



HOUSE OF LORDS

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Inquiry on

DIGITAL SKILLS

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Witnesses: Sean Williams, Dominic Field and Daniel Butler

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on
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Members present

Baroness Morgan of Huyton (Chairman)
 Lord Aberdare
 Earl of Courtown
 Baroness Garden of Frognal
 Lord Haskel
 Lord Holmes of Richmond
 Lord Janvrin
 Lord Kirkwood of Kirkhope
 Lord Lucas
 Lord Macdonald of Tradeston
 Baroness O’Cathain

Examination of Witnesses

Sean Williams, Group Director Strategy, Policy and Portfolio, BT, **Dominic Field**, Partner & Managing Director, Boston Consulting Group, and **Daniel Butler**, Head of Public Affairs, Virgin Media

The Chairman: Good afternoon. Thank you very much for joining us and helping us in our deliberations. I will just outline a few points to start with. You have a list of interests that have been declared by the Committee. These were declared orally at previous sessions in July. They are in the transcripts. This is a formal evidence-taking session of the Committee. A full note will be taken. It will be on the public record in printed form and on the parliamentary website. You will be sent a copy of the transcript and you can revise any minor errors. The session is on the record. It is webcast live and will subsequently be accessible through the parliamentary website. You are really very welcome to give a bit more information on any issues—in fact, we would encourage that. We are very pleased to receive supplementary evidence after the session if you wish to submit some. Make sure that you speak up reasonably clearly. It is not bad in here for acoustics, but it is not great. If you can speak up, that will be helpful. I will start by asking you to introduce yourselves. If you want to make any opening remarks do so, but you do not have to. As we go through the questions it may be that all of you want to answer on each question or not. We will see how it goes. Let us start with Mr Williams.

Sean Williams: Thank you very much. I am very delighted to help you with your inquiry. I am Sean Williams from BT Group.

Dominic Field: Hello everybody. I am Dominic Field from the Boston Consulting Group. I am very happy to be here and helping you with the inquiry.

Daniel Butler: Good afternoon. My name is Daniel Butler. I am head of public affairs at Virgin Media. I just want to start by saying that it is really welcome that this Committee has been formed with this particular focus. We have seen a strong focus on supply-side interventions in digital policy, which is shaping this particular phase in digital policy. What has received less attention to date has been a focus on how to stimulate and sustain demand to secure long-

term investment in infrastructure. We see that as the central challenge for government policy in future. There have been some notable, successful attempts to look at ways of stimulating demand. They will provide a good evidence base in future, but we would like to see a more coherent approach to demand-stimulation policy as the next phase of digital policy takes shape.

Q76 The Chairman: Thank you very much. I will kick off with quite a general question to all of you. Can you just outline for us what you see as the main technological advancements that most affect the UK's infrastructure? How do you see that change coming forward? What are the challenges and opportunities for the country?

Sean Williams: The central thing that is happening is a proliferation of connected computing devices, whether they are smartphones, tablets, PCs or even televisions these days. They are all essentially connected computing devices. They are all driving an enormous amount of data traffic on two networks. In the past eight years we have seen a thirteenfold increase in peak data usage on our network. That enormous growth in demand, which is driven by incredibly capable devices, is changing the way people work and live, and is driving demand for the investment in networks as well. As a consequence of that, all networks are essentially investing to increase speed and capacity to respond to that level of demand. For BT in particular, this is driving our broadband and fibre broadband agenda. We are responding with capital expenditure investment in our fibre broadband network of about £3 billion over a number of years. We already have the UK at about 78% coverage of fibre-optic or superfast broadband, which is ahead of the major countries in Europe. We have a goal to get well beyond that—to get over 90%—and support the Government in doing that. It is driving a lot of investment in demand. We see those as the central changes currently going on.

Dominic Field: To add to what Sean was saying, in addition to the step change in consumer demand for data services, we would also highlight a couple of things we came across in dealing with our corporate clients. Those would be, number one, a proliferation in business activity online and by mobile. Although the internet is over 20 years old, we have seen waves of digitisation through different industries: first the music industry, then retail. We are increasingly seeing other industries finding that the infrastructure and the demand is now at a point where it makes sense for them to shift their modes of operation, interaction with consumers and interaction with other businesses online. That is a continuing wave of advancement that is affecting the UK's infrastructure.

As a second-order consequence of those shifts, we see significant growth in the amount of data that are generated by consumers and businesses, which in turn allows the development of extra intelligence and further opportunities for growth and new business. The UK, as some of our reports have shown, is a leader in what we would define as eGDP—an attempt, which has been verified by the OECD, to quantify the impact of the internet on the economy. The UK leads, with roughly 9% of its GDP generated as eGDP on an equivalent basis. That is a disproportionate outcome relative to other countries around the world. We see a significant opportunity for the UK to continue with that position.

Daniel Butler: I would just add that clearly, at consumer level, there is exploding demand and traffic consumption, driven primarily by HD video consumption. In the business market, we see increasing demand for dedicated broadband services—often point-to-point services, often fibre-rich services.

I would just step back from the question for a second and make a slightly optimistic point. UK networks' strength is in responding very well to the explosion in the demand that we are seeing. Some interesting analysis was done by the Broadband Stakeholder Group and the Communications Chambers earlier this year, which painted a more dispassionate view of how infrastructure is keeping up with increasing demand on those networks. The UK is actually in quite a strong position. We have two competing fibre-rich networks, which are demonstrating that they are able to reach not just existing capacity but conceivable increases in the level of demand that are placed on those networks. From Virgin Media's standpoint, we currently provide 152 megabits as our top-line speed to residential consumers. To business consumers we can offer a range of connectivity solutions, all the way up to 100 gigabits. Our most popular broadband service is 1 gigabit—what we call a Big Red service. There is a multitude of offers in the market that are pitched at levels of existing demand. What was interesting about that Broadband Stakeholder Group work was that the impact of current levels of traffic on network capacity is extremely low. The existing use of network capacity quantifies about 0.8% of the total capacity of UK networks, so clearly we have a long way to go before we exhaust existing capacity.

Q77 Lord Kirkwood of Kirkhope: This might seem like a blindingly obvious and naive question, but what does infrastructure consist of? I am not a specialist. I understand infrastructure in terms of railways and roads. Can someone send us a piece of paper—I guess I am looking at BT for that—that fleshes out what we are talking about when we refer to infrastructure? We are now talking about soft infrastructure and data networks. I am certain that the Committee will want to do a serious piece of work in terms of recommendations in this area. I would like to make sure that I was confident that I knew I was covering all the sections of the infrastructure. Does such a piece of paper exist?

Sean Williams: I am not sure that there is one readily available, but it is a very important question. To answer the full question you need to think about infrastructure quite broadly. I would articulate five different levels to this.

The Chairman: It is never easy, is it?

Sean Williams: No, that is maybe too many levels.

Lord Kirkwood of Kirkhope: I can only do three at a time.

Sean Williams: I know; the rule of three should apply. One level is simply about the cables in the ground, whether they are copper, fibre or coaxial cables. There is one level on top of that that I think is important, which is innovation. We should not forget that it is not just a static technology; it is about driving innovation in this environment. The UK has a strong track record in innovation in this space. We hold the world record for broadband speeds at 2.2 terabits per second, for example.

There is a third level, which is essentially people skills. For us, as a major participant in this space, it is about recruitment and training of capabilities in ICT services. That human capital element is also very important, but I think it goes beyond that. One has to think about the capabilities of the customer base as well. On the one hand, our engagement with our customers ranges from the largest corporations in the world and trying to devise technology solutions for their business problems. It goes all the way through the SME base, where they may, for example, be moving their technology infrastructure from something that happens in their premises into The Cloud. It may be that it is just the mass market of residential

consumers who are learning how to use the internet, how to communicate and connect, and are often very reliant on support in that from their service providers. The fifth level is, in a sense, the public policy establishment around this. Think of it in terms of the curriculum in schools, the developments in science, technology, engineering and management, the real soft elements of this. You have to think at all five levels to take this whole agenda forward.

Lord Kirkwood of Kirkhope: That is very useful answer. Thank you very much.

The Chairman: That pretty well summarises the judgment of the Committee, actually. That is very helpful.

Dominic Field: Could I offer a double-click on the hard infrastructure piece?

The Chairman: We do want to get into the nitty-gritty.

Dominic Field: Absolutely. On the hard infrastructure piece, we asked ourselves the same question: what is it and where do we stand relative to other economies around the world? We published a report in January 2014, which I am happy to send to the Committee, in which we quantified the relative position of 65 global economies on the infrastructure metric. The criteria that we used for that were: access—how widely available it is, and there is a set of sub-dimensions there; speed—if I am fixed or mobile, how quickly can I interact?; the price, which is important in terms of availability and affordability; a traffic dimension—how much is flowing across the infrastructure; and finally, the architecture, which may sound slightly IT-oriented, but the underlying structure of the internet and how it is organised can also speed up or slow down our ability to access it, and it varies on a global basis. So we quantified those five dimensions for the hard piece. I would add soft elements such as skills, tech talent and so on.

Daniel Butler: I would just add that there can be a tendency in public policy debates about network architecture to reach immediately for technological solutions based on a series of assumptions. Often when we talk about the broadband infrastructure, the immediate leap is to fibre-to-the-premise connectivity and an assumption that a certain network composition is required to meet the trajectory of demand that we are seeing. Actually, there are a variety of technological solutions that can meet a particular level of demand. As I said in my previous answer, current network composition is doing that very effectively even where that does not constitute fibre-to-the-premise. It is a fibre-rich network, fibre-to-the-cabinet, with varying degrees of different materials running from the cabinet to the home. It can lead to very expensive and actually perverse impacts on the private investor to leap straight to a particular network composition as being the solution. Actually, the long-term policy challenge is how you stimulate investment in different technologies in order to create the right conditions to keep up with demand wherever it may go and with the ability of networks to get better at managing that demand, which is an important element. If you look at where traffic is going, one might assume that speed has to increase at the same rate as traffic. Actually, there is some really useful analysis that shows how networks are getting better and smarter, through things such as video compression, at managing that traffic and its impact on consumers more successfully. They are not necessarily as closely correlated as you might think.

Q78 Lord Aberdare: My question, which you have already addressed to some extent, was: does the UK have a competitive infrastructure to support a knowledge-based economy, and how does the UK compare to other countries? You answered that in a fairly positive and

encouraging way. I now have two questions. First, who is responsible for making sure that that is the case? Is there a role for the Government or somebody? BT, Virgin and others are doing their thing. Who is going to make sure that we have, in the round, everything we need? Secondly, how confident can we be? I am very conscious that when we first started downloading videos and everything, the speeds that we thought were going to be tremendous suddenly became nowhere near good enough. Is there any danger of being complacent about where we are at the moment?

The Chairman: Lady O’Cathain has a supplementary to that and then you can answer all of it.

Baroness O’Cathain: Yes. We have been hearing this marvellous expression of how it is great science and terrific and everything in the garden is lovely, but I am sure that every single person around this Committee table, unless they are a major scientist, has experienced utter frustration about the reliability factor. Even this morning I had problems with my electricity company. They said, “We won’t be able to do your direct debit for another 24 hours because our system is down”. Then you go to the airport, as I did on Saturday, coming from a country that shall remain nameless. I waited in a queue for two hours because they could not get the aircraft off the ground because the computer system was down. How many times do you ask for theatre tickets but are told, “Sorry, we’ve had a glitch in the computer.”? If you looked at my annotated bill from BT, you would see that the main people I speak to are our own computer assistants here at weekends because the system has gone down or something has gone wrong with it. Reliability has not improved at all and the customer is so frustrated.

Lord Aberdare: I will not even mention the saga I have been having for the past couple of weeks trying to move my phone number from BT to Virgin.

The Chairman: We will pause at this point because otherwise we will be here for another two hours. Who would like to start covering both those questions?

Sean Williams: I am happy to. I think it is a shared responsibility between the Government, the regulator, the industry and our customers. I think it is quite well recognised in the UK that there is a commercial case to take investment to about two-thirds of the country, and beyond that the commercial case for investing in new networks is uneconomic. We have had support from the Government under the BBUK scheme. As a result, we will get superfast broadband networks into more than 90% of the country. With the extension programme, we will get it considerably beyond that as well, in partnership. The regulator has responsibility as well to ensure that it is possible to make reasonable returns on investments, not just over a three-year market review cycle but to commit to a policy and a strategy towards investment that promotes investment over the long term. Clearly, that involves the Government, the regulator and commercial organisations. At the same time it is ultimately driven by our customers and whether they have a demand for these things. That is where the complacency comes in.

We should not be at all complacent. The world is moving on very rapidly. We watch very carefully and consider all the time when the next level and phase of investment is coming in. In my view, we will be investing in new technologies every year for the next five to 10 years as we develop new ways of answering as yet undetermined and unidentified customer issues. We take some comfort from the Broadband Stakeholder Group report that was published earlier in the year, done by Communications Chambers, which says that the kinds of technologies in the market today—the cable network and the BT network—are likely to be sufficient for 90% of users for the next 10 or so years. Again, that depends on the kinds of

compression that Daniel has spoken about, and the emergence of 4K or 8K television and how popular that becomes. There are lots of indeterminate drivers. We just have to be very watchful.

I completely agree with Baroness O’Cathain that it is not about just speed and coverage; reliability and consistency—resilience, as we would call it—are also very important. We look at this all the time in our strategic reviews of our fibre deployment—how can we ensure that this network is designed to be as resilient as possible? As more and more people and businesses rely on connectivity to connect their systems and their devices, it becomes more and more critical that they are always available. That is not being glossed over in our work at all. I assure the Committee that it has very high prominence among the three most important things that our network will have to deliver over the five to 10 years to come.

Daniel Butler: In terms of the regulatory architecture that governs competition in the UK broadband market, we benefit from having quite a robust set of regulatory powers. Ofcom has not been afraid to act to address competition issues where they have been posed by the exercise, or rather the existence, of significant market power in both the residential and business markets. We have a robust regulatory framework to ensure good competition. What you have seen in the UK market as a result is infrastructure-based competition. It is critical to draw a distinction between infrastructure-based and service-level competition, where you are talking about infrastructures keeping pace with technological innovations and investments being made in the quality of the network. It is vital that there is that infrastructure-based competition so that where Virgin Media is investing in fibre-rich networks, that then puts pressure on the incumbent to do something similar. If you look globally at the impact of infrastructure-based competition, particularly on penetration, it is very high. Where there are two competing infrastructures, you typically see 20% higher penetration. You also see more revenues being reinvested in the quality of networks by the incumbent—around an 8% increase in the amount of revenue that is invested. So there are definite benefits to having competition at the infrastructure level. If you will allow me a second of corporate lobbying, we at Virgin Media are keen to extend that infrastructure-based competition as far into the market as is financially viable. We are currently present in fewer than 50% of homes, and there are some regulatory barriers that prevent us from being able to build an economic case to go further. This is some material planning regulation and red tape that constitutes about 85% of our build-out costs—restrictions on how we dig up the roads, the permissions that we need to do so and the behaviour of local authorities in assessing the quality of the reinstatement of those roads. That takes significant money off our balance sheet that we cannot then invest in generating more competition at infrastructure level, and we think there are really actionable things that the Government could do today to reduce the burden on infrastructure investors to generate further competition.

Q79 Earl of Courtown: Mr Williams, I think you mentioned that one-third of the country would be difficult to upgrade broadband in. Is that what you said?

Sean Williams: Yes, the case for superfast broadband fibre-optic penetration goes to two-thirds.

Earl of Courtown: What population does that affect?

Sean Williams: About 10 million households. As a result, the Government have—

Earl of Courtown: I know that there are various areas, and I live in one of them. The problem that you have, of course, is that most of us around this table rely on BT to supply their broadband, and as someone who lives just outside the M4 corridor my BT broadband connectivity is absolutely appalling. This is not right up in the Cairngorms, Snowdon or the Pennines. I was just wondering how on earth you are going to improve this for quite a large number of households.

The Chairman: Can I ask an additional question to that? We have been concerned about speed in general everywhere. I am not saying that you are being complacent.

Sean Williams: I am not.

The Chairman: However, we have had very clear evidence from people working in London—the obvious hubs, if you like—that their speed is now inadequate for uploading rather than downloading. We are seeking to get underneath the glossy headlines, if you like. How do we get rather more reassurance, or more openness, about what the challenges are and any ideas on how they are going to be met?

Sean Williams: I do not want to paint a glossier picture than the reality. However, we start from a pretty good place, although there is a lot more to do. We have superfast broadband coverage of 78% of premises, which is a good score relative to our major competitors, and 99.3% ordinary copper broadband in the UK, which again is higher than in most other countries. But that does not change the fact that some people are getting speeds and indeed resilience that are inadequate for them. All I would point to is that over the next few years there will be a very large investment in superfast broadband for the final third to get to over 90%. Once that is deployed, our estimate is that households that will get less than two-megabit broadband, which is pretty basic broadband but is at least functional for downloading, will be fewer than 1% of premises. To get the uploading part going well at the same time you really need in the order of 10-megabit broadband, and we will probably have fewer than 5% of premises getting less than 10-megabit broadband after all that deployment. At least, it will be available to them; obviously I cannot guarantee that we are going to get to take-up at that level. So there is an enormous amount of investment going on over the next few years out to 2018. We will be in much better position as a result of that. There will still be some holes. It is right that we as a country consider what we are going to do about all those white spaces that are left where people cannot get enough. There should be a continuing agenda to drive coverage. I also endorse the point that Diana made at the beginning: this is also about driving the demand side. How can we ensure that everyone gets the benefit of it?

The Chairman: Mr Field, do you want to come in on this?

Dominic Field: Yes. I just wanted to say that those figures that were just laid out there, which I concur with, place us in a strong position relative to the other big five EU countries. When you look at the question of who is better, the names that typically come out are the likes of South Korea, the Nordics and Japan, but we are up there. In the infrastructure scored that I talked about earlier, we place the UK at number 13 out of 65 countries around the world. The area that held us back was not fixed broadband, which we have talked about so far, but mobile. Mobile broadband access is actually the primary mode of access for many people in the country and is increasingly becoming so. That is an area where we have lagged behind both in access and in price. That was the factor that weighed us down and took us to

number 13. I will not hypothesise as to where we would be if we had taken a fixed-only view, but it would have been higher than 13.

The Chairman: Lord Haskel, we have covered some of your questions. Is there anything else that you want to pick up on?

Lord Haskel: First, I want to say that I am a fibre-optic customer of Virgin, and obviously the system is overloaded.

The Chairman: Basically you are running a case work seminar.

Q80 Lord Haskel: Getting back to the question of infrastructure, in March 2012 the Government actually created an e-Infrastructure Leadership Council to make recommendations to government on all aspects of e-infrastructure. It defined e-infrastructure as “a complex interaction of software, computer hardware, networks, data services, cyber security and the skills of the people who make the e-infrastructure work”. Mr Williams has mentioned some of those things. I just wondered, with this proliferation of what infrastructure is—hard and soft infrastructure—how we are going to get all this infrastructure to come together. Obviously one aspect of it without all the others could let us down, so it is not just a matter of whether we have the wires and the fibre in the streets, so to speak, but somehow we have to get it all together in balance.

The Chairman: I sense we have done hard infrastructure so let us put a tick against that. In particular, help us to work out how the development of the soft infrastructure works with that in an overall strategy.

Lord Haskel: And mobile.

The Chairman: Who would like to kick off?

Dominic Field: It is easy to quote figures on hard infrastructure. With soft infrastructure, it is harder to come by the data. We recently did a small study in which we talked to the CEOs of 30 technology companies, large and small, based on what makes a great tech city. We looked at London as the case study, evaluating its position relative to San Francisco and other tech hubs around the world. The conclusions from that study were, first, that our hard infrastructure was in relatively good shape and, secondly, on the key areas where the country could do more—in this case it was the city but you could extrapolate—at number one was talent. When those CEOs talked about talent, it broke down into a couple of buckets. First, there was securing the supply of people with advanced degrees in science, technology, engineering and mathematics, the so-called STEM topics, who could help to drive technology-oriented companies. That was the top one. The second thing was ensuring that there was the right visa and immigration agenda to allow those people to either enter the country to work in this sector or stay on after university. I am aware that there are already initiatives in place around these areas. However, there was a sense that this was an area where we were on a good path but we could do more to drive availability. That would be an area for your skills question because that starts to bridge into that category. That was the number one piece that came across in terms of how you bring it all together: who are the people that will actually do this?

Daniel Butler: I agree that one of the central soft challenges is how you build digital confidence and digital skills—the capability challenge, if you like. Underpinning that are two elements. One is a marketing challenge, effectively. We need to be able to sell the benefits

of superfast broadband to the 16 million citizens and 20% of businesses that have not yet embraced it and live their lives offline. Clearly, in terms of economic value and significance to economic policy, targeting that 20% of businesses is hugely significant. There are various studies out there about the economic impact. The most widely quoted figure is that there is an £18.8 billion annual revenue opportunity for more digitalised businesses. There is also an efficiency benefit to small businesses getting online. Digitalisation improves efficiency by about 20% on average. At Virgin Media we undertook a digital training project in Birmingham in 2012 with 25 local “hard-to-reach” businesses—microbusinesses that had developed their businesses strictly offline. I think it is fair to say they had not embraced the potential of digital technology for their businesses. There was an anecdote from the first of three weeks’ of training sessions that we did with the training provider Free:Formers. There was a guy called Marvin, a plumber from Solihull. Six months’ prior to the training session, Marvin had no digital footprint whatever. Then he paid for a website, and paid an IT consultant to build him a Facebook “like”—one of the thumbs. He paid £2,000 for this guy to do a week’s work, doing what is very simple coding to put the Facebook thumb on to his website. Within the first 15 minutes of the training session, all 25 people in the room had been taught the code to do that. I just offer that as anecdotal evidence that at the moment SMEs and microbusinesses in particular do not know what they do not know. Without wanting to take aim at the “have you tried turning it on and off” brigade, a lot of IT consultants do extremely well at the moment out of uninformed small businesses. That is a major challenge to be addressed. If you look at how digital policy has attempted to address that challenge, in this policy cycle there have been some welcome efforts. Web Fuelled Business is an interesting programme with a huge amount of central government sponsorship.

As an observer, I would not say that it is the most accessible programme or best targeted at hard-to-reach audiences. Our experience of the Birmingham project was that, because these businesses were not convinced about digital technology, you really had to spoon-feed them a little bit. You had to sit down in a very structured environment and take them through the material step by step. Web Fuelled Business is a great marketing tool but I am not sure that it lands that particular approach. Our observations of Tech City—I think Marcus from the Chamber of Commerce put it well in his evidence—was that its success was built on demand aggregation around existing, strong pipeline of both soft and hard infrastructure. On connectivity in east London, there is recent press contesting this argument, but we have some of the best connectivity in the world. In east London, Virgin Media tested a 1.5 gigabyte residential connection at the heart of Tech City back in 2011. Tech City benefitted from having strong infrastructure and a pipeline of talent. Crucially, its success also depended on attracting major anchor tenants such as Google at a very early stage in the process. That was in large part to do with the work of UKTI and particular individuals in central government such as Lord Young selling the potential of Tech City. For cities outside London, if we are looking to build a blueprint for a tech city, I would say, first, locate your incubators where there is existing very good connectivity and softer infrastructure. Secondly, how do we allow other cities to benefit from these kinds of political endorsement and marketing benefits that attracted major companies to locate in those centres?

Q81 Lord Macdonald of Tradeston: We hope in the course of this inquiry to find evidence that digital input will drive competitiveness and indeed economic growth in Britain. So far, that is proving a bit elusive. On the other hand, on the skills side we have tended to look at

that as a way of getting people into jobs. As you heard from some Committee members this morning, there is probably a larger issue here of how fast this technology is developing and the risks we run because of it, whether that is the crime figures that came out last week for online fraud or the risks to our essential community services and the networks we depend upon. That resilience seems to be lacking even at the very basic levels that we heard about earlier. Yes, we need skills to put people into jobs, but surely there must be a huge skills shortage in terms of the kind of people that can try to ensure that society is not at risk because of the way this technology is rocketing forward, without a great deal of control partly because the private sector can find an answer to that. It is regulated to an extent in some areas, but it is a bit alarming to many. Do you feel the anxiety about the skills gap of those people who will make this stuff more resilient?

Sean Williams: There are two parts to the question. I certainly take the view that it is important that all organisations invest in developing the skills fit for this environment. From our perspective, some of that is within the business and some of it is about how we look after our customers. On the first of those, we recruit around 300 graduates and more than 700 apprentices into technology roles, as well as 1,600 servicemen coming out of the forces into our network business. We are recruiting thousands of people a year into the technology world and training up thousands of people a year who will obviously have careers and go on to other places. It is part of building the soft infrastructure.

On the piece that is outside BT, it goes back to my fifth level—the whole public policy environment for this. Some of it is about developing skills and some of it is about protection. On the skills front, we very much support the introduction of computing into the school curriculum and we are working in partnership with an organisation called Barefoot Computing, which is helping primary school teachers to train up so that they can actually deliver the new curriculum, as well as helping the National IT Partnership to develop apprenticeships in these areas. We are going beyond that to help to encourage people into STEM subjects. We have nearly 500 STEM ambassadors, as we call them—people in our business who go out and use their skills in local events in communities to get people engaged with this whole agenda.

There is also the protection side of it. This is very powerful technology and we need to ensure that people are properly safeguarded. We are doing a lot in that regard both commercially with the introduction of parental controls and out in the community. We are working in partnership with UNICEF UK on an initiative called The Right Click: Internet Safety Matters. We are out in schools training children and teachers in internet safety. We hope to reach a total of tens of thousands of parents and children through our one-hour online safety training. Lots can be done within the business in developing curricula in schools and more vocational avenues. Thirdly, there is more we can do to support our customers in using this great capability in a safe and protected way.

Lord Macdonald of Tradeston: Is there a step change that you would look to government to introduce? If it is a technology of such profound influence and very real dangers, should the Government be taking it more seriously? Should there be a step change in the recruitment and training that is necessary? The thousands at BT are very welcome but that is out of a workforce of 29 million working on a technology that is about to transform industry, as we hear every week.

The Chairman: How can we join up the bits? In every session we have had, we hear lots of good bits. You have just said you are working with primary teachers—great—but I bet it is not that many in the grand scheme of things. In every session, we as a Committee are trying to think, “How the heck do we take all these bits and turn it into a proper UK plc strategy?”.

Daniel Butler: It is central to our commercial objectives to get network resilience right. Particularly in the business-to-business market, the resilience of connectivity is even more important than the quality of the service or the speed. If you survey businesses, they will tell you that resilience comes first, security second and speed third. It is important that we ensure that our network is secure at a critical infrastructure level. From a residential broadband perspective, clearly engagement with broadband depends first and foremost on consumers trusting the service and trusting that their security will be looked after. What you see across the market is that we give away antivirus software to our customers on the basis that we know how fundamental it is to them that they are able to protect themselves from malware. Each network operator will take action to protect its own critical assets. I do not see it as a challenge for central government; I see it as a fundamental necessity for us at a commercial level. It is important not to underestimate the amount of activity that already goes on to ensure the resilience of our services and our network.

Q82 Lord Janvrin: I have a very quick question on BT and your recruitment programmes. I think you said 300 graduates, 700 apprentices, 1,600 servicemen. Where are you having the greatest problem? At what level?

Sean Williams: I do not think we are facing a problem; we can recruit people. The problem is that we do a lot of the training. We would benefit from having recruits who are better prepared for their technology roles in life if they have come out of school with more depth in those areas. We do not have a problem with attracting talent and capability and training them up in the specifics of our business and getting them out into the field and into the business in a useful way. Where the Committee could really help is in devising a coherent framework that could slot helpfully into a clearer overall picture.

Dominic Field: We should not be complacent, but it is fantastic that in terms of economic positioning—the eGDP, as we would call it, which is the economic impact of the internet—the UK ranks number one among the G20 economies. Just to put some numbers against that, in 2010 we quantified it as 8.3% of GDP, which compares with 4.1% for the G20 countries on average. We are actually doing quite well.

We have heard a lot about the infrastructure, which is actually in pretty good shape on the hard side—there are obviously some folks who are not feeling it yet but it is coming—but there is an area in which a co-ordinated national policy could help. In the same way Daniel said that Tech City has managed to help this in London, I would raise two questions. One would be: how can we have several tech cities across the UK? Where are the next tech cities coming from? Where do we have the degree of co-ordination and focus? Ultimately, a lot of the growth that we are talking about will come from companies that do not exist today. That is the power of the internet—the ability to transform businesses. It is a revolution, an industrial revolution of sorts. That would be the first question: how can we develop industrial policy to create that? The second thing, to feed those future companies, would be the ICT skills. To put one piece of data out there, I talked earlier about the UK being 13th overall on our global index. It is 29th overall in ICT skills. As a contributing factor that powers the growth, it will be important to continue to push that area.

The Chairman: Thank you. It would be very helpful if you could send us the document on this. Lord Holmes has a different question.

Q83 Lord Holmes of Richmond: Picking up what was said a few minutes ago about the potential market for superfast broadband, what about delivering on the promise to all those people who have been convinced to go on to superfast broadband? If you chat to most people about service and supply, it is seldom super, rarely fast and often when you get dropouts, on a Sunday night especially, it is not even broadband. What is going to be done to improve networks in places such as London—we are not talking about rural areas—where people have been sold superfast broadband and it is not?

The Chairman: Do you have anything to add to what was said before?

Sean Williams: I will have a stab at that. The data that Ofcom produces actually suggest that the superfast broadband network is delivering what we define as superfast broadband speeds. You can define those in the way the BBUK process did, as over 24MB, or in the way that the European Commission targets work, at over 30MB. On average, the SFBB network is delivering 47MB. I point to the data that suggest that actually it is delivering good speeds. Not all the provision arrangements are perfect and it is not always faultless, but it is improving all the time. It is also important to register, as we have in passing in this conversation, that for businesses it is very often not about superfast broadband but real ethernet fibre connectivity. In addition to all the superfast broadband, a lot of companies rely on ethernet connectivity, which is very reliable once it is installed and is able to deliver multiple GB of symmetric speeds, which businesses require.

It takes continuing investment in what is a new technology in superfast broadband. We had not started deploying this until about five years ago. It is going very rapidly and it will improve all the time. It is not perfect, but it is delivering superfast broadband speeds.

Lord Holmes of Richmond: Do you think it is acceptable for customers to have interrupted supply on a regular basis? If you were a power supplier the current service, for many people in areas such as London, would make the blackout of the 1970s look like the blink of an eye.

Sean Williams: This goes back to Baroness O’Cathain’s point earlier about resilience. It is very important that the resilience of these networks is enhanced all the time. When you make the comparisons of fault rates on various different technologies, you can see how, as the fibre technology has matured, the fault rates have come down enormously and will continue to do so.

Daniel Butler: I would just plug our own network performance. Virgin Media has topped Ofcom’s speed reliability charts for six years running. The extent to which we have fibre built into our network and the coaxial cable that runs from the cabinet to the home helps to guarantee that there is no dramatic degradation in speed for the end consumer. As Sean says, Ofcom’s statistics point to a very robust performance of speed. It speaks to why speed, in and of itself, is not the best indicator to build policy around, because one of the challenges that any network operator faces is not so much the speed of application but the stuff that is being used. HD video requires about 10 megabits; 4K TV is estimated to require about 20 megabits of bandwidth. The challenge for network operators is how many people are using how much across a single network at the same time. That is very different from the headline speed. A fixation on headline speed will not address that as a policy outcome. Performance

against headline speed is improving. On Virgin Media's network it has always been very robust because of the quality of investment we have made in network.

The Chairman: But that is not enough as a measure.

Daniel Butler: The bigger challenge is how network operators deal with a connected home. Again, just to plug the BSG's—

The Chairman: I am going to stop you, otherwise we are not going to get our last questions. I want to do that. I know Mr Field wanted to come in.

Dominic Field: I suspect, although I have no evidence to back this up, that many people who believe they have a problem with their superfast broadband have a problem with their old fashioned dial-up or DSL. That is much less robust than the superfast broadband. As we talked about before, there are also many people who are not taking advantage of the fact they could have a much better service.

Lord Holmes of Richmond: On that, I suspect it is an oversold service and there are too many—

The Chairman: I am going to stop this, because otherwise we will say, "A week last Monday X happened". We will not go there.

Q84 Lord Lucas: If I am running Eastbourne or Hatfield or some community like that with a university and a decent set of tech people around there and I want to create a hub, what can the infrastructure community do to help? Do I need to stump up a lot of money? Do I need a greenfield site? What makes one happen?

Dominic Field: The questions I would ask are whether those universities are offering the right kinds of degrees: the basic conditions of science, technology, engineering and maths. Number two, I would look for opportunities to locate and anchor tenants of technology companies near to campus, in and around the area. Thirdly, I would make sure they are well plugged in. Those would be the three things I would look for.

Lord Lucas: Is being well plugged in something that you can do starting from nothing, or do you require an initial investment by a local authority or someone to get you off the ground so that you can provide that sort of quality of service?

Daniel Butler: Virgin Media does not take public subsidy to invest in our infrastructure. We never have, because we operate a closed network. My challenge to the aspiring incubator would be first to look at sites that already benefit from strong connectivity. That is clearly not always possible. In those types of scenarios with those types of capacity requirements, one would expect that business-grade connectivity was what was required to serve the particular needs of that incubator hub. Virgin Media itself has the ability to provide point-to-point fibre connectivity to 85% of business premises up and down the UK, so there is a strong possibility that in any hypothetical scenario there is an opportunity to provide services. This speaks to the willingness to pay, frankly. I was having a conversation with Tech City last week; with some of the tech start-up incubator hubs that are emerging in east London we still have a marketing challenge to get over. Those communities might not think that they need point-to-point ethernet or business-grade connectivity, but the things that they are going to use that connectivity for, particularly the upload demands that they will place on networks, probably speak to the requirement that they do need that level of connectivity. For small businesses there is a challenge in marketing the availability of

products and the benefits that they can get from those products better so that we can address that willingness to pay issue.

Sean Williams: I endorse the general sentiment that if there were a hypothetical greenfield business park for a tech cluster, I would expect that we would be deploying fibre, whether business-grade ethernet or superfast broadband connectivity. We would not particularly be looking for contributions from people developing such a place. We are in the business of serving greenfield sites and working with developers all the time to find fibre solutions to provide to new premises.

Q85 Lord Janvrin: A final question, which we are asking all panellists who come before us: if you had to pick out one suggestion or recommendation that you would like this Committee to make to the Government in the area of infrastructure that we have been covering, what would that recommendation be and have you any thoughts about the cost of it? If you picked out just one priority.

Daniel Butler: I would actually suggest that you do not focus on infrastructure. The unique contribution that this Committee can make, given that it is the Digital Skills Committee, is to consider what the next phase of digital upgrade looks like. As I opened by saying, I think that is more a demand-stimulation and marketing challenge, a challenge about how you get those who are currently digitally excluded, particularly small businesses, to embrace the possibilities of technology, over reaching for a particular speed conclusion or a particular network infrastructure conclusion. The one bit of infrastructure policy that we think needs working on is looking at what the right conditions are for private sector investors in network, because supply-side infrastructure policy in this Parliament has focused on government-funded schemes, and rightly so because it was addressing a particular market failure. If you are stimulating demand, the next phase of digital policy should also look at the right conditions for private investors in network to continue to invest in meeting that demand. We think that there is a bunch of useless red tape that could fall by the wayside.

The Chairman: I think that was two, actually, but there we are.

Dominic Field: As Daniel has said, from a hard infrastructure perspective the UK is in pretty decent shape. It is about the soft piece and a focus on developing a stronger talent pipeline to produce more engineers, data scientists and people who can help to grow the businesses that will employ the UK population going forward.

Sean Williams: I support both those recommendations from Dominic and Daniel. I would add on the hard infrastructure side that there are still some white spots—that is, non-fibre areas—particularly in cities, because network economics for cable operators and BT do not work. My ask of the Government would be to go forward to seek approval from the European Commission for a city fibre subsidy scheme to deal with the non-fibre areas in cities. The reason for saying that is that to achieve the universal coverage goal, we have to deal with the problem in cities. It would be really rather ironic if at the end of this we had 95% coverage across the whole of Cornwall and Northern Ireland but only 85% coverage across the whole of the city of London.

The Chairman: Can the EU do that?

Sean Williams: Yes. The issue is that the European state aid guidance and guidelines lay out some quite restrictive provisions around the terms on which such aid would be approved.

The Government should go into battle with the European Commission and come out with approval for a scheme that would be viable for the UK.

The Chairman: It would be very helpful if you sent us a bit more information on that. That answers some of the points that we have been trying to raise today.

Daniel Butler: More public subsidy for BT would be a brave recommendation for the Committee to make.

Sean Williams: I said nothing about a subsidy for BT. That is a very cheap shot.

Lord Kirkwood of Kirkhope: Is there any chance at all of a combined industry-wide approach to government before the next election covering the next five-year period? We know that there is an election in May. Is there any chance that there could be an industry-wide body that could come together and make exactly the kind of points that you have just been making about infrastructure?

The Chairman: They are not all here today.

Sean Williams: There are industry fora. The Broadband Stakeholder Group is probably the leading forum in this area.

Lord Kirkwood of Kirkhope: So that would be the one that would be—

Sean Williams: Maybe you could invite it to come to speak to you on that subject.

Q86 Lord Macdonald of Tradeston: I have a question for Virgin. It has been my impression that after the various amalgamations that created Virgin Media, you stopped at 50% of the country covered and seemed to find it very difficult to go beyond that. Is that correct? Is there a stasis at Virgin Media that means that you can serve only half the country? That speaks to BT's point about the other half.

Daniel Butler: That is an accurate description of where Virgin Media was up until this time last year when, speaking frankly, we were at a stage in our history where we had invested heavily and consolidated the cable markets down to a single operator. The market economics were particularly challenging as an independent company regarding how we built out further. As I think you know, Lord Macdonald, we were taken over by Liberty Global just over a year ago, and the scale of that potentially opens up routes to investing and expanding our network considerably. Already this year we have announced an expansion of 100,000 homes in east London, and we have acquired a small cable operator in Scotland that serves around 50,000 homes. There is huge appetite within the business to expand the network. That speaks to the funding and market-condition challenges that I mentioned earlier—the impact of red tape. Red tape constitutes 85% of our build-out costs, so anything that we can do to deploy the network cheaper means that we can provide more competition to BT in more postcodes up and down the country. I accept that there are white spots in cities that need addressing. Our view is that you should start by seeing how far the market can get you, without all this red tape, before immediately looking to the taxpayer to subsidise that expansion.

Lord Lucas: Can you let us have some details about which regulations and how much?

Daniel Butler: It is hard to shut me up about it at the moment, Lord Lucas.

Sean Williams: We endorse that general agenda of reducing red tape and have already submitted quite advanced proposals to the Government on that. Some action has been taken but there is more to be done.

The Chairman: Thank you all very much indeed. That was very useful.