



Select Committee on the European Union

Sub-Committee on EU Services

Corrected oral evidence: Future UK-EU relations: trade in services

Thursday 28 January 2021

11.40 am

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Members present: Baroness Donaghy (The Chair); Lord Bruce of Bennachie; Baroness Coultie; Lord McNally; Baroness Neville-Rolfe; Baroness Prashar; Lord Sharkey; Lord Thomas of Cwmgiedd; Viscount Trenchard; Lord Vaux of Harrowden.

Evidence Session No. 4

Virtual Proceeding

Questions 35 - 42

Witnesses

I: Professor Ian Greer, Vice-Chancellor, Queen's University Belfast; Hillary Gyebi-Ababio, Vice-President for Higher Education, National Union of Students; Erik Huizer, Chief Executive Officer, GÉANT; Professor Keith Jones, Pro-Vice-Chancellor (Research and Enterprise), University of Sussex; Sir Paul Nurse, Director, The Francis Crick Institute.

Examination of witnesses

Professor Ian Greer, Hillary Gyebi-Ababio, Erik Huizer, Professor Keith Jones and Sir Paul Nurse.

Q35 **The Chair:** Good morning, and welcome to the EU Services Sub-Committee public evidence session as part of our inquiry on the future of UK-EU relations on trade in services. The session is being broadcast on parliamentlive.tv and a full transcript is being taken and will be made available to you to make any corrections shortly after the session.

I would like to welcome our five witnesses: Professor Ian Greer, vice-chancellor, Queen's University, Belfast; Hillary Gyebi-Ababio, vice-president for higher education, National Union of Students; Erik Huizer, chief executive officer of GÉANT; Professor Keith Jones, pro-vice-chancellor, research and enterprise, University of Sussex; and last but not least, Sir Paul Nurse, director of The Francis Crick Institute. You are all very welcome.

I will open up the session by asking you, in the order in which I read the names, how important the TCA agreement is between the UK and EU for UK's research and education sector. Professor Greer.

Professor Ian Greer: Thank you, Chair. There is absolutely no doubt that the TCA is critical, both for research and education and in particular for the association to Horizon, not just because of the funding opportunities and the collaboration that it brings, but because it is an important signal that we in the UK are outward-looking.

Around 54% of UK publications are internationally co-authored, and there is no doubt that research collaboration with international partners is increasingly seen as being synonymous with excellence. We are regarded as a European, indeed a world, leader in science, and that leadership reflects genuine international and collaborative endeavours, because the challenges that we face, such as health, are global, emphasised perhaps by the Covid pandemic and sustainability issues, for example. Those challenges are best addressed through collaboration. These collaborations cross disciplines, institutes and borders, and to be highly effective we need to continue that collaboration with Europe and across the world.

We should not lose sight of the economic and societal impact that research brings. Queen's University Belfast, my own university, is a provincial research-intensive university, but critically, for the economy, our economic impact is around £1.9 billion a year, and we are the leading entrepreneurial university in the UK. Every £1 million of research spend delivers almost £4 million of economic impact.

Much of that value comes from Europe. Just to put that into context, in the last round of Horizon funding, one university, Queen's University, had more than 100 awards, bringing in more than €50 million, with substantial economic impact collaborating with 820 European and international partners. Around half that income was associated with the training of early career researchers, creating a pipeline of internationally

connected talent for the future that will drive the economy further forward.

Most of our collaboration was with European partners: Germany, Spain, Italy, France, Belgium, the Netherlands, and of course Ireland. I guess I should mention Ireland specifically, because it has a lot in common socioeconomically across these islands. Indeed, the drawing of European funding from north and south in Ireland was quite substantial.

Just last week, the Secretary of State for Northern Ireland wrote that the UK Government's commitment to promoting the positives of the union for Northern Ireland do not negate the benefits of improved north-south collaboration. I would argue that we could extend that to European collaboration and to international collaboration post-Brexit. There is much to be gained by having this agreement in place and much to be gained by the association to Horizon. I should pause there.

The Chair: Thank you. Hillary, welcome back.

Hillary Gyebi-Ababio: Thank you. It is lovely to see you all again. Following on from Professor Greer's comments, I too think that the TCA is crucial in providing certainty for education, but even more so in allowing to plan for the year ahead, especially as it has been such a tumultuous year for education and particularly for students.

It would be remiss of me not to mention that we are deeply disappointed with the loss of Erasmus, given that it was such an important and impactful scheme for millions of students in the UK and the EU for educational opportunity, but we are glad to see that Horizon Europe is still a ready-made programme that we are associated with. We are even more glad that we have not had to deal with the upheaval of a no-deal Brexit, which, on top of the pandemic, would have been an absolute nightmare, just to be colloquial about it, for students and colleagues across the education sector to have to deal with at this time.

We are hoping that the TCA will provide a basis for collaboration to continue between the UK and the EU member states and to preserve research collaborations that are already in place.

Before I come to the end of my starting remarks, I note that uncertainty still remains, especially pertaining to the Turing scheme, the replacement for the Erasmus+ scheme, due to the uncertainty about its details and what this will mean for current and prospective students in the coming months and years as we work out what this trade agreement will look like in research and in the wider education sector.

Hopefully that has given you much needed context from the student side. Thank you.

Erik Huizer: GÉANT of course welcomes the UK Government's decision to remain associated to Horizon Europe. The GÉANT Association has 39 European partners, so we are bigger than the EU. We really cover the whole of Europe, and we also have a partner in the UK, Jisc. We will

benefit directly from the funding under Horizon Europe, and our goal is to make sure that worldwide research and education can co-operate by delivering networks and services.

The TCA in its current form only allows the possibility of participation, so we look forward to having the final protocol of programmes and activities in which the United Kingdom participates. We really hope that this will include access to large research facilities such as ITER and to observation infrastructure such as Copernicus. It is important to point out that, so far, only legal solutions are discussed. That is critical but not sufficient. Research and education are more and more data-driven, and even more so thanks to the current pandemic. Therefore, connectivity, which is growing up to terabit speeds, is a precondition for scientific co-operation, as has been referred to by Professor Greer.

That is also why there is a specific European research and education network infrastructure: because the amount of data that is shipped by research has grown so significantly that commercial networks are not capable of dealing with it. This is exactly why we have GÉANT and entities like Jisc in the UK. We therefore hope that in the future we can keep extending that network into the UK to make sure that researchers between the UK and Europe can continue to collaborate and exchange data.

We are worried that the TCA does not mention programmes that make this possible, such as EuroHPC and the Marie Curie programme, which allows for the exchange of researchers all through Europe, and the Erasmus programme, which allows for student exchange.

Professor Keith Jones: Hello and good morning, everybody. The impact on research is very important and very welcome, of course, because having associated membership will essentially give us access to the vast majority of the Horizon Europe programme. That has been what UK university researchers have been holding out for. There is a great deal of positivity there in achieving the main goal.

As for what the TCA covers, as I recall it mentions our participation in Euratom and ITER, the nuclear fusion project, of which the UK is one of the global leaders. Our participation in Copernicus has also been mentioned. Copernicus is associated with the EU satellite surveillance and tracking services, and it will entitle UK researchers to contribute to bids for the contracts for the Copernicus project through the European Space Agency.

On the whole, it is an exceptionally welcome achievement. The only negative here, of course, and it has been mentioned by the previous witness, is the lack of inclusion of Erasmus+ in the TCA and the impact that will have in some sectors on education. On the whole, though, I can only echo the comments of Professor Greer at the beginning on the positive impact it will have on us for collaborations.

Sir Paul Nurse: Thank you, Chair, and thank you for the opportunity to speak to your committee. I may have a conflict of interest, which I should mention. I am a chief scientific adviser of the European Commission. There are seven of them, and presently I am deputy chair. I step down from that in a few months, but mention it just to be clear.

It is very important that the TCA is in place. I think we should thank the negotiators for getting it in place. I believe Patrick Vallance played an important role in that, and that should be recognised. Why is it important? As your own committee said in the letter you sent to the Secretary of State for Education, research matters. It matters to the country, and we have to preserve the highest quality research that we can in our country.

What points would I make? Some of them would certainly echo what you have already heard. First, Europe as a whole is one of the three superpower blocks in science. One is based in North America, the second is centred in China, and Europe as a whole is the third and probably the most impressive. Our close association with that not only makes it stronger, because our country is a leader in science, but also because it strengthens us as a consequence. It is really very critical, and research is clearly critical. It allows interactions and collaborations; and I do not need to repeat that. These networks have been built up over the last 30 or 40 years. They are fragile, they have to be preserved, we have to keep going with them, and being part of the show will allow us perhaps to get an even fuller relationship in the future.

As Hillary has already said, the Erasmus omission is unfortunate. We have to make Turing work. I have not seen the details, but we have to ensure that there is an exchange both ways, from the UK into Europe and from Europe to the UK. That is absolutely critical. It is through youth that we build the future, and that has to be preserved.

Talking about youth and the future, it is probably well known to the committee that 90% of scientists and youth were against Brexit. They did not want it. We have to bring them along with the fact that Brexit has taken place, because they—scientists and youth—are the future of our country, and 90% were not in favour of it. We have to reach out to them. We do that through research and education.

Ian mentioned the image to the rest of the world, which is critical. This is not just about a relationship with Europe. It is about being seen that we are not turning our back on the rest of the world. It is a very positive signal that we have the TCA in place. It is mentioned to me every time I recruit senior group leaders from overseas, and in the last three to four years I have recruited over 20 from overseas. The first question is nearly always, "Does leaving the European Union mean that Britain is turning its back on the rest of the world?" We have to correct that and we have to deal with it. It is a bit of a hill to climb, maybe a mountain to climb, but having the TCA in place allows us at least to begin that climb.

The Chair: Thank you very much. That was a very good start. I now call

Lord Vaux.

Q36 **Lord Vaux of Harrowden:** A number of you mentioned the Horizon situation, so I wanted to dig down into that a little bit. What does the UK's decision to associate with Horizon mean for the sector? Given that the details of the UK's participation still need to be finalised, what should the Government's priorities be for these negotiations? If I might also add, how do we make sure that as an associate we have some real say over the direction of the Horizon programme? We will start with Eric Huizer at GÉANT.

Erik Huizer: With the UK decision to remain associated to Horizon Europe, GÉANT will continue to be able to provide seamless and dedicated high speed connectivity between our partners all across Europe, and from Europe to our global partners all around the world, which are all research and education network infrastructures. We will provide the global research and education community with dedicated and secure data communications that will underpin all research education and innovation.

The UK should stay, and with the TCA under Horizon Europe will stay, an integral part of this network, with the important points of presence in London that we have as a network where a lot of global interconnections take place. However, I must note that the GÉANT Association, which until 2016 was a limited company based in Cambridge in the UK, decided, following the UK referendum, to move its headquarters to Amsterdam. From 1998 to the UK referendum in 2016, we in Cambridge received a total of €421 million from the research framework programmes from the EU to build out our network and to innovate.

With our move of the office headquarters to the Netherlands, this funding is no longer channelled through our UK office but is now going through the Dutch office. We currently retain our operational centre of over 100 staff members in Cambridge, but of course that in the future depends entirely on how the trade agreement and Protocol I work out. If those people cannot work freely and easily in the EU and other European countries to support researchers over there, we may be forced to transfer those jobs to the Netherlands as well.

On your second question, I would say there is a need to ensure that the association is for the entire duration of the Horizon Europe framework programme and not just for the first two or three years. Research programmes take a long time to build up and execute, and two or three years is nothing for this, so we need clarity there.

There is a need to make sure that they retain equal status as much as before, if possible, which requires the UK to contribute at the same level as the funding received—I would say a net zero rather than a net beneficiary.

There is also a need to look into interdependence between Horizon Europe and the programmes which the UK at this point has not yet

agreed to be associated with. I point in particular to the CEF2—Connecting Europe Facility—programme for European high-performance computing, which the UK did not sign up to, which will implement not only the high-performance computing but the terabit networking between all the countries. The same questions can be asked in relation to the space programme and the Marie Curie programme, which I referred to earlier.

It is also important to ensure the political commitment to scientific co-operation and data flows, and if possible to commit to the open science development at the EU level, which other countries in Europe are now committing to, and to building the European Open Science Cloud to ensure common open science standards for the future to exchange data and to build on each other's results. The pandemic has proved to be important to enabling us to build quickly on each other's results and data to make sure that we find solutions to these problems quickly.

We need to find solutions to budget lines in article 185 and article 187 initiatives in the TFEU which the UK has no intention of joining as a third country yet. I hope it will. That, again, is the CEF and the DEF funding.

Non-research employees in research organisations and research supporting organisations need to be exchanged at the same level of freedom and mobility as researchers. Otherwise, my staff, for example in Cambridge, will not be able to support people in the rest of Europe.

Lastly, it would be ideal to have somebody in the Specialised Committee on Participation in Union Programmes with expertise on data and scientific data exchanges.

Professor Ian Greer: I think we are all agreed on the importance, so I guess the priorities move into how we make things happen. Picking up Paul's point, we have a mountain to climb here in terms of our global positioning, so we want to move on this as quickly as possible. I would like to see an agreement on the actual funding and the mechanism so that we can move quickly and participate in the next round of the Horizon calls in the spring.

The main areas in Horizon Europe are scientific excellence, global challenges, industrial competitiveness and innovation. It is all highly relevant to the UK.

We should try to ensure that the European funding complements and enhances the domestic R&D funding and could level up the UK with a significant capacity and capability that has not yet been unleashed to drive that economy further forward. We can use this to shape our future, but we need to move quickly.

Sir Paul Nurse: I agree with everything Erik and Ian said, so I will not repeat it but will just give my support for it. The connection that we have had with continental Europe in the last 30 years has been extremely successful for British science, and we should, as much as possible,

preserve everything that we can about that, despite now being outside the European Union. That summarises what we have just heard from the two previous witnesses.

There is much that is very good here, and it is a shame to get rid of it. The two major platforms are the Marie Curie and the ERC. I will comment briefly on the ERC. It is highly ranked around the world. It is very prestigious because of the way it is set up. Many of the researchers at the Crick Institute have ERC money, and they like it because of the prestige that it attracts. There is a soft part to this as well as hard money. It is prestigious partly because of the way it has been set up, which is to support creative research.

You have heard from the two previous witnesses that there is lots that is good here and we should preserve it. Remember "Better together". We are 350 million and we can fish in a very big pool. The UK is big at 60 million, but it is small compared with 350 million. That allows us to look for quality across Europe and to attract it and work with it where and when we can. We have to ensure that it is long term and that we are not there just for two years or three years to manage transition. Erik emphasised that. It has to be a real commitment. To make Brexit work we have to make this work.

Professor Keith Jones: Paul mentioned the prestige associated with the two flagship schemes of what was Horizon 2020 and will now be Horizon Europe, which are the ERC and the Marie Curie. The importance of the sector is probably highlighted by the fact that in the previous five years at the University of Sussex we had 50 of those awards. It is a substantial amount of funding for the university and equated to close to £30 million. EU funding for the University of Sussex—and we are no outlier; there are better performers than us—was nearly 20% of our total funding. That gives you an impression of the importance of Horizon Europe in the next period for us.

As has been intimated, the five missions associated with Horizon Europe will be very important for us as a country, because we have international prestige in them. The five areas are: adaptation to climate change, and being climate neutral in smart cities; cancer; healthy oceans; soil health; and food. As a player in the Horizon Europe programme, we will compete and have great input and play into all five of those missions.

On the question of where we should be going now, speed has been mentioned. The first call for ERC starter grants is 9 March, so we need to get the programmes going and advertised in the UK as soon as possible. If there are any issues, they are associated with specific areas that we may be excluded from, such as security. We have some assurance in the TCA that those will be very exceptional and justifiable cases. Moving forward, we need to be able to monitor that to ensure that for the most part we are included in all the activities associated with Horizon Europe, and that the cases where we are excluded are very much the small and the minority.

Lord Vaux of Harrowden: As an associate, do we lose influence that we had previously, or do you think it will remain similar?

Professor Keith Jones: We have, as I understand it, seats at all the appropriate tables. We do not lose influence in that respect. The issue comes when, in due course as part of the programme, specific calls are made that have a focus on security that excludes associated members. I am unclear whether we would have a say in whether we were in or out of a specific call, but it is obviously something that we need to monitor.

Hillary Gyebi-Ababio: I am keen not to labour some of the points that have been made, because largely I agree. I was very glad, on behalf of students, to see that we were continuing our association with Horizon Europe, especially because, had there been no pandemic, there would still be heavy evidence that would have supported our continued association with Horizon. The pandemic has emphasised, in a not so nice way, the importance of our research and development sector and education sector in feeding into wider society and the social and global issues that we continue to face.

The specific point that I want to make about what the government priorities need to be, in addition to what has already been said, is that for post-grad students, students who are involved in research, it is so important that no limits are placed on how many projects they can be involved in or collaborate with. We have seen, for example, how many collaborations enabled the vaccine to come across with such speed this year. It is important that we recognise the importance of collaboration and try to continue to move along that path rather than sort of carve out our own way, because collaboration is essential in research.

This is particularly important for early-career researchers who are looking to build on that and to make a long-life career out of it. Those students need those provisions for mobility to continue in the research and education sector.

Q37 **Lord Sharkey:** I should start by declaring an interest as a member of the UCL Council and chair of the Association of Medical Research Charities, whose members spent £1.9 billion on research last year.

What should the Government's priorities be for domestic research funding in addition to the Horizon Europe programme? Should they, for example, simply align with the proposals in the R&D road map? We lose access to Horizon Europe's SME fund. What should the Government do about that? What support should it give to research-intensive SMEs?

Sir Paul Nurse: The priorities are to get it all to work. That is important although sounds a bit mundane. This is a major shift for us all. We all want it to work, and we have to have the determination to make it work. That means that we all have to put our shoulders to the wheel to get it to work. We have to start acting in a more grown-up way. We have to remember that to get positive negotiation you have to have good relationships. Quite a lot of the language we have heard and still hear is not very helpful for that. If we are going to make jokes about fish in

British waters, at least they should be funny. Otherwise, they just sound infantile. We have to learn how to negotiate. We have to learn to build the new relationships with our past colleagues in the European Union. There is good will, but we have to start putting that in place.

You mentioned the priorities. What do we have to think about? I am a life scientist. The life sciences are critical. You, in your various positions, would recognise that, particularly with the AMRC. We need a better life sciences strategy. The one that we have is too limited. It does not embrace pharma, agriculture, or biotech. All these things are connected, and it is intellectually weak not to have it across the life sciences, because they inform each other in ways that you cannot predict.

We also have to think about the contact between discovery science and the use of that knowledge for the public good in all sorts of ways. We have to remember that we are excluded from innovation, essentially, in the European Union because we are outside the common market. We need to give some thought to that, because there is support in the Commission for innovation that we are not eligible for, and we need to ensure that we have substitution in place to be able to make that work.

I am not convinced that ARPA is the right way. I certainly do not think it is right to have it outside UKRI. It should be properly connected, so that needs to be reviewed as well. My point is mainly about the energy to get everything to work.

Professor Keith Jones: Paul has mentioned the balance that we need to achieve in domestic research between discovery and applied. I would also reflect on the fact that we need to make sure that we get balance across all disciplines. We are a world leader in the area of biomedical research—there is no doubt about that—but one of the lessons the pandemic has taught us is that we have very unusual disciplines coming together to solve a problem. Who would have thought that mathematic modellers would be so essential to understanding the spread of a virus? It is maintaining that spread of discipline knowledge that we should focus on, in addition to the Horizon Europe programme.

Paul mentioned ARPA. There is a certain amount of scepticism there, but in general the idea of using research funding for the levelling-up agenda is quite an interesting one, and we should have some focus on that. It is important for the good of the whole of the UK. Regardless of what other disciplines we try to focus on, we must also think about the geographical mix.

In terms of the lack of access to SME funding, we are not going to get access to that. I am not convinced it is needed from a UK perspective, but we have Innovate UK as an important component of UKRI, which is there to promote that connection between industry and the universities, which can help in this space. There is a lot of optimism that we will be well placed to help pump-prime applied research.

Erik Huizer: I feel that I represent more of a multinational perspective than a UK perspective. Therefore, I will pass on this question, if you do not mind.

Hillary Gyebi-Ababio: In terms of the Government's priorities for domestic funding, there are a plethora of issues that need to be addressed. Whether it is to do with the green economy or supporting researchers in environmental fields, the world is our oyster in thinking about how diversely we can invest domestically.

The crucial point I want to make here is that, as much as we need to think about what we invest in, it is important that the Government look at investing in people. People have been central throughout. The post-graduate researchers who I represent have so many skills and so many plans for what they can do in the research field, and we need to be careful that they are not limited as a result of a lack of funding or a lack of support in being able to progress in their careers and go on to do much more in lots of different fields.

I do not have much to say about the SME fund, but funding is essential. It is important that no researcher in any research project should be limited because of a lack of equity in funding. They should be able to do the broad and diverse parts of research that they were doing before. It is important that we work out how to make this work properly and smoothly so that we can continue having an effective impact on research in the UK, and in collaboration with the EU and other international collaborations that we hope to have.

Hopefully that spoke to the student side of it and the wider implication.

Lord Sharkey: I do take the point about PhD students or post-graduate students of any kind.

Professor Ian Greer: The R&D road map that was published this summer set out our ambition. I do not think anyone would take issue with the ambitions of ground-breaking research attracting global talent and cutting out unnecessary bureaucracy, all of which can unleash a new wave of innovation.

Research and innovation are at the heart of the UK's industrial strategy, but none of this can be done in isolation. This cannot be done by a single country. It needs that international collaboration. We want to achieve that great ambition of being the most innovative country in the world, with a GDP spend on R&D of 2.4%. We can do that only through collaboration within the UK and internationally. The road map sets out opportunities to work in partnership with government, industry and research organisations. That will be required more and more to drive our agenda and that partnership approach.

A great example is in Regional Growth Deals that harnesses the research strengths of a region to the regional economic opportunities. That should also help our economic recovery post-Covid, and help to level up the UK

at the same time, as well as addressing those global challenges. Aligning our resources is key.

As the research continuum is all the way from blue skies, curiosity driven research to applied R&D, international partnerships matter along that whole pathway. Along the whole route, boosting international collaboration is key to the UK R&D road map, so we need to align with our European partners.

There are specific interventions that we can make. We should have some flexibility in how we approach it, because different parts of the UK have different needs at different times, so some flexibility would be good to harness that capability and capacity and drive the economy further.

We need more agility. I would have some reservations about the ARPA-type approach, but the ARPA style of looking at mission-orientated or goal-orientated research, valuing failure as much as success, and taking high risks for high rewards is something that we could embrace in order to have an agility and to meet the challenges that are perhaps best exemplified by the problems brought by the pandemic, which was so unpredictable and so impactful.

Lord Sharkey: I am sure that the House of Lords will keep an eye on ARPA as it develops. We have a firm interest in all of that.

Q38 **Baroness Prashar:** My question is about the Erasmus+ programme. What do you think will be the impact on students and on the research and education sectors more broadly on the UK's decision not to associate with the Erasmus+ programme?

Hillary Gyebi-Ababio: We are very disappointed that the UK has decided not to become an associate member of the Erasmus+ scheme. It is important to contextualise this. Over 50% of UK students who studied abroad were able to receive funding for this, and this has meant that so many opportunities have been taken away from students who have wanted to benefit from this scheme. I am thinking especially of the €26 billion that will be invested in it over the next seven years, which is a substantial increase from previous years. Students from underrepresented backgrounds in particular will be heavily impacted by this.

I can speak quite personally to this. I have siblings who were hoping to benefit from the study abroad programme. Now they are worried about being able to have access to that in the same way in which students have studied in the past and enjoyed it.

There are a few students' concerns that I want to discuss. I will continue the point about students from disadvantaged backgrounds. I know that the Government have said that they are bringing in the Turing scheme, which we do not have a lot of information about right now. But we are quite worried that there do not seem to be provisions for the associated costs in supporting disadvantaged students through things like extensive

scholarships, grants, bursaries and marketing to these groups of students.

This will have a major impact on the education sector and students in the EU. It is important that we recognise not only the value of Erasmus for UK students going abroad but that there is massive value in students from the European Union coming to the UK, especially as the UK was an overwhelmingly popular destination for European Union students to travel to as part of the scheme.

To contextualise this, in the academic year 2018 to 2019, 30,501 students and trainees came to the UK from the EU through this programme. It is important that we understand that EU students receive just as much value from coming to the UK as UK students do going to the EU and abroad. This is important, because the benefits of EU students coming to the UK provide the mutual benefit of building international connections for UK students and international students on their own campuses.

My final point is about the wider benefit of the Erasmus scheme for students and what the Erasmus scheme has meant for the UK taxpayer. It has been of massive benefit to the UK taxpayer. The living expenses of European Union students coming to the UK in 2018, for instance, amounted to £440 million, which is a 71% increase since 2010. It is important to emphasise students' huge disappointment in losing all that benefit and not having the clarity that they need from the Turing scheme, not only to make up for that but to provide them with the equivalent resource, opportunity and links which Erasmus+ gave students over the years we were in the European Union.

Hopefully, that has covered everything. I will leave that there for now and leave my colleagues to feed in, too.

Professor Ian Greer: Can I start by welcoming the Turing scheme? We really do need to support this type of initiative. We know that international experience, as Hillary said, is very important, and it is associated with greater academic and employment outcomes, too. It is really important for our students. The Sector Committees have had lots of discussions with the Department for Education over the past few years on this to make the case. We are delighted to see that there is a scheme in place with significant support. We welcome the focus on disadvantaged students, although we do not have details as to how this will operate, and we also recognise that there could be a greater international reach.

However, as Hillary has said, Turing focuses on outbound mobility only, and we really have to have a system that allows inbound students to come easily to the UK. Hillary has made very clear not just the numbers but the financial and economic impact on the UK, but it is also important for the types of campuses that we have as universities, which are attractive globally because they are truly global meeting places. I should point out that northern Irish universities will continue to access Erasmus

through the Republic of Ireland, and they can access both Turing and Erasmus, although the details of that have not been set out yet.

The benefits overall of these programmes are substantial, and not just for the individuals. They bring economic benefits as well as cultural diplomacy, and they enhance the soft power of the UK because we are educating leaders of the future throughout Europe and across the globe.

Baroness Prashar: You are winners. You will have the benefit of both the programmes. Professor Jones?

Professor Keith Jones: Hillary has given the perspective from the students. From the perspective of the university and how we organise things, of course the Erasmus+ programme gave us a very convenient and useful umbrella under which to exchange students. Now, of course, we will lose that administrative umbrella and help, which really oiled the wheels of student movement between institutions. We will lose that and probably now have to establish bilateral relations and bilateral agreements with individual universities. That is a practical consequence.

Of course, we do not know what the impact of the reciprocal side of the exchange will be and how Erasmus will work for our potential future bilateral partners in the way they exchange students who will be coming to our institution. It will very much be a work in progress.

The most acute aspect of this, of course, is for students. The Erasmus programme was an integral part of their student degree, particularly if they were studying languages, for example; it would be seen to be a vital component of that. Obviously, we have to take steps as universities to ensure that there is an equivalent replacement for that.

Erasmus also covered more than just student exchange. It also allowed for staff exchange. Something like 8,500 staff were exchanged as part of the Erasmus programme in 2018-19, and of course they were involved in activities that a lot of the time were associated with educational or pedagogical research exchange. We will be a bit poorer as a country as a consequence of that, because there will be no equivalent. I imagine that universities will be working on bilateral agreements, essentially to see if they can replace Erasmus with such agreements, but, again, losing that umbrella just makes the whole process a little bit slower.

Erik Huizer: If you do not mind, I will speak from the non-monetary perspective here. Thousands of talented students from all across Europe have come to the UK to study through the multilateral Erasmus+ programme. They have come with open hearts and minds, and a willingness to learn and to contribute. Often, they have stayed in the UK, basing their lives on the promise of freedom of movement across the European Union.

Equally, British students have been able to join universities across Europe. For a young person, an Erasmus year is a priceless experience. It is an opening of the mind. It is stepping out of the ordinary, out of your

own culture, out of your comfort zone, a learning experience that is not only academic but includes the expansion of culture, understanding, empathy, sympathy and laughter across borders.

From a GÉANT perspective, where many of our staff have profited from the Erasmus+ over many years, the UK Government's decision to no longer take part is one of the most deeply harmful decisions taken in our area. It isolates British students, and in consequence it will cut off generation after generation from the regular and deliberate coming together which continental European students will continue to be able to enjoy. It is not something you can replace with a unilateral programme, I am afraid. We think this will widen the gap between the UK and Europe rather than close it.

There is one other aspect that I want to point out. Erasmus+ will have a stronger digital focus, including an increase in virtual and blended mobility enhanced by the current pandemic. Due to the efforts to digitise the public sector at EU level, including education, through the European student card, if the UK does not follow these standardisation efforts, interoperability can quickly become a real obstacle, especially as the UK has no intention of joining the Digital Europe programme.

Sir Paul Nurse: I can do nothing but echo everything my colleagues have said. The decision not to be engaged in Erasmus is deeply wrong. I really do want to communicate that. Turing is better than having nothing, but it is a pale shadow of the really strong brand—we have to call it a brand—of Erasmus at all levels. I do not need to say anything more on that.

If I might, could I say two more sentences about ARPA? The idea of ARPA is, of course, not a bad one, but it is the mantra that is central there: "Let's do high-risk research to get high gain". We never do research that is high-risk. Why on earth would you do high-risk research? It is a nonsense. Can you predict "high gain"? The mantra should be replaced. "Do research of great boldness that is tolerant of risk, and which is very open for application for the creation of wealth and the public good". We need to get that message across, because this mantra here is driving ARPA in the wrong way. I just wanted to emphasise that. I am sorry to interrupt the Erasmus question.

Baroness Prashar: That is fine. I think we are finished. Thank you very much indeed for your responses.

Q39 **Lord Bruce of Bennachie:** Good afternoon. Following up, if I may, on the Turing scheme, to pick up on Erik's comment, the Government, I think, have been reported as saying that what they do not like about the Erasmus programme is precisely what you all like about it: namely, that it encourages European co-operation and cohesion. We have left Europe and they do not want to encourage it any more. I wonder whether, first of all, you could comment on that. Hillary, I will come to you last, because I think you should have the last word.

Turing, from what we know, is talking about a figure of £100 million compared with the £130 million that we got out of Erasmus, and more if we were staying in it. That is to fund a worldwide programme and a one-way programme. When Switzerland tried it, they found that it did not work. Of course, there is the issue of tuition fees that universities may have to forego if they have to do bilateral agreements.

I wondered if you could indicate what you think should be the priorities for Turing, what your concerns are about what you have heard about it, and whether or not you have been consulted, frankly, on how it should be shaped up. Of course, I understand Professor Greer to be saying that he welcomes Turing, because not having a programme would be terrible, but the question, I suppose, is how it should develop in a way that, if it does not replicate Erasmus, at least gives us a chance of getting some of those kinds of benefits. Given that I quoted Erik at the start, perhaps I could start with you, Erik.

Erik Huizer: Thank you. Let me start by saying that I think the world is facing several major challenges. The current pandemic is an example of that, but we are facing a shortage of energy, a shortage of materials, and overpopulation. All those kinds of huge challenges can be fixed only if scientists all over the world work together and if education is at an appropriate level. We should not stop something like Erasmus+ for the single reason that the UK is leaving the EU. The UK is not leaving Europe, and I do not see why it has to be enforced by not participating in the Erasmus+ programme, isolating British students even more from the rest of Europe and possibly the rest of the world. We need to work together. A multilateral programme like Erasmus+ contributes to understanding each other's cultures, and the potential lack of that, and the ignorance that would come from that, is really harmful in fighting the huge problems that the world is facing.

We do not see how a unilateral programme can possibly have similar benefits and therefore very much regret the UK decision. We also hope that at least this Turing scheme will try to be as multilateral as possible, and will include the digital identity infrastructure that goes with that to allow for digital mobility.

Lord Bruce of Bennachie: Professor Greer, you welcomed Turing. I wonder if you could indicate how you think it could and should develop.

Professor Ian Greer: We do not have enough detail to know precisely how it could and should develop. Certainly, we welcome something as being better than nothing. Our concern is that it does not have the same breadth that Erasmus has, as I think Keith pointed out. From a university perspective, on the face of it is certainly good for outbound students. It seems to focus on disadvantaged students and have a greater international reach, and these are welcomed areas.

The biggest drawback, as everyone has said, is the lack of an inbound mobility programme, which detracts from the opportunities in the UK for people coming from Europe and impacts negatively on the cultural

diplomacy and soft power that I mentioned. The UK is such a popular destination and we had such enormous influence on so many young people. That can only be a positive. The main issue for us is to think about how we deal with the inbound mobility of students to the UK, because that is a loss to us.

Professor Keith Jones: First, I would like to get over the point that universities absolutely want to work to make Turing a success. I do not see Turing as a replacement of Erasmus. It is essentially a different scheme, and because of the lack of the reciprocal nature of the mobility it cannot operate in the same way that Erasmus did. None the less, being light on detail at this stage, all we can say is that we want it to work. We obviously recognise the importance of the focus on disadvantaged students and the possible opportunity to gain influence in parts of the world through the scheme that we currently do not enjoy. We use it as a way of looking to increase relationships in parts of the world we currently do not have that relationship.

Practically, we absolutely need to work out how universities are supposed to operate the scheme, and the funding that comes to the students to work abroad. Maybe, possibly, there are parallels with Australia's Colombo plan. Australia has a system similar to Turing in Colombo, and maybe we should look at that scheme for parallels to see how it could work.

Making sure that we have all the aspects which the Government hold dear for Turing working and in place for the planned initial start date of September this year is going to be a tall order. That aspect of the programme, the nuts and bolts of making it work, is probably the biggest consideration here.

Lord Bruce of Bennachie: Thank you. I should have declared an interest. I have a son who is doing a language degree who was hoping to get an Erasmus placement and now does not know what is going to happen. He is in the same boat as many others. Sir Paul?

Sir Paul Nurse: I think you framed the issues in the way you asked the question, Lord Bruce.

This is a major mistake. Normally, I am pragmatic and say, "Well, let's try to get it to work", but, as has been said already, this is positioned in the wrong place. It is not a substitute for Erasmus. It might open up interesting connections across the world. That is a possibility, and that is perhaps worth pursuing, but where I really come out is that I look upon Turing as just a steppingstone back to Erasmus. In other words, I think we have to get Erasmus back up again. The Government does not like U-turns, but this cannot be critical to leaving the European Union. Maybe, over a few months or a year, they will be able to see sense and see what Erasmus had to bring. In this instance, we have to try to make it work, but I do not think it will in the form it is in, and we should try to return to Erasmus.

Lord Bruce of Bennachie: Thank you. That is very helpful. Hillary, you absolutely must have the last word.

Hillary Gyebi-Ababio: I echo the points made by my colleagues. First, the Turing scheme is no replacement for Erasmus. I cannot emphasise enough the benefits of Erasmus in its vastness and all that it offered, particularly for underrepresented and disadvantaged students from both the UK and the EU.

Rather than labouring those points, I would point to our concerns about Turing and what it would mean for students losing Erasmus. To start off, I am not a big fan of talking about funding. I tend to leave the numbers to people who get the numbers, but it is important to look at it, because the funding is the bedrock any scheme needs to be successful.

£100 million has been allocated for the first year of the Turing scheme, based on a figure from three years ago, and it is completely inadequate for launching a scheme that is anything close to what Erasmus would have brought for UK students. That is particularly important, because that is going to be a lot less money to support students who would have benefitted from the scheme to be able to do it fully and without restriction. You can see a lot of those benefits in UUKi's report called, I think, *Gone International*. There are lots of figures there that show you what a properly established and well-funded scheme could do for social mobility and for those students.

It is also important to emphasise that while that money has been allocated for students, there does not seem to be any provisional clarity to support students with the extra expenses that come with studying abroad, whether that is health insurance, international travel, accommodation, or all the other things associated with having a full study abroad experience. It is important to note that when students go to study abroad, it is not just about going off to a hotter country than the UK or going somewhere different. It is about experiencing new cultures, absorbing the richness of studying abroad, and the international perspective that students get from going abroad.

On top of that, it is important to emphasise my point about scholarships, grants and bursaries enabling students to go abroad and have that full experience academically. The Turing scheme does not seem to address this in any way that is comparable to the Erasmus scheme. In many ways, it feels much like what Sir Paul was saying. It is a steppingstone that will inevitably only lead us back to rejoining Erasmus, which I think is crucial if we want to maintain the benefits of studying abroad.

The tuition fees issues have been mentioned already. There is not yet confirmation that tuition fees will be waived, which causes a lot more uncertainty and is a massive barrier for the vast majority of students who do want to study abroad.

I wanted to labour a little bit the point about the mutual benefit of any scheme that replaces Erasmus, even though I think the Turing scheme

does not come close, quite frankly. It is important that we understand that you cannot do much to help students to study who do a course with a language—perhaps a student studying German, for example—if you cannot afford to send them to the country in which that language is widely used and where the culture that language is based on is widely practised. This scheme, because it is outgoing rather than incoming, also poses a massive detriment to our connections with European countries, which causes a massive detriment to students who have studied courses that rely heavily on European connections.

The Government's priorities have been to widen international collaboration and to use our leaving of Erasmus to widen the places and countries that students can go to study abroad. Quite frankly, the funding does not match being able to do that in the widest possible way. Neither does the provision or the clarity—or the lack of clarity, rather—which the Government have given for this.

It is important that, in pushing back against this, we labour the point that the loss of Erasmus is completely detrimental to all the things I mentioned, but also that the aspiration to have a broader international reach for studying abroad is let down at the first level by the scheme lacking the provision and the opportunities that any study abroad scheme would provide students who so desperately want to have these experiences and enjoy the richness of studying abroad.

Hopefully I have covered everything and have not laboured the points too much, but I really want to emphasise that for students this is completely detrimental. Unless the Government are prepared to stand up, invest and look at how they will do this comprehensively, it is just completely disappointing that the Turing scheme lacks the opportunities Erasmus gave and, even more, lets down the prospects of any international collaboration or connections that it looks to replace, or looks to create, rather.

Lord Bruce of Bennachie: Thank you. I do not think the committee will have any problem formulating recommendations on this.

Q40 Lord Thomas of Cwmgiedd: I want to ask you, very briefly, about mobility, and I want to qualify that by making two observations. First, I think you have all, during your evidence, explained the importance of mobility. Secondly, this committee is not at all concerned about UK immigration policy.

With those two constraints, can I just ask you a very specific question? It is for comment on the arrangements set out in the TCA and what effect those specific arrangements may have. Sir Paul, would you like to begin?

Sir Paul Nurse: I will be very brief. It needs to be simple, fast, and cheap, and it is none of those things, for sure, at the present time. If I may end with a historical metaphor, you may remember that when Cicero took the Governor of Sicily apart, rather than dealing with every particular offence that he made, he simply put a pile of the paper on the table to illustrate it. I suggest that we simply take all the background

information and the form that has to be filled in, which I can tell you is this thick, to make the point.

Professor Ian Greer: Paul summed it up beautifully. There is no doubt that Brexit has had a negative impact on us recruiting people from Europe, and the bureaucracy associated with the new arrangements will be a continued disadvantage. While technically the provision looks very comprehensive and good, how operable it is will be absolutely key. If it is not cheap, not simple and not quick, it will continue to be a disincentive. Theoretically, it works, but in practice I think we need a lot of lubrication to make this work smoothly and easily.

Hillary Gyebi-Ababio: This is a point that I made when I first appeared before this committee, but it is important to understand that the new student route, again, does not meet any of the requirements that Sir Paul and Professor Greer mentioned: it needing to be cheap, fast and simple. It is important to note that students who are looking to come to the UK for a period of more than six months through the student route will face so many barriers because of cost, lack of simplicity and efficiency.

I also want to add the point, briefly, that the requirement for students to prove their English language ability, when a lot of students would be coming to the UK to improve and further their language skills, is a massive barrier that needs to be considered. If this is to be successful, it must, again, meet the requirements mentioned by my colleagues, and it has to be accessible for students so that they do not feel penalised, especially students who do not speak English as their first language. Those are the key points that I want to make.

Erik Huizer: I fully agree with the previous speakers. I would like to add one point that is pretty important for me. The current provision only talks about researchers. We have already talked about students, but I also want to ensure that non-researcher employees in universities—and, of course, research-supporting organisations such as my own organisation—can be exchanged, because if my employees in Cambridge need to fill out a whole stack of these forms, which Paul pointed to, every time they need to replace a router somewhere in Europe, that is an unworkable situation that would force us to move the whole operation to another country.

Additionally, I would strongly hope—there is currently no mention of this—for co-operation in the European integrated identity for online, eIDAS. If the UK does not follow that, physical mobility in the future will also be limited, because the eIDAS will make all the administrative procedures and identification go much more smoothly.

Professor Keith Jones: I think that all the witnesses are in furious agreement. The only point to be made here is, of course, about the R&D road map, because there is a potential issue here. If universities have to deal more and more with visas and so on, that just adds to bureaucracy. We need to address the impact that will have.

In a positive light, the graduate visa to be launched this year, which Hillary mentioned, is a positive development. Irrespective of cost, if it allows international graduates to stay in the UK following their degree or their PhD, that is a welcome initiative. I appreciate that that is separate from the TCA.

Q41 **Lord McNally:** I will depress Hillary again, as I did last time, by reminding you that I was once a vice-president of the National Union of Students. How would the absence of a positive data adequacy decision at the end of the bridging period affect the UK's research and education sector? To show my complete impartiality, could I ask Hillary to open the batting on that?

Hillary Gyebi-Ababio: I am not sure that I can speak much to this, if I am completely honest with you. It is an area that I do not think offers a lot of clarity to me or to students. Thank you for picking me first, and it is good to see a fellow NUS alum here, but I would happily pass it on to any of my colleagues, who might have much more clarity on this.

Lord McNally: That adds weight and substance to your other contributions. Could I ask Sir Paul Nurse, therefore, to respond on that?

Sir Paul Nurse: Yes, you can, although I will be brief. Medical data is critical. It is personal, it is difficult to handle. But we know in the time of the Covid crisis how important it is to share medical data, and we have to make sure that this is dealt with in the arrangements that we have. It is a specific point, but critical. Of course, across the board, exchanging data is essential if we are to produce the best policies and the best ways of working, but I particularly wanted to emphasise the importance of making sure medical data is properly transferred, because it is critical. Thank you.

Professor Keith Jones: There were equivalent conversations on this in the committee's conversation earlier today, and the expectation, or the hope, is that we have a positive outcome. To be succinct, for universities it will simply mean that they will be more focused on the contract writing and how data is managed—something that will be a challenge to a lot of universities, because we often have small professional services departments that deal with this sort of thing. Again, it will add an element of bureaucracy to the workload should we not have a positive outcome.

Erik Huizer: The bridging period is now providing us with stability regarding the processing of personal data, but a positive adequacy decision is needed after the transition period to ensure that stability continues, and it is desperately needed.

If there were no adequacy decision, universities and research institutions would have to ensure that proper agreements are in place. That would have significant administrative and legal costs, as Professor Jones just pointed out. Moreover, it would be really time-consuming. It would delay the starting of projects and so on, maybe for up to half a year or a year,

in our experience, because we work with other non-EU countries and have to deal with this. It would also be necessary to improve security requirements and controls to guarantee the safety of the transfer of personal data and so on. We would be faced with a whole rigmarole. It would be challenging for both the UK and the EU if there was no adequacy decision, as in this black scenario it would divide the UK research community from the wider European research community even further.

Looking at my own organisation, if you will allow me, which is now based both in the Netherlands and the UK, we would not be able to exchange data between staff members at that point in time without having all the administrative hurdles taken care of. For the very small organisation that we are, that would be prohibitive. Thank you.

Professor Ian Greer: I cannot imagine a world without reciprocal transfer of data. It is absolutely essential. I would hope that we would maintain very high standards of data protection that would make it equivalent to the EU and make it easy for this to happen. It is absolutely essential that we have this going forward. It cannot just be a bridge. It has to be indefinitely.

Lord McNally: Thank you very much. I was slapped on the wrist by our controller for making a noise during one of the earlier contributions. It was my wife shouting, "What do you want for lunch?" I do not make any hint about where we are in these proceedings, Chair, but I think I have finished.

The Chair: Thank you, Lord McNally. Viscount Trenchard.

Viscount Trenchard: Thank you very much. Am I allowed to ask a question or am I keeping Lord McNally from his lunch?

The Chair: I think you have just been invited to ask your question.

Q42 **Viscount Trenchard:** Do our witnesses think there are any opportunities for UK universities and research organisations post-Brexit under the arrangements in the TCA? You have already explained many of the detrimental events from the change from Erasmus to Turing, but looking at the money side, given that we are talking only about UK students going out, the money available per UK student seems to be rather greater. It is £100 million for Turing, compared with £130 million for students both ways under Erasmus.

Do you think that there might not be greater opportunities to study in the wider world—in Asia, in America—for UK students? Are there other ways in which British universities can attract more students from those countries? Also, nobody has mentioned that Turing, I think the Government argue, is providing grants for young people not just in universities but to support study and possibly working as well as studying. Can I start with Professor Greer?

Professor Ian Greer: Certainly. First of all, there is a big opportunity to collaborate with Europe through the Horizon programme and the associated programmes. That is really important for us. It also allows us to look at the overall opportunities of our funding base and make sure that the European opportunities add to the totality of funding for research across the United Kingdom, and to make sure that we are positioned as an international player and that we are outward-looking to address the issues. Both Paul and I highlighted how the UK was perceived post-Brexit and the need to be outward-looking if we want to continue to be a scientific leader.

Turing is a start, because it delivers some opportunities and outbound mobility, but there are lots of questions and we still need that inbound programme. I certainly think that Turing can be an opportunity, and we should see what we can make of it—it would be good to see the detail—but it does not make up for that inbound piece and it is not quite as wide as Erasmus, as Keith pointed out. There is a job of work to be done there, and I know the committee has already thought that through.

I guess those are the immediate issues that I would like to highlight, but I would say that in totality we should use this, along with our own funding, our own opportunities, to deliver a step change, if you will, an economic policy in the UK that aligns research to business and industry need, that grows our economy, grows our research base and allows us to be a world leader with impact. We need to do that in an agile and effective way.

Hillary Gyebi-Ababio: As I mentioned before, although there are some potential opportunities for global collaboration, I think it is important to do this in a way that makes it easier for international researchers to come over to the UK and support international research projects.

In relation to what you spoke about with regard to Turing, although there are opportunities to be had, it is important to note that all those opportunities will take time and substantial effort to establish and see the benefits of, as opposed to the fact that Erasmus is already made and quite well established. While we have the opportunity to attract students from other countries and build relationships there, Erasmus has been a widespread scheme that has already established that and has been quite fruitful in doing that with our European partners. We have much more scope to do better global collaboration starting from the point that we have a strong European connection. That feeds into how we build relationships with global partners.

Ultimately, there are a few opportunities, but I have to emphasise that Erasmus and what we had before was of much more benefit, and was readymade for the benefit of students now, than anything we are seeing today.

Erik Huizer: My short answer to your first question would be no, but I will say a little bit more. I think there is a recognition in the TCA that research is not a national issue but requires global co-operation, and

that, I think, is a very positive signal. That brings the opportunity to make sure that in working out the details we include a broad range of collaborative options including, but not limited to, digital identities, exchange of open scientific data, an underlying state of the art network infrastructure, and, of course, the free movement of researchers, students and supporting staff.

With regard to your question about the Turing programme, it is difficult for me as a non-British citizen to say something about it. I just observe that you are replacing a two-way street with a one-way street.

Professor Keith Jones: With respect to the TCA specifically, I only see that through the lens of Horizon 2020. Ian gave the answer with respect to the importance of that.

When you think of the fact that we probably have a fixed envelope to invest in research and development within the UK and a large percentage of that is taken up with existing schemes and now Horizon 2020, it is what is left to invest in the rest of the world. Maybe Turing is a step in that direction and to thinking about non-European research. We have obviously raised today some of the practical issues associated with getting that off the ground and the fact that it is one-way. None the less, you are right that it gives us an opportunity to think more creatively about how we collaborate with countries that at the moment we may not do that level of research investment with. China and the Far East, and Singapore, are examples of some of the economies that we look towards that are doing very well. It may be about translating the potential from a relatively modest stage of investment.

We have to determine, with Turing, what we are using it for. Are we looking primarily at students and widening participation, or is it about trying to turbocharge the economy? They are not naturally normal bedfellows. It is really about the purpose of just one scheme. We cannot hope that Turing will solve all our woes, but yes, we should be looking to non-European collaboration more effectively to do our research in the future.

Sir Paul Nurse: I do not have very much to add. The Crick is not a university, it is a research institute, but we have a programme of 250 PhD students. We are employing about 40 a year and we get about 1,400 applicants from around the world. It is a very large number. Approximately—approximately, because I looked for the numbers and could not find them; I apologise—one-third are from the UK, one-third are from continental Europe, and one-third are from the rest of the world.

We found that we have tended to recruit those from the European Union rather than the rest of the world—we are open to that—for several reasons, one being that it is often extremely difficult to evaluate, at graduate student level, students who are outside Europe and the United States. That is a problem that we have to solve.

To deal with the point you bring up, it is not simply a matter of providing resource; making judgments and assessments in China, India and South America is really quite difficult. It is much easier, obviously, to do it in continental Europe. It needs other things, not just money, and it is quite difficult to deliver.

The Chair: Thank you very much. That concludes the questions, you will be pleased to know, and we have no supplementaries. We are sorry that we have run out of time. We are very grateful indeed to all five witnesses for being so frank and so clear about the issues ahead, and for concentrating, as far as they can, on the positives and the future. We are grateful for that. Professor Ian Greer, Hillary Gyebi-Ababio, Erik Huizer, Professor Keith Jones, and Sir Paul Nurse, thank you very much. Thank you for your time.