. It is always going to be a journey, and that is right and proper, but the experience of entrepreneurs in effectively leveraging the money that is designed for them to support their R&D and hopefully boost their businesses—the journey from public support for the R&D process, and hopefully commercialisation, to private funding for these businesses and scaling and growing them globally—shows that there is a bridge to be built there. There are significant challenges to how we make sure the money is deployed effectively through reformed institutions that can work closely with the successful private sector that we have built.

Chair: I will bring Steve back in briefly, and then we will go to Adam.

Q35 **Steve Race:** I think that is a really interesting conundrum. The other aspect of this is access to private capital in the regions.

Dom Hallas: Yes, absolutely.

Steve Race: My region, the south-west, gets about 2.7% of all private investment in the country. The vast majority is obviously sucked up by London and the greater south-east. It would be great to hear more, maybe in the future, about what we can do as a country to get private investment into scale-ups working better for the whole country, so that we do not miss the opportunities that are present elsewhere.

It would be great to get your view on the role of universities and spin-outs. There has been quite a big debate over the years about the heavy hand of universities in spin-outs, which has not been particularly helpful in building the sector. Any views you have on that would be useful.

Dom Hallas: On the regional point, I completely agree. We see this as a few different challenges. We built a really successful ecosystem that is deploying more capital now than almost ever before, and we are building much better businesses, but that capital is not spread equally. If you are building a business outside London and the golden triangle, it is more challenging. If you are a female founder, it is way more challenging; we all know that the stats there are absolutely horrible. If you are an ethnic minority founder, it is more difficult. If you are a working-class founder, it is more difficult. Those are four challenges that we see as core to this. We need to address them and make sure there is more equal access to the funding to build a business.

When it comes to spin-outs, this has been a consistent problem for a long time. Over the past few years, we seem to have had a battle between, on the one hand, private sector investors who say that universities should take a much lower stake for the businesses to be made more investable and, on the other hand, universities—although, more accurately, it is not necessarily the vice-chancellors but the tech transfer officers—saying, “We think this is really important. We actually quite like our 20%, thank you very much.” The reality is that you have start-up founders stuck in the middle having a pretty crappy experience.

The question is, how do we address that? A lot of useful information came out of the spin-outs review. If I am honest, it would have been better if it



had not been conducted by people from Oxford and Cambridge—not because they are not great institutions, but because they are outliers in this discussion, almost obviously. Not enough of the review has been taken forward yet. Crucially, there will be a journey, much like with some of the pension fund conversations, not just of saying that we want things to change, but to some extent of dragging stakeholders, especially the tech transfer officers, kicking and screaming towards change.

There is now a slightly different attitude in the funding environment to R&D and universities than we had over the past decade, where it felt a little bit Punch and Judy with the universities and the Government—I do not think it will be like that going forward. There is now a better chance to say, “We are going to look at the way in which R&D funding works in universities and provide you more funding to change your policies in these areas to make your businesses more investable.” Ultimately, that is a benefit to both sides. The reason why these TTOs are clinging on to this high equity stake that damages the businesses in the long run is that they are trying to protect their bottom line in a way that is not beneficial to the whole pie. There is a really easy trade-off of being like, “How do we provide more support for the kind of research that the universities want to do in order that we have better policies that can build better businesses out of spin-outs?”

Chair: That is a very good point, Dom. During the discussion, you should be clear if you think there are particular areas that the Committee should look at in more detail later in our programme.

- Q36 **Adam Thompson:** As a former manufacturing researcher, I agree strongly with the comments that Stephen made a few minutes ago about the UK being at the very forefront of manufacturing innovation. My constituency is in the east midlands, which is very much in our manufacturing heartland, from SMEs right up to big multinationals. There has always been a large inequality in—Dom, you touched on this a minute ago—regional investment. What are your collective experiences and understanding of regional investment requirements? How can we ensure that the various regions around the UK get the investment that they need?

Stephen Hipson: We are seeing a significant change right now—the midlands is a very good example of this—with clustering becoming really important. Some of the most advanced technologies in aerospace in the world are coming out of clusters in Bristol. In Teesside, astonishing investments and innovation are happening around the net zero agenda. We are starting to see that attract investment into the area. The new investment zone in the centre of Birmingham will be one of the biggest in Europe. That will attract a lot of investment we have not seen before.

We are also seeing universities—to join up the other dot—leaning into the idea of clustering and regional development. A lot more of what we call OT—operational technology—is coming out of universities, rather than just pure research. A lot of universities are now thinking about the processes



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we use in the new environment to do production, rather than just the core R&D side of it.

That combination of universities with the local clustering that is happening—a lot of it under the mayors, which is interesting—is starting to attract in. Talking to the banks, they now have regional people who are focused on where those regional developments will happen. This is a great development to watch very carefully over the next few years.

Chair: Thank you, Stephen. That is a very positive response.

Dr Greated: We represent all the different parts of the sector, and the consistent message from everybody—whether we speak to universities, small business, big business, charities or anything, including the public, which is important—is that they see the value of regional innovation. They see the value of all the different parts of the ecosystem working together to benefit the community, to link up skills—we have talked about skills—and to bring money and jobs into local communities.

Obviously, we need a national strategy—we have got national strategies—but the challenge will be how to link up the regional needs with the national needs. What has come very strongly from our discussions is that we need freedom, within the regional contexts, on how decision makers spend money, but—the question came up before—how do we link that national strategy and funding with the local, making sure that it is done in a quality way? We have those structures already in lots of parts of the system. Again, we think it is a very exciting opportunity.

To link to the skills agenda as well, it is about linking local business needs for skills with providers such as universities. We do not do enough of that, and there is massive need to do that. Also, promoting more R&D is happening in the region, bringing skills in that way. We feel this is a very big opportunity for the next spending review and the future of R&D.

Q37 **Chair:** On that point, I have a specific question that I perhaps should have asked the previous panel. The previous Government had a commitment to increase the R&D spend outside the greater south-east by 40%, over a time period that I cannot quite remember. Would you recommend that this Government continue that commitment?

Stephen Phipson: In the framework of a recast industrial strategy—that is the answer to that question. It should take into account the regional focused clusters that we have and the development of net zero technologies, aerospace or whatever else we have in the industrial strategy, when we get to the point of the spending review and its publication. We are inputting to that now, but it has to be in that framework and support it.

Dr Greated: I agree. We need to be thinking about building capability—they mentioned this in the first panel. What happens is that we get high performers, which is natural, and then they receive funding and investment, so it reiterates and reiterates, and we end up with a golden triangle. We need to think carefully about how we build a capacity that is



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different from how we invest or direct funding currently. I also think we need to have a national strategy, but we have to be careful how we do it, so that we do not waste money.

Chair: I will bring in Emily briefly now, and we will then go to Lauren. We are into the last 10 minutes.

Q38 **Emily Darlington:** I have a quick follow-up question. Milton Keynes is technically in the golden triangle, but not necessarily considered with it. The local leadership has played a huge role in creating the fifth biggest GVA in the country—but that goes back to mayors and local leaders. Very specifically, what do you think the Government's role is in creating and supporting clusters?

Dom Hallas: I can come in on that. Milton Keynes is a really good example. The first thing to say when it comes to venture-backed technology companies is that, compared with other European economies, we are really good at building them outside our capital. It is an unusual story. Usually we say, "How do we get regional growth in the United Kingdom?"—although, being from Leeds, I hate the word "regional", because of the implication. Regional to where?

In the case of the BBB, we have a lot of local investment funds that are deployed in certain regions. Actually, the south-east, including Milton Keynes, is currently not covered by the BBB in a way that is really silly, because if you are in Milton Keynes, you are not in London. That is an obvious example of something that can be addressed quite simply.

It is about working in partnership with some of the successful work being done locally. One of the things we have seen work well is what we call co-investment funds, where you have local leadership. The first one was the London co-investment fund, but there is also something interesting going on in Liverpool that Steve Rotherham is building, which takes local investment and twins it with investment from local institutions.

Obviously, the reality of the amount of money in local government at the moment is not great, and the ability of the Government to support that through the BBB or other institutions would make total sense. It is about building programmes that take a look at what is working locally, and then support it and lift it up, as opposed to what we often see, which is relatively top-down Government programmes that say, "We're going to come in and tell you how to do innovation locally." We find that if there are people building ecosystems in these places—and there are really successful people doing that—they think, "That's lovely, but you have just sent me two civil servants from the Government to tell me how to do my job. I don't think so." There is an obvious way, which is finding the people doing great stuff locally, supporting what they are doing and putting money into the schemes that are effective in those different places.

Chair: Building on what is there already.

Dom Hallas: Absolutely.

Chair: I am going to go to Lauren now, because we are coming to the last few minutes. Sorry, Alicia.

Dr Greated: No, that is fine. We are at that time.

Q39 **Dr Sullivan:** Some of my questions build on the discussion we have been having about access and opportunity in skills. The regional point is interesting, but Dom also mentioned the working class and women. How can we break down the barriers and get access to curriculum and skills employment in place? How do we answer that?

Dom Hallas: I would start by saying that one of the big problems for tech and those sorts of business is that if you are a teacher—both my parents taught in high schools—the reality is that you haven't got a clue what these jobs are. So the starting point is how you show people when they are at school that it is possible.

You then get into the skills system as supported by the Government. A mild anecdote is that we did a lot of work on the previous Government's kickstart scheme, which was supposed to support young people at risk of long-term unemployment into jobs—it would funnel them through. We had 250 companies across our community that were willing to take those people on, and the Government were providing incentives for them to do so. The jobcentres in the DWP scheme did not even know how to describe the jobs that those companies were offering.

Crucially, and this is important for understanding how to spread opportunity, even though a lot of the jobs were available to be done wherever in the country—these are tech companies; you do not necessarily need to sit in an office—the whole system was built on the idea that someone went into their local jobcentre and found a local employer to hire them. That meant that if you were, for example, the 100 kids in the Shoreditch jobcentre, you were doing great. But that is not super helpful. It is not a rational way for companies to hire either.

The starting point has to be how you tell the story of what the businesses are even doing, and to get them involved earlier on. What you find with entrepreneurs in particular is an absolute willingness to do that, so it is about linking them with that system.

Chair: That is great, and it is something we can feed into the ongoing DWP review of jobcentres.

Dr Greated: Can I add a point about diversity, because I feel so passionately about it? I am sure you have this information, but we know that if you have diverse exec teams in companies, they outperform financially, and we know that we can boost GDP and economic growth by being more diverse and having inclusive practices. But to be frank, we are not doing very well.

You mentioned the horrible stats. I have seen that all-female founder teams receive less than 3% of UK VC funding, and that has not changed for a long time. That is absolutely shocking. It is totally unacceptable. Of



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angel investors, only 14% are women. There are so many other areas we could look at, such as ethnicity, social position and so on. I think diversity is seen as an add-on, and it cannot be, even if you just look at its economic importance. I have not seen big changes happening. I think we need to see this as a priority for the economy, not just something that women are moaning about.

We talked about publishing incentives. How do we incentivise things? A lot of that is by money, or it could be done through tax. How do we ensure that we are really transparent with information, and that we are looking at that properly? When we look at how we invest money, it is about not just who receives it but who is making those decisions. We really do not look at that very much.

I would say my overriding message is that we need to take this seriously. It is not an add-on. It is fundamental to the future of the UK.

Q40 Chair: I think you will find the Committee is very much of that view as well. Reflecting the increasing presence of technology in all our lives and in every sector of society, and every sector of business, the need to have that diversity of skills is essential.

Stephen, I think you wanted to make a point.

Stephen Phipson: I would make a small point, to give a positive example of things that are happening. In engineering, there has been a challenge around gender, for example. If we look at apprentice starts, they are around 20% female—that is the average. A lot of that is down to STEM education. It is a maths-hungry profession. You need to do maths if you want to be an engineer.

One thing that has really worked well over the last five years, which has been funded by the DFE, has been the university technical colleges. They start at 13 and 14. It is another school, but with a heavy bias on technical education and maths. From there, you have 85% going on to do apprenticeships, and they are 50% female. That is really impressive.

We have only got 44; if you asked any of the big names in manufacturing that you know and love, they would say, "Please fund more of these UTCs." Let us get the kids started early. Let us get them in on these vocational skills early. That is a great way of trying to address that challenge.

Q41 Chair: Thank you very much.

We have come to our last five minutes. I am keen to understand what you think are the barriers, challenges or opportunities associated with a specific example of an opportunity for this Government. I will also give you the opportunity to make closing statements.

As Josh said earlier, digital government has now come into the Department. The Government are committed to the digital transformation of government and the benefits that that will bring to the general public, and in terms of productivity and personalisation and so on. That is a



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tremendous opportunity for business in this country, and particularly for small businesses.

Do you have any views on how the Government can ensure that this is a successful opportunity for research-intensive businesses? What could the Committee do to support that? Please also take this opportunity to make any other statements you would like to make.

Dom Hallas: The use of technology in the public sector is absolutely critical. The opportunity is massive, not only for the UK, in fixing its challenging public services environment—anyone who has used public services recently knows about that—but also because the companies we are building here have the kind of people who can fix these problems.

A super-practical example, in *The Independent*, is one of the companies that we have worked with a little bit, called Tortus. What they do is allow doctors to automate their clinical notes from appointments, so straightaway you have all the notes from the appointment when, for example, you have done a video appointment. It means the doctor does not have to spend 10 minutes typing it up. It is a super-practical example. Obviously, there are more sexy versions of medical technologies that might help with diagnostics and things like that, but this is a super-practical example of identifying a burden for clinicians and looking at how we fix that problem with technology. These are super-practical things.

In order to address these problems, we have to fix procurement. This is the point at which everyone on the Committee goes to sleep, because it is hugely challenging and, frankly, quite dull. In reality, what we have is this sort of version of death by pilot. You might get into one part of the NHS or one part of the public sector. Then, as a small business, you will be like, "Great—I have built this amazing thing, it has worked really well in this area." Then you go to the next NHS trust or a different part of the public sector and they say, "That's great. We will start again from the ground floor and we will have those conversations again." And you say, "We just did all this work over here and it has worked really well." And they say, "No, we are really sorry, we have to start again." That is hugely challenging and, for small businesses, is an absolute killer. We need to address that. We have a lot of work on fixing the procurement challenges.

The other opportunity that we have not touched on much, but that is crucial, is in AI. We did a big report last year that said there were 1,700 AI businesses in the UK. That number is now way over 2,000. The Government are thinking about that quite deeply, both in the public sector context, where it will be critical because of examples like the one I just talked about, and outside, where there is opportunity for us to grow our economy by leveraging those opportunities.

Right now, we are behind on some of the core things we have talked about: fixing the compute challenges and making sure that people have access to the compute they need; understanding the data environment through the data Bill and through the national data library—getting people access to the data they need in a safe, secure and sensible way; and being

able to build the funding environment, which we talked about as well, to build those kinds of businesses. If we do not win that race, it will be a hugely challenging environment for us. The opportunity to fix some of the public service challenges and grow our economy is clear, but to do that we have to build on the base we have.

Chair: Fantastic. Alicia and Stephen, you have one minute if you would like to make a contribution.

Dr Greated: Dom talked about us giving small businesses an opportunity and using the brilliant innovation we have in the UK, and I agree with everything he said. In the other direction, we have data that is better shared and better understood across the public sector. That is the most fabulous resource for researchers and innovators, so let us find ways to have access to that data and to protect and regulate it so that we can use it for brilliant research.

I have some quick closing remarks. First, the consistency and sustained strategy and policy are brilliant for the sector. Please keep it up and review it and involve us.

Secondly, on long-term investment and support, I will send out a document that we have made about 10-year investments. It all sounds great, but what about the practical delivery? We have done quite a bit of work on that. How do you stop things? How do you start things? How do you keep it innovative?

Finally, listening is really important—listening to diverse groups, the R&D community and, really importantly, the public. We are doing a lot of work on that and are very happy to share our civic engagement.

Chair: Listening to the public is a focus for this Committee. We will be doing more engagement.

Stephen Hipson: There are three big things that are important for me. The first is digital adoption. I mentioned Made Smarter, and the 5,000 or so businesses that have been through it show massive productivity gains and big energy efficiency gains. We have a long way to go. We have hundreds of thousands of businesses to digitise. We need to focus on all the support that goes around that.

Secondly, there is a theme of localisation nowadays. With the geopolitical situation and the change in supply chains, most large companies are looking at their localisation rate. That is an opportunity for this country to bring more stuff back here to make in the UK. To do that, we need to support it with advanced materials and all the other R&D work that goes with that, and show there is a joined-up strategy for it.

Thirdly, we think that the transition to a net zero economy will create a big opportunity to grow manufacturing from 10% of GDP to about 15%. There is about £140 billion of opportunity there in different manufacturing technologies. We need to make sure that is an uppermost priority for us.



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In summary, whenever you have the Secretary of State or anyone else from the Department in front of the Committee, the No. 1 question for me is going to be skills. How are we going to fill the skills gap? There are all these great opportunities. Every time we announce another investment with another 10,000 jobs, where are they going to come from? Are we joined up? Do we have a proper skills policy in this country to generate the skills we need for the future? I think that is absolutely vital.

Chair: Thank you. That is a fantastic note to end on. Thank you all so much for your time. It has been an excellent discussion and debate.