



# HOUSE OF LORDS

Unrevised transcript of evidence taken before  
**The Select Committee on Communications**

Inquiry on

## **SUPERFAST BROADBAND**

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Witnesses: Mr Lorne Mitchell

Mr Francesco Caio

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Members present

Lord Inglewood (Chairman)  
Lord Bragg  
Lord Clement-Jones  
Baroness Deech  
Baroness Fookes  
Lord Gordon of Strathblane  
Lord Macdonald of Tradeston  
Bishop of Norwich  
Earl of Selborne  
Lord Skelmersdale

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**Examination of Witness**

**Mr Lorne Mitchell**, Managing Director, Objective Designers Limited.

**Q75 The Chairman:** Lorne Mitchell, welcome, and thank you very much for coming to give us some evidence. In a moment I will ask if you could introduce yourself so that the broadcast picks that up. We have a CV from you. Thank you. If you have an opening statement you would like to make, please feel free to begin with that; so, if you could introduce yourself, and then away we go.

**Mr Mitchell:** Thank you. My name is Lorne Mitchell, and I have been in the telecoms industry for about 30 years, some of that time served with BT, which was useful, and since then I have been with a number of companies, AT&T, MCI, KPN in the Netherlands and PWC and IBM. These are all three letter acronyms that probably do not mean too much to you. A little over three-and-a-half years ago I set up on my own as an independent—I do not like the words “consulting company”. I always think consulting is a cross between a con trick and an insult. I call myself a designer. I think that is important because design is a very important discipline in telecommunications and I hope as we go through today we can explore some of the design constraints that are placed on the UK infrastructure and some of options we have going forward.

I am ultimately an optimist, I think because of my engineering background, and I think the UK is a fantastic place for innovation. There is a lot going on here that it is worth noting rather than jumping on an aeroplane and going abroad. There is a tremendous amount of stuff going on in the UK, of which I hope to highlight some. In the last three-and-a-half years I have become a bit of an industry facilitator, nothing like Lord Bragg's deep insights every Thursday, which I listen to, but I try to get debate going within the industry. In fact, today I should be in York facilitating an industry conference, but this is much more important. Through the last, I suppose, four years I have become quite deep in terms of understanding what is going on and what the options are going forward, which I hope is one of the reasons I have been invited today.

Finally, about two years ago I decided that, rather than just talk about it, I should become a practitioner. So I started my own scheme in rural Kent, in Goudhurst, which is going very well at the moment and is something I am very proud of. We have managed as a community to get £100,000 of grant funding from Kent County Council. I would like to bring that to your attention as a case study where we have learnt an enormous amount in the last 18 months, and I think it will be useful in terms of articulating some of the options we have going forward. I have also brought some slides along. I do not quite know the mechanics of how this works, but my first one is a quote by Albert Einstein, which is a favourite of mine and one of the reasons I set up Objective Designers, which is, "A perfection of means and confusion of ends seems to characterise our age". I think that perhaps is a succinct way of putting the issue that we have facing us at the moment, although on the PowerPoint it has not quite come out the way I meant it to, but it is there anyway. So, that is it.

**Q76 The Chairman:** Thank you, that is a very helpful introduction. I will set the ball rolling by saying that the UK Government's aspiration is for this country to have the best

superfast broadband network in Europe by 2015. To that end it has set a target of 90% of premises having access to 24 Mbps and the rest at least 2 Mbps by 2015. Do you think this is the right way to think about a broadband policy? Do you think then that these particular aspirations are the right measures of what you should be doing? Is capacity the right point to start in thinking about what you are trying to do in this area?

**Mr Mitchell:** It is certainly one of the factors. I think that capacity needs to be taken both in terms of supply and demand. Often the “up to” whatever the figure is is a banner headline. If you look at the demand side of the equation, I think that the public has become quite confused as to what all this means, and indeed in my own scheme what I am finding is that once people get over about 2 Mbps they change their mind about what is important. Within our parish we have a main exchange and we also rely on other exchanges. About half of our population can get 2 Mbps or more—in fact it is up to 6 Mbps or 7 Mbps—and that is enough for a lot of people. So what we are finding is that the demand, if you like, for more than 2 Mbps is considerably less—people do not think the issue is as important as if you are less than 2 Mbps or less than 1 Mbps, and we have some parts of the parish that are down at 0.1 Mbps, so tiny. If you like, it is a hosepipe with a rock in it blocking it up. Those sort of anomalies, even within a tiny parish—I have a map of the parish, which is that one; the green areas are the ones that get reasonably good broadband up to about 5 Mbps, the light green is about 4 Mbps to 5 Mbps, the orange is about 2 Mbps to 4 Mbps, and then the red areas are less than 2 Mbps.

You will see that even within a parish like ours, which is about 5 kilometres across and about 11 kilometres long, we have our own final third and the interesting thing is that as you take this whole jigsaw puzzle down it becomes like one of those Mandelbrot things—the smaller you get it looks the same. You could draw London in the middle there and have the

same sort of problems. Even in rural Kent we find that within a small area like that we face many of the national problems, which again has been very interesting in terms of our case.

I am an optimist. I think that the targets that have been set have been set for convenience to be more achievable than the targets that perhaps would put us on a better path to something that is longer term. I think the whole question mark around capacity really depends on your time horizon and how ambitious you want to be. The Government set, with Jeremy Hunt's speech, the 2015 time horizon, which was convenient for this election period. If we look beyond that to 2015 to 2020 then I think the game changes dramatically. That is the work that I am doing currently with a number of industry bodies, including INCA, supporting the broadband stakeholder group, and the CMA, the Communication Managers Association, which is a group of businesses who use telecoms. I think there is a real concern that between 2015 and 2020 we are going to miss the longer-term targets set by Europe. It is interesting that Europe has set targets of 30 Mbps, not 24 Mbps, which deliberately does not include the ADSL2+ technology, and they are setting targets of 100 Mbps not 80 Mbps, because BT knows it can get to 80 Mbps through clever convolution of the copper network. The European targets are a stretch target that require us to think differently.

**Q77 The Chairman:** But you said, and I will ask you about this as the second half of my question, that you think that when people get a certain amount of access to bandwidth then suddenly their attitudes change. How is that change going to read across into what we are talking about? There is no point in having huge quantities of bandwidth if people do not want it? How do you think the demand for bandwidth is going to change from now?

**Mr Mitchell:** If we could jump to slide 7, I will skip through a few things. There is a brilliant bit of work written by a guy called Everett M Rogers in 1962, which is still highly relevant and it is worth looking on Wikipedia at some of his work. He had this book *Diffusion of*

*Innovations*; it got to its fifth edition. The next slide is a wiring diagram, which I am not even going to explain but what runs across it is, “Decision process in which an innovation is communicated through channels over time moving among members of a social system”. So it is a fairly big, broad thing. If we go to the next slide—I have nicked this, so I have probably broken all the copyright laws going—this is his curve of product adoption. I think what we have at the moment is that we are in this chasm on the left-hand edge. We have innovators and early adopters taking up some of the faster broadband products that BT and Virgin Media are currently adopting, and there is this question mark as to how we are going to use this going forward. If you look in the theory of Rogers, what he says is to get over the chasm we have to create a network effect among people who are using stuff more innovatively.

Let me give you an example. Within the last two weeks I have suddenly discovered that I can download movies to my computer here. In fact I could do it a number of different ways but I use a particular way. It takes me an hour to do it. So I talk to my wife, and I say, “There’s nothing on television tonight”—which is normal—“we’ll watch a movie”. I go in and I order it up before supper and an hour later it comes down and we watch it. This is our new way of working. I was informed by my ISP I have finally triggered my 50% of usage. I have something like or 30 Gb per month, an enormous amount of bandwidth that I never thought I would use.

So the answer is, I think, as people start to use this stuff, and not just for pleasure but for business as well, for instance a video broadcast or something—I do quite a lot of broadcast material getting transcribed, which I send to the States. It normally takes me about an hour to send it over to get it transcribed. Applications and things like that are starting to break over. Once the early majority start to see how people are using it then I think we will get up that next curve.

The next bit is also very useful, the late majority. This was drawn to my attention by a friend of mine, Adrian Wooster, who has done some work in this area, and he says that in the late majority the key there is not so much about individuals referring—in that case, I am using this great application to ship this movie so I can change it and I do not have to go to the video shop—but it is much more about being in a club or being attracted because there are common ways of using it. This is where local authorities, and indeed the Government itself, can play a crucial role in bringing people online. I did a bit of research last night and I was very pleasantly surprised to see I could download a list of all of your CVs and do a bit more research about who was going to be seeing me today. I could not have done that 10 years ago. The ability to interact with Government, understand who is important and get some of these micro-agendas on the table is going to become a very good way, I think, to get into that late majority.

The laggards become also very interesting because, as you will see there, they are the final third of the final third—I call it the final ninth—of people who really do not want to use the technology. Again, in that space you have to make it incredibly easy for them to use it and show that there are benefits to them. Things like—I do not want to be too brand-specific—Apple iPads with Skype mean that now my mother is seriously considering moving online whereas before she got increasingly frustrated with email and all that sort of stuff.

I think the adoption curve is a key tool that we need to use when being clear about which part of the debate we are trying to focus on and so much of this debate has gone off into blah-blah land where everyone is throwing platitudes about. We need to be very clear about what the objectives are and how we are going to hit each of those groups as a marketer might.

**Q78 Baroness Deech:** Just a quick question on your downloading of the film. Is it legal? Is it free?

**Mr Mitchell:** It is totally legal. I pay £3.49 for some of them, and I pay 99p for others. The platform is iTunes, and it is great.

**Q79 Baroness Deech:** Is the cinema industry content?

**Mr Mitchell:** Absolutely, because I still go to the Odeon for the latest releases. I am watching things I did not manage to see about two, two-and-a-half years ago. I just watched *Anonymous*, the great “was it written by Shakespeare” thing. It is a tremendous film but I missed it at the cinema. So it is complementary and I think there is far too much focus in Government on all this piracy and stuff. We need to get the thing sorted in terms of the mechanics and then put the right traps in place to stop the worst offenders, but there is far too much focus on that at the moment as far as I am concerned.

**Q80 Lord Gordon of Strathblane:** I wonder if you would agree that one of the drivers towards people wanting higher bandwidth would be the arrival very shortly of things like YouView?

**Mr Mitchell:** Definitely. I think to complement the film I have started to use iPlayer a lot and I can now watch Lord Bragg’s excellent thing on the class structure of the country when I want to, where I want to, without having to worry about watching it on the day and the time that it is broadcast. We are shifting very rapidly now away from the broadcast world to this on-demand world and that is a key driver we have to recognise and get behind.

**Q81 Lord Gordon of Strathblane:** Arguably that could be satisfied with 2 Mbps, could it not?

**Mr Mitchell:** Indeed, and this is the interesting thing. I must admit that the ability for the technology to adapt and deliver within the design constraints that we have at the moment in terms of the 2 Mbps copper network is quite extraordinary. But having said that, it still takes me an hour to download a movie; I would prefer it in five minutes, and so the more bandwidth the better, really.

**Q82 Lord Gordon of Strathblane:** Government is to some extent the language of priorities. Assuming the two are in conflict, would you go for universal availability of 2 Mbps or half the country with superfast?

**Mr Mitchell:** Can we go back to the second or third slide. I think this whole debate about percentages is all blah-blah. This is a map of Kent. You cannot see it that well. The blue flag in the middle is where I live and these are all the exchanges that BT has agreed it is going to upgrade. You will notice there green is Tunbridge Wells—there are two of those where they definitely have plans—orange is a place called Paddock Wood where they are going to come soon, and the majority—I hasten to say over 80%—of the exchanges in my local area have no plans at all. So the real issue here is that the percentage blah-blah rhetoric that has gone on between BT and Government is a house of mirrors and if you get down to a local level—

**Q83 The Chairman:** Do you mean that will not go above 2 Mbps?

**Mr Mitchell:** No. Each of those exchanges is served by a number of cabinets, and this is where we get quite complicated. Say each of those exchanges has four cabinets hanging off it, one of my villages, Kilndown, which is down at the 100 Kbps level, is left off the radar screen of all this 2 Mbps rhetoric. Going back to the earlier question around capacity, we have these headline speeds of “up to”, but the biggest capacity constraints we face are the

number of planning engineers in BT Openreach and the number of engineers we can get out on the ground to hit the 2015 target. Kent was smart enough to get its BDUK submission in so it is going to be eighth or ninth on the list. Heaven knows what North and South Tyneside will get to.

I think with this whole banner headline that BT is going on around percentages, we need to get down to cabinet level understanding of what is going on in order to ensure that this plan is going to be met. At the moment it is all fuzzy.

**Q84 Lord Gordon of Strathblane:** If I can pursue that final point, it seems to me that this is getting down to the nitty-gritty. At the moment, how many new installations do you think BT could cope with in a year in terms of converting exchanges?

**Mr Mitchell:** They are not converting exchanges; they are converting cabinets. There are 5,800 exchanges. There is about, I do not know, 50,000 cabinets. I have not done the maths, but I know people in BT who I have spoken to very recently are concerned about this capacity problem within BT to deliver. We are not talking so much about Virgin Media. Again, a lot of these people do not work for BT; they are contractors.

In Kent ourselves, where that orange thing is, we have one very smart ISP who is working alongside BT to try to help them. He was training people in the middle of the snow to get up telegraph poles. A lot of the training that needs to happen needs to happen very fast and one of the obvious things to do is to train up ex-military people, which is what BT is starting to do, who have many of the right disciplines and skills to get on with this, as they come back from the war. But this is the capacity problem that I see—

**Q85 The Chairman:** Just so I am clear, are you saying there are not enough people who know what to do out on the ground to do it?

**Mr Mitchell:** Correct—to hit this plan, yes.

**Q86 Lord Macdonald of Tradeston:** Given that problem that you describe, would it not be better perhaps to just go for basic broadband and make the priority stimulating demand and encouraging non-users on to the internet rather than rushing rollout for superfast broadband?

**Mr Mitchell:** Yes. Can we go to the next slide? I think in terms of my plan for the parish, the green areas for 8 Mbps, we are looking to get that to about 30 Mbps this year and we reckon that by getting community engagement into the plan we will—in fact some work has been done on this. Adrian Wooster was very helpful last week with a pre-briefing. You can get four times the penetration by engaging the community versus the current model that is TalkTalk, BT, Sky, Three broadband, all that sort of rubbish stuff that they bundle with other services.

If the Government is serious about broadband being a strategic infrastructure, a critical utility, we need to find ways to get that multiple effect by engaging communities. This is something that has been completely ignored by BT, by Virgin Media and by all the mobile companies, apart from perhaps O2, who sort of get it.

**Q87 Lord Macdonald of Tradeston:** So focus on the mass rather than going for the small number of superfast users?

**Mr Mitchell:** Indeed. If you look at the red and orange areas, we are probably not going to be doing that with too many existing copper lines so there is a role for radio, there is a role for a hybrid network. There is another anomaly. You will notice the big green patch in the middle there. This is probably of no surprise to you, but that has four information super highways running past it. Goudhurst is on the main link between London and Folkestone and

we have these large pipes going through and around the edge of the village that are strategic assets for the large global ISPs like Level 3, Global Crossing, Cable & Wireless and a long list of them.

One of the real opportunities we have to break the back of this is to recognise that the old world thought in two dimensions. There were lines into the exchange and then there was the access network that was the exchange outward. The internet works in three networks. There is the internet, there is what is called the middle mile and then the access networks. The middle mile is responsible for backhaul. I do not know if this is a term you have become used to in studying this. Backhaul networks become absolutely critical. So, although we have several motorways running through the village, we have no on and off ramps to get down to the village. Within Kent itself we do not have just one of these; we have many of them. Within Kent itself one of the great opportunities we have is to create some on and off ramps into those information super highways.

**Q88 The Chairman:** Is that easily done?

**Mr Mitchell:** It is. Not quite as easily as I think Peter Cochrane said last week about a screwdriver. I have had it costed. It is going to cost £100,000 to get into one of those networks, at a maximum. But if Government is going to put effective money into this problem, one of the greatest things it could do is to define these breakout points, get behind them and then make them open access. Open access is another muddled debate not helped by Europe. The openness must come in the middle mile. The access network itself should be competitive and people should be allowed to lay their own networks and possibly to begin with not opening them up.

**Q89 The Chairman:** Could you say a bit more about the middle mile? I understand about the open access point, I think, but what bit of the equation is the middle mile?

**Mr Mitchell:** Could we go a few slides further on? I think in pictures—you will have to forgive me. I do not know how you are going to transcribe it. Here we have a complicated picture that I am going to explain to you. On the right-hand side we have the users in the white boxes. There is a mobile phone at the top, there is a home in the middle and there is a business at the bottom. You then have, working back from the right-hand side, an orange mast-looking-like affair, which is a mobile mast, and a BT cabinet. You have to just imagine there are lines and connections and radio waves going between the lot of them. Then you have your BT exchange, and then you have your internet. The middle mile is effectively a line that connects, much like that red box down the bottom, from the internet through to the BT cabinets or to the mast and it provides internet connectivity between the main internet and the breakout point for that final access network.

That is a key design point that has been ignored by Ofcom, by the current franchise model put forward by BDUK and by most of the local authorities who have put bids into BDUK. That is quite convenient for BT because BT subsidises all its fibre into the back of its cabinets by calling it core network and therefore not being regulated. No other provider can provide that kind of subsidy into cabinets, which is basically why the Rutland business model failed. I do not know if you are conscious of what happened in Rutland, but they tried fibre to the cabinet and it just did not stack up economically because they could not lay fibre into that cabinet and make money on it. The regulator has been—I do not know; I will shut up.

**Q90 Lord Clement-Jones:** You talked about critical utility, but you were talking about the rather lower level of megabytes per second at that point, I think, 2 Mbps or whatever. But in a way, just by talking about open access you have opened up a much different

possibility and you could go further perhaps. You have listened to what Peter Cochrane had to say. He thinks we are being grossly unambitious—

**Mr Mitchell:** He does.

**Lord Clement-Jones:** —in terms of the speed and the capacity. 24 Mbps is not enough, frankly; we should be far more ambitious, given that a change of strategy, as you have described and he described, the open access strategy, could deliver a very different world.

**Mr Mitchell:** It could, but I think we have to be practical here. We are on a course. The current Government is halfway through a term; it needs to implement something. I have spoken to a number of people in the industry who, on balance, think that the cost-effectiveness of the current plan is okay. There are people who believe that a natural monopoly in the final third is probably the answer anyway and that BT is probably the answer to that.

**Q91 The Chairman:** The final third is the middle mile?

**Mr Mitchell:** The final third is the term used to describe effectively where I am in rural Kent where you are not in the first half, which is competitive, because it has Virgin Media and other operators—you are not in a city. You are quite a long way either from a cabinet or your exchange has not been upgraded to ADSL2+. It is a fuzzy term but of the country as a whole, it is the last third who have the lower access speeds and the lower availability to the internet.

**Q92 The Chairman:** If you start with the final consumer, how far back in towards the core of the internet does the final third arrive, through the cabinet or by BT exchanges?

**Mr Mitchell:** Yes. Where I am the BT exchange is on ADSL technology. It is not even on ADSL2+ so the limits there are 8 Mbps, but you will notice from the grey blobs on the map

most of my part of Kent is. So this is where the percentages become meaningless and they are as bad as the whole debate around “up to”.

**Q93 Lord Clement-Jones:** Is this not where the strategy, you are saying, is to keep on course because then you will be able to solve that particular final third?

**Mr Mitchell:** I have clients in Northern Ireland. BT has made a massive difference in Northern Ireland. Northern Ireland has one of the best connected rural setups going. It is attracting inward investment; technology companies are moving there because of it. I am a great supporter of what BT has done within the constraints that it has, but I think we need to be more ambitious in the longer term. This is the kind of balance we have to make. So rather than criticise what is up to 2015, the group that we have got together, including INCA and others, have said, “Look, there is no point in criticising what is there, which is going ahead. We might be able to tweak it a bit, but let’s look at the 2015 to 2020 time horizon”. I think that is where we need some new thinking, new designs, new way of franchising the model, and the franchise model to me is key. The next slide up is the whole way that we franchise or license out this next wave of development, and I think we need to put some serious thinking behind that.

**Q94 Lord Clement-Jones:** That is the point when you are talking about much higher speeds. You are talking about maybe a universal service obligation for higher speeds and so on.

**Mr Mitchell:** Yes. On a geographic level probably Scotland and Northern Ireland and Cornwall and Wales are good blocks for playing with. I think there is a challenge at the moment with the whole BDUK process. There are so few bidders, which is another problem, but that aside, the English counties are probably too small. I think in terms of

getting rid of the RDAs, the current Government has thrown the baby out with the bathwater. Maybe nine is too few, but certainly England needs to be thought about in terms of sensible blocks. Just as with water you would look for the natural water courses and valleys and things, telecommunications has a similar topography that needs to be designed into the overall franchise model. We need to include mobile and fixed with this funny thing we have in the UK where fixed and mobile are kept separate. It brings you to the point where—certainly Michael Foreman and I have spent many hours debating this—the idea of creating some sort of local internet exchange, a local place where the backhaul is delivered to that is not necessarily the telephone exchange, becomes very interesting. On the right-hand side of this model the next slide should show that there are these new types of telephone exchanges that are emerging. They are internet exchanges, for want of a better word.

At the moment we only have five internet exchanges in the UK. There is London, which is a mega one; there is Amsterdam, which does not really count but is the biggest in Europe; there is Manchester; there is Leeds; and there is Edinburgh; and then Dublin also has one. We need many more of these in order to get to the next wave of internet development. If we took, as a nation, a clear and decisive objective as part of our overall programme to create 100 internet exchanges across the country, we would be spending our money much better, I believe, than this current ultrafast cities thing that we have, which is rather awkward and sitting on the edge of the BDUK programme as something that is almost unimplementable.

**Q95 Bishop of Norwich:** Can you explain exactly what an internet exchange is? I am not sure I understand.

**Lord Clement-Jones:** And the difference with the cities thing you have just talked about.

**Mr Mitchell:** Sure. I hope I am not being too outrageous here, but I think it is important that people speak their mind on this. So, going back to the internet exchange, a good example is how the internet has developed internationally so far. Back in 1999 I was fortunate enough to help create Level 3, which is a big global ISP system across Europe. They have, effectively, data centres or collocation space that they allow their customers to come in and put computers in to serve up data for the internet. Effectively that is what we are talking about.

As time has gone on those internet exchanges have differentiated themselves by doing particular things. There is a good example in terms of a company called Equinix who have a big data centre or two outside Slough and they were very early in identifying the opportunity in the UK to create not just an internet exchange but financial exchanges that relied on the internet and they specialised in financial exchanges. They then moved on and they have some that are media friendly so they are very used to handling large amounts of content.

The opportunity for the UK is to allow new internet businesses to be created around these internet exchanges, and it is a bit like an incubator. In Germany, they are top down, so they force you, "If you want to be in the content-moving business, you have to move to Hamburg". I am not suggesting that. This thing could grow organically as we go. Last week I was in Manchester. We are looking at a bilateral arrangement between Northern Ireland and Manchester and ways we can trade services in the digital media industry. This is all without Government intervention at the moment. We would like some going forward to fund the initiative, but at least initially industry is waking up to the fact that we can differentiate on a regional basis by getting cities talking to one another. I think, again, it is a much smarter way of developing this whole city strategy than just giving each city £10 million and telling them to get on with it to give to BT to put out more cabinets. It is not the point.

**Q96 Baroness Deech:** Just a quick question. Some of us around the table are dinosaurs, but is enough being done at school and university to educate people? You have already mentioned there are not enough engineers. It is not enough to know what is going on now; they need to be able to see ahead. Are we providing that education?

**Mr Mitchell:** I am not an academic. I think there are people better qualified than me. I gather we are not training enough engineers. I have an engineering background, but I have learnt more than I ever learnt out of university. I did aeronautical engineering and things at university that were terribly interesting at the time, very mathematical, and I have forgotten it all now. There is a practical side to this at the deployment level of getting people who do not need to be that highly qualified. Getting up a telegraph pole and stringing wire together, I did that way back. You need an apprenticeship scheme, for want of a better word, and then above that people who have the engineering skills.

**Q97 Baroness Deech:** Yes, but to have the vision to go forward, ought we to be recommending that there be more education in this field, or can you say people can leave university with a degree in engineering and they will learn it as they go along?

**Mr Mitchell:** For every person who leaves with a degree in engineering we need 10 behind them helping to deploy these networks and then we might get there. We have a great opportunity to get a lot of people back to work doing this stuff. It is practical. It is the sort of thing young men particularly enjoy doing; it is challenging, as you are out in all weathers, as I was describing, and you are training in the snow. The way that, unfortunately, the industry has restructured itself with outsourcing everything has made this whole thing become slightly more difficult but it is certainly there.

I think a national broadband—and I do not really like the word “broadband” either because it has so many connotations—or national infrastructure access plan, much like they do in

China, is not perhaps such a bad thing, where we calculate the number of engineers we need and we calculate the number of people we need to get on the back of diggers and lorries. We had another project in Kent last week that has this amazing bit of kit that will dig a trench and slot cutters—as Peter Cochrane was saying yesterday, men with toys and all that stuff. Forgive me, this is a male thing here, but there is an enormous amount of potential there to get behind a plan that could be tremendously powerful in bringing the economy back to its knees.

**Q98 Earl of Selborne:** You are touching on how you engage at the level of community. You referred earlier to the need to engage the local community, and in your green patch in your map of Goudhurst you suggested you could quadruple the broadband investment by engaging the community. I was not entirely clear how the community was going to be engaged in order to achieve this. Is this the answer, that you are going to bring in tackle like this?

**Mr Mitchell:** Can we go back a few slides? There are three layers that you can engage the community on. The base layer is the digging and the physical work, and this is the passive infrastructure. At the moment you have probably heard of this PIA—passive infrastructure access—product that BT offers, or you may not have, but that is a critical layer in terms of BT opening up its network. At the moment that is only offered out in the final bit, the access network. So the opportunity for new service providers to emerge, engaging the community to provide internet access into communities—so it is, if you like, fibre to the community as opposed to fibre to the home—is a great opportunity, and that is very physical. At the next layer up you have the more technical world of advanced electronics where you are putting electronics on either end of the network and making sure that the two bits talk and that they are tested properly. Then at the final level you are talking about the conventional

service provision layer, which is about making new products, pricing them, attaching customers to the network and billing them.

So there are three distinct layers that communities can take in this. Some of the models in some of the trials that have been done so far in the UK have muddled a lot of those up and as a result their commercial models have failed somewhat. In order to do this properly, I think you would have to think through and design a proper scheme but allow people to plug into it.

**Q99 Earl of Selborne:** If I could just take you back to your Goudhurst rural model, here you have a community and I am sure you have some rural businesses who need wide-spectrum broadband because they want to do video-conferencing and all sorts of things. What they need surely is fibre optic cables straight to their business. Is that right, or am I missing something?

**Mr Mitchell:** They need internet access. I struggle with this fixation on fibre in the final third because it is so bloody expensive. There are ways to deliver high speed internet access into rural communities not using fibre that are perfectly feasible. Point-to-point radio is a perfectly feasible solution. There is a big supply-side push by the fibre part of the industry to sell as much fibre to anyone who wants to buy it as possible. But I believe that over 90% of the fibre in this country is unlit. So one of the things we could do—Peter Cochrane's calculation is that every community is within 1 kilometre of fibre; certainly we are within 1 kilometre of fibre—is create these on ramps. Currently the UK is one of the very few countries that taxes you to light up fibre. In the Netherlands they do not do that; they tax you for having dark fibre that is not lit to encourage you to light it. I think that many of our incentives around how we incentivise service providers to get in at that blue bottom layer

and get this passive infrastructure active and working for communities is another missed opportunity.

**Q100 Lord Gordon of Strathblane:** You said that fibre is so much more expensive, but I understood that 80% of the cost was really the civils, the laying the thing.

**Mr Mitchell:** It is, yes.

**Lord Gordon of Strathblane:** Surely fibre is not that much more expensive therefore than copper.

**Mr Mitchell:** No, but the copper is in the ground already. Where you are looking to upgrade a rural community, a perfectly valid plan is to put a radio link in for the first year or two. For instance, if we go back to my Goudhurst map at the beginning, you will see right at the top there is a school hat with a black box at the top. That is Bethany School. They are the largest internet user in our community. They have 450 users online during school hours. There are 400 students and 50 academics. They have spent a large amount of money putting their own fibre optic network into the school, and they have a 7 Mbps backhaul link to the main village of Goudhurst, which is a radio backhaul link. They are a prime candidate to put fibre in.

If you allow fibre to follow the demand over time—and this is where BT's on-demand product is not such a bad idea; it is just not costed very easily to encourage deployment—then you will start to reinforce the high users initially and then back that up eventually.

Further down—the two other hats—that school asked to put a large fibre link in recently and it was going to cost £250,000 just to dig the fibre in. That was with BT and the exchange is only about 2 or 3 kilometres away. So the way that the industry charges communities to get this stuff in is abhorrent. BT will subsidise some of that if you get your digger out and you get your JCB out. In the community there, a farmer wanted to have in his fields very

complicated spraying equipment that was going to knock into telegraph poles and he got BT to agree that he would dig the trench, he would lay the duct and they would take out four telegraph poles. He did all that for free for BT and now BT goes underground not overground. In a local sense BT has the mechanics to work with communities to get this stuff in but they are just not very clear about how they are going to do it in scale. I think they need to be encouraged to work with the communities.

The other big issue and the big blockage is what is called the build and benefit model. The idea is the community builds it, digs the holes, gets everything there, and then BT benefits because the whole thing goes on to BT's balance sheet. There is no way currently that BT will accept joint assets within a community over a long period of time. If only we could get BT and other investment vehicles in to accept, much as we did in the early part of the cable industry, that innovation at the early stages requires joint investment not monopolistic investment, we would get a lot more of this fibre rolled out much more quickly. We have to come up with a mechanism to do that.

**Q101 Lord Skelmersdale:** Surely all houses and businesses are already connected. They are connected usually by poles, either because of electricity or because of telephone. What is stopping those poles being used for any other purpose?

**Mr Mitchell:** BT's passive infrastructure access product as it relates to poles and ducts only allows you to create an access network. The obvious thing to use the poles and the ducts is to distribute the internet closer to communities. I live in a hamlet where if we could get a large mast we could probably provide a wireless scheme and get a big kicker. So the answer is nothing is stopping people building access networks. The price point is pretty prohibitive and the uptake on the PIA product has not been that great. One of the local companies in Kent has been trialling it and they think it is pretty good. But there are costs associated with

using existing poles and there are health and safety issues. Where I am, a lot of the telephone lines go down power cables so you do not want to put any old Tom, Dick or Harry up there.

**Q102 Lord Skelmersdale:** That is more than digging trenches, is it?

**Mr Mitchell:** No, it is still cheaper than digging a trench.

**Lord Skelmersdale:** Yes, it must be.

**Mr Mitchell:** Yes, still cheaper.

**Q103 Lord Skelmersdale:** But there is no open access, as I understand it?

**Mr Mitchell:** No. Well, BT has this thing called Openreach and you would assume that is open access. It is not open access. It is open at one end and closed at the other. So, within a community point of view, we are closed. At the other end it is open to the big ISPs but if you are a local network and you dig your own local network it is impossible to connect back to Openreach and offer up that asset, that piece of extended network, back to BT. They will not accept it. That is, again, part of the business model that would be very interesting to change. I am not sure how you would change it.

**Q104 Lord Skelmersdale:** Do you think it is a matter of regulation? Does Ofcom have a part to play in this or not?

**Mr Mitchell:** Yes, I think it would. That is to a level of detail that we have studied, but we have not gone down to the "how". However, we see that as the issue. But certainly by creating these new internet exchanges, which are open at both ends, it would force BT to join the party. So I think that you could create a new environment by looking to the future, creating these new internet exchanges and then just saying, "If you want to use your

network, come and join in". That has happened in the Netherlands and there are cases where that has actually happened quite well. They are trying to do this in Australia and other parts of the world that have these NBN—national broadband network—schemes that are very expensive and up until now are not proven. There is a whole spectrum of opportunities here in terms of how we could do this. I think that comes back to the design and I do not think there is any one right way. What I have found with Goudhurst is that even within a tiny parish of 11 kilometres by 5 kilometres, we are having to deploy about three or four different systems to get to the sorts of levels that we want. This is an engineering problem. Just as if you are going to build a bridge you do not build it just out of concrete—you use a bit of steel, you use a bit of tarmac and everything else—I think in building these networks this fixation around fibre has somehow missed the point in terms of how we deploy access networks.

**Q105 Bishop of Norwich:** Can I take you back to open access, which I thought I understood but it is getting more complicated as time goes on as far as I can see.

**Mr Mitchell:** It is.

**Bishop of Norwich:** Can I establish that you think wholesale open access to both dark and active fibre would create a comprehensive national network, or is that too simple a concept?

**Mr Mitchell:** I think it is at one level too simple. The way I would choose to do it is to say, "Let's forget our bipolar old world telephone exchange access network thing; let's move to the internet". Where this could be most effective is in opening up the middle mile. The openness that Europe puts down on networks is rarely due to Government money. There is quite an interesting case in Holland at the moment where Neelie Kroes, the European Minister for this whole area, is going up against the Dutch Government, who are trying to

force the cable networks within Holland to open themselves up. We have a similar situation here in the UK where Virgin Media is not open, and it has no intention of being open.

Why should you apply a whole set of rules to these local networks where you are really disadvantaging them in the early stages of their growth where they have, in our case, a network? Sure, it is going to be open if BT chose to come and connect to it, but we know they will not. It would be nice to encourage them, but effectively the competitive advantage of any scheme we put into our community is that we are buying time and we will hope to get a percentage of the community, perhaps 30% to 40%, on to this network, maybe more if we are using this one-to-four ratio of community engagement, in a way that we can provide—I hate to use the words “local monopoly” because it is not a monopoly; there are other choices within the community—a local advantage, as opposed to a local monopoly.

The key to me, and I have thought this through quite hard, around the open problem is the openness of the middle mile, which is the connection back to the internet. If that can be designed in a way to give each community a chance to get to one of these community hubs, fibre to the community, and that itself is open, can be provided by anybody, we would then make a massive leap forward in terms of the way that we deploy the—

**Q106 Bishop of Norwich:** Can that be done by regulation or incentive?

**Mr Mitchell:** I think it can. A bit of local town planning, local authority planning.

**Q107 Bishop of Norwich:** Why are we so blind to that?

**Mr Mitchell:** We are blind because we have nationalised this industry, or renationalised this industry—and I do not use it in the Thatcher sense of nationalisation and denationalisation. If you look at the actual organisational structure of BT and Virgin Media, they are incapable of taking on any local nuances in terms of their products. If you wanted to put a Virgin Media

mast on top of Norwich Cathedral, they would blow a gasket; they could not do it because they do not have a product that is masts for cathedrals. They are very tramlined.

**Bishop of Norwich:** The Diocese of Norwich does have a company called Why Spire.

**Mr Mitchell:** In fact we are looking at our church. I noticed that last week you were talking about this. Church towers are a fantastic asset. In fact, where we live we are on the hills in Kent. Herefordshire have taken some very large strides in terms of using church towers. When you take it down to a local community, this is where you get the community engagement and the church has a massive role to play in this, it really does, in terms of unlocking some of the potential here.

**Q108 Bishop of Norwich:** One of the interesting things when we heard evidence from Finland was, if I remember it correctly—I was not here but I read it—that the larger providers were no use when you got to places of considerable sparsity but they had significant local providers for whom a smaller profit margin was acceptable. Is that—

**Mr Mitchell:** Absolutely. Let me give you an example in Kent. The scheme that we have gone into that we won is a scheme run by Kent. They have, I believe, between seven and nine suppliers on their list, which they went out to procure last year. They have a range of services and we have had back—I cannot tell you the result because it is still under procurement—a range of very interesting bids, about five or six bids, coming back, a range of technologies, all very interesting in terms of how they would be funded. We only have £100,000 in the grant so they have had to mix and match technologies. Full fibre deployment for our tiny little parish was going to cost between £1.5 million and £2 million. We went back into the community to try to raise that kind of money. In fact, we have somebody who used to be one of the three founders of TalkTalk in the parish, and he has done his business

planning well because he said the return on investment for these fibre networks in rural areas just does not stack up so you have to deploy hybrid networks.

We have nine companies interested in the Kent scheme. I do not know how many BDUK has. I hear that it is possibly three or maybe less. So at the national level we have far fewer people being allowed to play than at the local level, and one of those providers in Kent comes from Spain because under European rules we had to open it up to anybody in Europe. So not only do you have the local providers but you also have this quite interesting mix of other national providers coming in, because the scale is not massive. They do not have to employ armies of engineers; they can come in, do a job and go away so the diversity becomes really interesting. We need to encourage diversity in this next phase of development and find ways to encourage local approaches, which we can do within the current franchise model if we are flexible enough.

**Q109 Baroness Fookes:** I am particularly interested in your Goudhurst experiment. I live not far away and I have spoken under our Peers in Schools scheme at Bethany School.

**Mr Mitchell:** Excellent.

**Baroness Fookes:** So I have a particular interest in it. We have been told that in the next Parliament there might be an extra tranche of public money available of perhaps £300 million, but we do not know for certain. Could you see how that might be used to advantage in some sort of collaborative effort for local projects such as you have been describing?

**Mr Mitchell:** I think so. Could we go to the almost final slide, because obviously it is time to start wrapping up? We have talked a bit about franchise models and the way that counties are now taking control of their own broadband plans. I think that is a good step. Some counties need a lot more help than others, and I think we have developed a kind of queuing system, which is going to have its own ramifications. We have talked about how this money

might be spent in some of the access networks but I think there are certain enablers that we also need to consider when we are planning this national investment of national taxpayers' money as opposed to local money that would be from the local community. If we can get that blend and that mix right of local schemes feeling empowered enough to create community funding models that are reasonably well understood and reasonably robust, and match that to some of the national moneys that are putting some of the enablers in—not just trying to put money into local schemes, which to me is a mismatch of objectives—I think we could get the right blend.

If we have, say, in the order of £300 million, how we design the interventions to make that money most effective is a debate well worth having. I would suggest these four points on here, in terms of the franchise model, the local exchanges, and these middle-mile breakout points. If we are going to design a motorway system for the UK, let us get the on and off ramps right so you can get access on to the motorway if you are a local thing, and let the local counties worry about the A and B roads and get them empowered to start sorting out some of the local planning issues that require fibre into the community. I do not know if that answers your question.

**Q110 Baroness Fookes:** Yes, it is certainly very helpful. Would you see some actual matched funding arrangement that if the community raised X amount, the Government would match it?

**Mr Mitchell:** One of our schemes has certainly looked to that sort of matched funding. I think one of the troubles of matched funding at the national level is that BT and Fujitsu are the only two players that have shown any interest in matched funding because the figures are so big.

**Q111 Baroness Fookes:** I was thinking of this local level you are talking about.

**Mr Mitchell:** I think at the local level definitely. We have pilots. I do not know if you are conscious of the BARN local initiative up in Cumbria, which certainly Lord Inglewood is close to, where I gather they are raising thousands of pounds a week for a local scheme. It requires a degree of local intelligence and a local knowledge to drive it through. We have another one in Crockenhill, locally in Kent, that is out there now looking at providing local businesses. One of the other insights that is useful is that when we did the survey for Goudhurst we found that the old world industry splits business and residential—business and consumer—in terms of how it sees the market. We found that there was a massive untapped, misunderstood part of the market called home-working and 60% to 70% of the houses used their internet access neither for home alone nor for business alone. They used it for home working, and I am one of them. I left big corporate three-and-a-half years ago and I rely on it. I set my own company up 15 years ago, and I just could not do what I do now.

So the economic driver to get this stuff right locally gives people an incentive to want to invest in the local networks and, yes, there is an opportunity to match fund and there are a number of ways with tax schemes for rich people. Forgive me, I do not have enough money to know what they look like, but I am told there are those sorts of schemes out there that are very attractive if you are a long-term community investor wanting to invest. After all, if you look at the original telephone exchanges, why we have so many is that the local lord of the manor said, “Well, I am not going to have that parish over there with a telephone exchange; we want one”, and so there was a race. I think we need to create a race to fast broadband, and that is effectively what we did in Goudhurst. We were triggered by this race to infinity. We will never get to infinity, but it is good to get on the road and start training together.

**Q112 Lord Bragg:** What do you think we can learn more broadly from the broadband infrastructures being implemented across the rest of the world, apart from abolishing BT?

**Mr Mitchell:** No, I do not think we should abolish BT. I think BT is a great asset. I think BT needs to be put inside the camp, not treated outside of it. I will be contentious here. I do not think you need to go anywhere. I think there are enough cases within the UK at the moment at the local level, like Goudhurst, like B4RN, like NYnet. There is this conference in Yorkshire today where there is a gathering of local community projects from all across the country. We run these—that is, the extended community that I am part of, including BT, by the way, who come—exploring the opportunities to make this stuff happen. I think that we have spent too long looking at our navels, worrying about whether the Singapore model or the Korean model or whatever is right or wrong. I think we need to create our plan, which we own, which drives the right types of behaviours within the industry, and it drives the right types of behaviours at national, regional and local level, to get this next wave right.

The current plan is a good first step there. I am not going to criticise it; that is not my role. The real opportunity is to shape 2015 to 2020 and if we get that bit right we will not only be best in Europe; we will be best in the world, and I am sure we can get there. I am an optimist.

**Q113 The Chairman:** That is a fine clarion call to end on. I have just been asked to put one question, which is where does your Goudhurst scheme get its backhaul from?

**Mr Mitchell:** We have not decided the supplier yet. It is likely that the chosen supplier will either get it from one of these big trunk lines going through the village and we will have to find some way of getting access to that £100,000 worth of unbundling, effectively, or we radio beam it in from another node in the wide area network to the church tower and from

thereon distribute it. It is a hybrid network. We have not decided the final solution yet. The answer is backhaul can be provided more cost effectively by point-to-point radio at the moment than by fibre because of the way fibre is locked into these motorways. I do not know if that answers the question.

**The Chairman:** I think it does, yes. What you are saying is that if you are near the “motorway” and you can get an access point easily that is probably the best option but if you cannot then it is node to node with radio.

**Mr Mitchell:** Yes, and I think that that is a perfectly acceptable short to mid-term solution.

**Q114 Earl of Selborne:** In the long term, does the radio present a constraint because of the width?

**Mr Mitchell:** Yes, and the weather and various bits and pieces. In the long term if you look at how these solutions deploy—like my Bethany School example, where you have a point-to-point radio link with 450 users, they want a lot of bandwidth, they could easily carry 100 Mbps—then you will start laying fibre. There used to be a big computer in BT sitting in Ipswich that would define which fibre line would be laid next on an economic model. This stuff is not difficult to do. We just need to get it more open and understand that the middle mile backhaul network is the thing that we need to invest in. We need to create these new internet points of presence, these new internet exchanges that are not telephone exchanges, and we need to take that control away from BT but still let BT play at the party, and then we can set ourselves apart. We will design a new network that looks very different from the old network that was created back in the 1930s. There were 5,000-odd exchanges in the 1930s, and there are 5,000-odd telephone exchanges now. We have not upgraded the infrastructure for 80 years. We need to be thinking about the next 80 years and the deployment and the topography and the design to get it right for the new internet age.

**The Chairman:** Thank you very much indeed. You have been extremely kind. We have taken a bit longer than we had allocated but I hope that was all right on your count.

**Mr Mitchell:** It was fine by me. I could carry on all day, as you can see. Thank you very much for your time.

### **Examination of Witness**

**Mr Francesco Caio**, Chief Executive Officer, Avio Group.

**Q115 The Chairman:** I gather that we are likely to have some divisions so I have mentioned that to our witness, Francesco Caio, whom I would like to welcome here.

**Mr Caio:** Thank you very much.

**The Chairman:** Apologies for keeping you waiting a tiny bit. We are very much looking forward to what you have to say. We have had a brief CV from you so we know your background and the role that you played for the British Government in this in the past. What I would ask is when you begin to speak, for the sake of the record and the transmission, please identify who you are. If you would like to make any kind of introductory statement, we would be very pleased to hear it.

**Mr Caio:** Thank you very much, my Lord Chairman. I am very pleased to be here and I was glad to get your invitation. I am Francesco Caio, currently chief executive of Avio, which is in the aerospace industry. We are not going to be there today, but I have had direct involvement with the information technology and telecommunications industry throughout my career. I would mention my time at McKinsey in London where I assisted a number of clients in this industry and then as chief executive of Omnitel, which is now part of the Vodafone Group, and most recently as chief executive of Cable & Wireless in this country. As you mentioned, I was asked by the British Government in 2008 to lead an independent

review of issues in the development of next generation access broadband network. I did the same a year later with the Italian Government.

My brief remark at the beginning is that if I look back to some of the conclusions of the review in 2008, I would say that broadly the market has evolved and the country has evolved along the lines that were quite clear three years ago. Penetration has grown, the world has entered into what was defined in the report as a post-PC era where the number of devices has exploded and the internet has reached many objects that were outside its reach maybe five or six years ago, such as television, radio, cars and so on and so forth.

I think more importantly I would say that the kernel of the recommendation to the Government at that time was that the competitive structure of the UK industry was pointing to a likely increase in investment in network upgrade, particularly linked to the duopoly, if you wish, of the two physical infrastructures that are in place in this country, one being British Telecom, BT, and the other Virgin Media. Clearly, where the two networks coincide in terms of footprint it was likely to predict that the competition between the two would lead to an acceleration in investment. I think that has happened, broadly speaking, even though in ways and pace that differ from area to area. But I would say that the decision of Virgin Media back in 2008 to upgrade the access network through a software capability and deliver fast broadband has been the primary driver of what we have seen in the last four years. I would say that broadly speaking the picture that was emerging from that work has been confirmed by market trends. The issue now becomes what happens next and where the country should go.

**The Chairman:** I see from the television monitor we are about to go and vote so perhaps that is a good moment to stop. Thank you. We shall be back.

*[Meeting suspended for a Division in the House.]*

**The Chairman:** Again, for the sake of the record, apologies for keeping you waiting.

**Mr Caio:** Not at all. I understand fully.

**Q116 The Chairman:** Perhaps I might start by saying that, when you wrote your report in 2008 for BERR, you said that one of the key findings of this review is that it is a mistake to believe the UK must have an NGA infrastructure tomorrow or suffer as a result. Clearly it is a few years on since then but presumably the underlying point you were making is that you must not rush at this like a bull in a china shop and that you want to get going and cannot expect to have perfection immediately.

**Mr Caio:** Yes. As I was saying before, if you look at many statistics, no matter how you cut it the UK does not seem to have suffered by a lack of a national publicly funded NGA plan, which was the issue at stake, or one of the issues at stake, during the report. You may remember that one of the questions that drew the report was the concern that with BBC launching the iPlayer, the number of people demanding high bandwidth consumption applications—namely the iPlayer—might have brought the internet to its knees. It became apparent that that was unlikely to be the case not least because, as was mentioned in the previous discussion, one of the issues was the availability of a backhaul rather than specific access capabilities.

Again, if you look at how penetration of broadband has evolved and how the average bandwidth available to citizens and companies in this country has evolved, broadly speaking it is aligned with what we have seen in other parts of Europe and even perhaps, at least in the first part of the last three years, in the US. That is to say that there was no need for immediate massive public funding but, as was reported and some of you mentioned already, there was an indication that the availability of a high-quality, world-class network infrastructure is not for debate. It is something that the country will have to have and three

years down the road some of the trends that were at the base of that statement have been confirmed and accelerated. We were just talking a second ago about where this whole internet of things developed with microprocessors appearing everywhere in objects in our homes or offices, or factories for that matter, the amount of bandwidth required is going to continue to grow very much. If I look back at some of the areas that were covered by Virgin Media and BT three years ago, the speed has gone up, but the big questions that we were debating, even in the previous session, of how far you could push the upgrade of the network and what kind of network the country will need in the long term are now very much relevant.

**Q117 The Chairman:** Given that allowing our network to evolve is not a massive dirigiste approach from the Government, do you think that the direction of travel that we have gone is one that will enable us to get to a destination where we do have a general provision that would be fit for purpose in, say, eight or 15 years' time?

**Mr Caio:** It is difficult. I would say it is unlikely. I need to emphasise I have not been following the details of the industry over the last year or so in this country, even though I have kept in touch with some of the players that are running companies in this country in this sector. I think that the speed of the rollout for fibre-based backhaul is likely to slow down now that the two networks have completed the first round of upgrading their network and therefore, if you were to just leave it to competition at work, it is unlikely that the speed would continue to be the one we have seen in the last three years. That is the first point.

The second one is perhaps this is an opportunity that I would welcome to invite you all, if I may, to reconsider how you define the endpoint and the level of—how can I put it?—the conviction and the belief you have for what that endpoint is going to be. Marginal

developments are fine, but I think it might be appropriate in this forum to be clear about the discontinuity we are going through at this stage. I was only able to hear part of the previous witness statement but I could not avoid echoing what he was saying. We are at a stage where technology allows us to build networks that have very little to do with the networks we have been building. One of the strategies and the strategic decisions to be made at policymaking level is where you draw the line between protection of the incumbency versus speed of travel to the new world.

More specifically, one point that may be helpful to raise here is that for decades the development of the network as we know it has been funded under the fundamental presumption that the company or the institution laying the cable was also the company providing the service. For many years you have had a biunivocal relationship between physical network and physical devices and services to be delivered on that device. That has been true in telecommunications, it has been true in broadcasting, it has been true in radio broadcasting and it has been true in information technology. You have different networks wedded to different services. That relationship has been evaporating under the impact of the internet, and therefore it is now possible and it should be preferable to have just one physical network carrying all kinds of services as we know them.

In my view, that is one of the critical issues because if you look at BT and Virgin Media—and I want to be clear and not misunderstood, as I am not saying that the solution is to get rid of those companies—the logic with which they have developed their networks has been to build a network, to sell services and to capture market share. That is no longer a necessary model, and one of my concerns is that convenience could be described as necessity from a technology point. Therefore, policymakers and regulators need to be very clear, in my view, to understand where the endpoint is, to get back to your question, my Lord Chairman. The endpoint, in my view, ought to be a world where anybody and anything can be connected to

anybody and anything, without limitation of speed, without limitation of latency in response time and without limitation of symmetry.

Therefore, when you deal with these things it is important to recognise that people with a vested interest—and I would add a legitimate vested interest—have very differing views and it is difficult, perhaps naïve, to think that one country can go through transition without some degree of perhaps heated debate on who is doing what and why. I think it is important for me to have this framework in mind. We are going to a world where the economic role for the companies that have been in place so far has been questioned and is being put in question.

**The Chairman:** I can understand that point well.

**Q118 Lord Gordon of Strathblane:** Is there any merit in looking at the model of the actual infrastructure being provided as a public utility?

**Mr Caio:** Yes. I think I have the good fortune of not being a politician and not running a telecom company these days, and that somehow puts some kind of a free perspective. I think of broadband as electricity. I am not sure that it is the right and the only way in which you can think about it, but there is no doubt that the separation between physical infrastructure and the services you run on that puts that kind of infrastructure very similar to water and electricity.

**Q119 Lord Gordon of Strathblane:** The alternative of letting the market determine it will give us increased competition and increased speeds in the 50% of the country that Virgin and BT overlap but absolutely no progress whatsoever in the other parts of the country, or very little.

**Mr Caio:** Back to the discussion you were having before, I think there might be more ways that you can think in creating conditions whereby other forms of networks and other forms of investment into those networks can flourish beyond the high-density regions.

**Q120 Lord Gordon of Strathblane:** There was also a point made earlier on. You alluded to the BBC iPlayer and how everyone thought that was going to create huge demand. There is another development that is due in the next few weeks, YouView, and we understand the BBC are going to be playing 70 channels covering every event in the Olympics, virtually. One thinks that might create a huge demand and certainly there might be thought to be a sense of deprivation among some citizens who cannot watch because the physical capability of doing so is not there.

**Mr Caio:** There is no doubt. I think that the notion of divide or differentiation across access to this network is becoming, and will become, an increasingly visible issue.

**Q121 Lord Gordon of Strathblane:** Are we getting hung up on this idea of superfast? Should we be concentrating more on universal provision?

**Mr Caio:** Three years ago I emphasised here, and to a certain extent in Italy, the notion that again it is a policymaking decision. Do you want to go deeper with quality broadband, or would you rather have universal access to provision? I think it is a function of the policymaking objective. For instance, to have e-government applications and to have a real push for efficiency, for instance in public administration, I suspect is going to be very difficult if you cannot guarantee universal access to broadband. At the same time, the competitiveness of any given city is now increasingly linked to the quality of the broadband you can get. Maybe while three or four years ago you had choices, I think these choices are perhaps less today. I suspect you need to do both.

**Q122 The Chairman:** So you think the distinction between widening or deepening is irrelevant?

**Mr Caio:** I think so.

**The Chairman:** Lady Deech?

**Baroness Deech:** I rather think Lord Gordon asked my question and that our witness has answered it. Is not that the import of this one?

**The Chairman:** I think it possibly is, but I did not wish to deny you your moment of glory.

**Q123 Lord Macdonald of Tradeston:** Let me just put to you the statement of one of the witnesses we had. He said what we are looking for with 20 Mbps, “is not superfast. It is super-slow. The UK risk being frozen out of the next industrial revolution”. Can you make those kinds of economic judgements yet? I know that there are great claims for what your superfast broadband might do for GDP, but where is the evidence for that? Is it not possible that by putting all people on to basic broadband you would get just as much of a kick for economic growth as you would from superfast for perhaps a smaller elite?

**Mr Caio:** I have never come across any convincing studies that would articulate the case for one or the other. It is important to go back to what I was saying before, and it might sound strange coming from somebody in the business community. I think you need to apply a bit of vision here because everybody, rightly so, is influenced by, for instance, the advertising campaigns of the current players where speed or headline speed seems to be the name of the game. There are other characteristics in networks that are equally important: symmetry is very important; latency is very important; and, just to go beyond the use of iPlayer and high bandwidth, you might want to think of distributed applications—robotics, for instance, is leaving factories and is being distributed; home-working, which we heard about previously;

and elderly home care—which provide a new way of distributing activity that we know requires quality networks that respond very fast and are symmetrical. Such networks may also come with bandwidth but bandwidth is not the only game in town; the speed with which you could seamlessly move activities in a ubiquitous way is the source of competitive advantage of a country going forward.

On whether 20 Mbps is super-slow, I am not in a position to say that that is true or not true. I would, however, add that the 20 Mbps that we have been sold is a bit of a theory because 20 Mbps is perhaps available to people who live near a BT exchange, but it is not the case for most users.

**Q124 Earl of Selborne:** Let me just follow up on your point, which I think must be fairly correct, that you have to define the endpoint or what you are trying to achieve. You made it quite clear that bandwidth is not by any means the only consideration. Would you believe that the most successful communities or cities or other areas are going to be those that do indeed have the most flexible service as well as the fastest service? If so, what is it that we are trying to achieve for each community?

**Mr Caio:** I am absolutely convinced that broadband will be one of the key features of any community, to the point of driving attractiveness for demographics, property value and the willingness of companies, and indeed families, to move to one area or not. I think you have heard before there will be many alternative ways. This is also something that we have put in the report. There will be a variety of ways to provide bandwidth going forward, but it is very clear that communities without bandwidth and without broadband will be put at a very material disadvantage going forward.

**Q125 Earl of Selborne:** Whether we like it or not, we have two providers of the infrastructure at the moment—one for cities and one for everywhere else. This is not a model that seems to suggest to me that rural communities are going to be able to compete, or at least those rural businesses that need access to a large amount of data and need to be interconnected around the world. You have suggested there might be alternative models that do not require us to continue to try to get a share of the market for existing players. Could you give us a clearer view as to what this alternative model might look like to us?

**Mr Caio:** There are many. I will mention a couple, again echoing some of the things you heard before. If you think of the network today, you have the ownership of the network in the hands of the provider until the very end, until the user. BT or Virgin Media owns it all. One alternative way of thinking of ownership structure is if the network is what I would define as the home with a tail, that is the household owns the last bit of fibre. Instead of having competition among suppliers to serve those homes, the ones you have somehow captured because services and the networks are together, you might think of a reverse model where you have the household auctioning the ability to connect with the backhaul and to the network, and then I, as a household, choose the services I want because I do not need the network provider to be the service provider.

You can extend that model to the community. You could have a community raising funds and digging the place to the closest and nearest backhaul and then deciding what they want to do in terms of services. With the separation of network and services, once you have optical continuity between point A and point B, the internet will do the rest for you. You might have read recently that Sky will be available on the internet, which means that all the efforts from Virgin Media and BT of bundling channels with the network is proving increasingly sterile because once I get connectivity I kiss them goodbye and go and get the services where I get them from.

The notion of reversing the model and saying that I am the owner of my own destiny when it comes to the last mile of connectivity is possible with today's technology. It has to be enabled, though, because you want opening of that backhaul, and you want opening of that optical continuity that is today in the hands of selected suppliers, BT, Virgin Media and others.

**Q126 Earl of Selborne:** There is clearly a role for Parliament and a role for regulators. Could you say what is the change in legislation that you would require in order to open up this access?

**Mr Caio:** I wish I had the answer and perhaps was sitting on the other side of the table, but I think one point that I am very keen in making, if I may, is: do not underestimate the value of putting a vision out there that you strongly believe in. It might sound rhetorical and philosophical, but it is important for the society and community to know that there is a vision that the Government and the institutions care about. I am saying that because, in my view, there will be the need to create an environment that encourages, for instance, Ofcom and other institutions to act boldly now. I think they need to feel the comfort of the support from institutions like yours because the choices to be made are difficult and very complicated.

I am afraid I cannot answer your question in terms of the specifics, but I wholeheartedly believe that the view and the vision from a policymaking institution is very important at this juncture. It is very important because the vested interests—and, I will repeat, legitimate vested interests—will try to portray things that are possible and things that are not possible in a certain way. A high degree of scepticism about what is possible and what is not possible should be welcome from this House.

**Q127 The Chairman:** Can I go back to one of the responses you gave to Lord Selborne? What in fact you are suggesting to us is that the last-mile connection is as much a part of a house as, for example, the roof?

**Mr Caio:** Yes.

**Q128 Lord Bragg:** I asked this question of the previous speaker who gave a very comprehensive answer, so I will try to ask it in a different way. Do you see a best model anywhere and do you see this country anywhere near getting to it?

**Mr Caio:** When I was doing the report I bumped into a very high number of MPs who were talking at that time about the Korean model. I dared to define it as the Korean syndrome, because it seems to me that it is very easy to gain the support of your own constituency if you promise bandwidth and fibre everywhere, as they did in Korea. However, I think the reality is I suspect that different countries will be better off with different models and I am afraid I do not have the model I would point to. But pragmatically, if I look at variables such as the amount of economy or GDP that has moved to the new era, if I look at penetration of minimum broadband in households, if I look at the creative industry and how fast it has embraced the new world of IT, London is not a bad place. I am not sure about the rest of the country, even though some statistics say very clearly that the UK is farther ahead than many other countries in this type of application.

I would be careful before jumping to the conclusion that the UK has fallen behind and everybody is in a fantastic place. Things are happening, however. I do not think there is much room for complacency. The US have started the rollout of fibre with Verizon. There are other countries that have the benefit of leapfrogging the development stage of the incumbent because they are just late to the party and it is good for them, and clearly Korea is one of

them. It is difficult to say, “This is it: a pre-packaged model that we can parachute into this country and it will do wonders”.

**Q129 Lord Bragg:** In many ways you concur with what Lorne Mitchell said before. Can I ask you a supplementary? You and the previous speaker mentioned BT in various ways, and not always in a complimentary way. Do you think that the BT-Virgin models that they are pushing are now limiting the development of broadband in this country?

**Mr Caio:** I would say that is one model, and it has to be confronted, debated and considered in the context of a variety of different models. This is one of the key issues. It is the usual issue of policymaking and regulator: where do you draw the line between incumbency and new models? These are big companies where pension funds have invested and there are all kinds of things that you need to take into account. I would welcome at the European level—I am not just talking about the UK—a more robust debate between regulators and incumbents. I think it is the time to consider more creative solutions and perhaps more radical solutions than in the past.

**Q130 The Chairman:** That brings us on very neatly to the next question. The way you have talked about a house with a tail—you have talked about reversal of the model—brings us straight back to the question of access again, Francesco. It has been suggested to us that the key ingredient in the establishment of a comprehensive national network would be wholesale open access to both dark and active fibre. When you are talking about new models you are talking, in a sense, about overriding the incumbents. Is that the direction of travel that you want to see policy take?

**Mr Caio:** I think that is clearly a very important ingredient to make sure that the environment fosters innovation and creates conditions for new investors, perhaps even locally, to have a chance of building new networks.

**Q131 The Chairman:** Maybe this is a naïve question, but why do you think the incumbents are reluctant to allow that sort of access to their networks?

**Mr Caio:** If you think of incumbents, or even mobile operators, both in fixed and mobile, the way they came about, the reason for their birth and their development is they have been built as organisations whose task was to build networks and connect people—and, perhaps in the context of mobile, to open shops to sell subscriptions. Two things happened. One is there is very little network to be built in high density and there are more masts than we can cope with. The fundamental growth driver of new people on the network has come to a halt; it is different usage for people having the network. So, that is the first bit. It is kind of a separation, if you wish, of the first generation infrastructure. The second one, and this is the one we were talking about, is separation of services and network. They are not in the business they were in 10 or 15 years ago. I do not need Virgin Media or BT to make a telephone call. I need that infrastructure to connect to a place and that place is for me to choose, not for them to direct me to.

If you bring these two things together, a picture emerges where you could run the network or run, without getting too technical, a national fibre network with, I am afraid, a small to very small fraction of the people you employ now. I think here lies one of the issues: the issue of overcapacity and overpopulation of an industry with the mix of skills that is not relevant to the new world. I am not making it anybody's fault; I am describing a trend. People who have been trained to test electrical continuity for a switchboard that in the 1950s was occupying an entire building are now replaced by software agents who navigate the net to

tell me where my connectivity has gone, in a switchboard that is as big as a shoebox. We all have an issue here and it is that issue that also creates a tension that is reverberating in the attention of Ofcom. But I think it should be clear that this is one of the topics.

**Q132 Lord Clement-Jones:** People may want to come back on that skills point, but can I make one final point? One of the difficulties if we are talking about the access issue is regulating, probably, for that access to be given but also allowing enough flexibility so that there is a business incentive to roll out the trunk network, the fibre network, whatever we describe it as. Can you see those two things being compatible?

**Mr Caio:** It is more difficult, and I think you need to be thinking about alternative technologies to create some ability to create competition in access. From my perspective—again, I would say something that might sound a bit controversial—if you think of fixed local access it is a natural monopoly and I think if you talk in these terms to incumbents they say that is not true. I am not talking about the UK. I will come to the UK in a second. They say, “Oh, no, no, there is plenty of competition in DSL and different providers”. It is not true. Once you have a wire into a home there is barely the economic value to justify one; to justify two is impossible.

If you do not start going back to the basics of the economics underlying that, it is very difficult to have an open debate. This country, I say, has been blessed with the presence of two physical access networks. One is the traditional copper network of the monopolistic incumbent of voice services. The other is the result, unfortunately, of a series of bankruptcies associated with franchises for cable TV, but this is now turning out to be a bit of a blessing because competition at the access level is not something that you find in many other countries, yet it is in this country and it has driven the upgrade of the network.

In going forward it must be clear that if physical access to the network is thought of as a natural monopoly then there are a number of consequences. I am not saying that this is the model—back to your question—but it is one possible model. It is perfectly technically feasible to think of a monopolistic, partially public and partially privately owned utility—back to your point—heavily regulated on RPIs and whose purpose in life is to provide optical connectivity between point 1 and point 2.

I will probably need some bodyguards when I get out of this building and I have repeated for the record this is not to say that this is the only and therefore immediate model that the country ought to be going to, but it is important for regulators and policymakers to understand that what is really needed to unleash the power of the internet and the creativity around the internet is optical continuity A to B. The technology in the market will do the rest but the market will not do continuity between A and B because 85% is creating the civil engineering work for the duct. That is a monopoly.

**Q133 Lord Macdonald of Tradeston:** In terms of economic regulation, which model would you use? In a natural monopoly like water you still have that divided into many service companies, or if you take energy, again you have a lot in the National Grid but you have another couple of companies in there. Would it be a single UK model or would you break it up in a regional way?

**Mr Caio:** It is too difficult for me to answer. Put it this way: technologically, you could think of it both ways. You could have regions of networks. One of the things I put in here is if the Government were to decide to support and favour this utility local model with, for instance, public funds it is very important to define a blueprint so that you can guarantee connectivity at the civil engineering level, at the optical level and, if you want to push it forward, at the IP level. I would stick at the optical level.

**Q134 Baroness Fookes:** In your report to the Government in 2008 you indicated that you thought the market could deal with the next generation access without major intervention from Government but that one needed to keep a vigilant eye upon it. I do not know how vigilant your eye has been since then, but do you have any comments to make? In particular, could you clarify for me—I confess I did not read the whole report—when you said “major intervention”, was that to be of a regulatory kind or financial or both?

**Mr Caio:** First of all, you are absolutely right in asking about my eye being on the industry. I follow it but not as closely as I did when I did the report, so you may want to excuse me if I mention something that has happened and it has not, or vice versa.

My observation on your first part of the question is that, although subsequent to my report the Digital Britain project was launched, my sense is that the Government might have done more in terms of keeping the debate going, in terms of checking what was going on in the country when it comes to network rollout. I am aware that the Government has been very active in publicising some of the local initiatives—maybe the local authorities more than central government—but I would not mind knowing as a citizen that on a yearly basis there is one broadband day where companies who have promised certain rollout in year minus one come to the fore and articulate what they have done and why and what they have not done and why.

I must say, if I may, that my perception walking away from the review was that there tends to be—not just in the UK but in Europe—the notion that if the Government does not have any funds to spend, then there is not really anything for the Government to do. I think that is not the approach I would take. There are many things that the Government and public institutions can do with our money, and I will go back to the notion of vision and control.

On the second point of your question, on the kind of interventions that the Government might take, they may vary and they may be all of the types that you mentioned. Let me give you an example, referring to the Italian debate, if I may, for a second. Bear in mind that in Italy there is no cable television and therefore the country is not benefitting—only one area in Milan—from the competition between two physical access networks. One of the possible remedies was what is called network separation, which was at a certain point debated even marginally in this country, which is to say you find a way of having two real incumbents. You take Openreach, I think it is called here, and you turn it not just as a division but as a fully listed company, the monopolistic utility we were talking about. That would have represented a major intervention because the incumbent articulated a very strong view against that option and I think the articulation of that view against that option goes back to the cultural model they come from. They have been trying to develop new services but they know in the depth of their heart that the source of profit is coming from the access network.

So, you might have a financial intervention. You say, “Okay, for these 15 cities we auction availability of £500 million to the best private/public projects”. You have a regulatory intervention, you mandate BT to separate the network and you mandate Virgin Media to open the ducts. At the point of the report I thought that was not needed because of what I had been told, and I was observing from an economic standpoint in high density areas. On balance, history is pointing in that direction, but these are the kind of toolkits that potentially the Government and the regulator have in their hands.

**Q135 Bishop of Norwich:** You have mentioned the need for vision quite a bit, so we might begin our report with a Biblical quote, “Where there is no vision the people perish”.

**Mr Caio:** I will buy that.

**Bishop of Norwich:** I just thought I would get that in for the record. But vision needs application as well, of course. One of the things that intrigues me is in your 2008 report you said market supply and demand needed to be assessed in terms of progress, but it is where market supply and demand are related in relation to everything to do with the internet. A decade ago I did not know I could not live without an iPhone whereas now because it exists I cannot live without it. It seems to me that market supply in this area creates demand in a way that does not seem to apply elsewhere. Do you think that is true, or is it just the strange experience of a bishop who cannot live without gadgets?

**Mr Caio:** It is true that innovation is very rapid indeed and at the frontier of the possible moves forward any single—*[Interruption.]*

**The Chairman:** I am sorry. This is democracy—although very rarely is that what we are described as being—but the Bell will stop. If you could finish the question, we are just about at the end. It goes on and off but we will have a gap and then we will all sprint.

**Mr Caio:** The frontier of the possible is moving forward and I think it is very difficult to decide today what the applications will be and what the markets will be. I can only tell you that there are things happening. For instance, we have not been talking about manufacturing today. The requirement for connected manufacturing is about to explode and the issue of creating jobs in places where you would not have thought jobs for manufacturing could take place is an example of things that maybe we do not look at today as familiar and will be a daily activity going forward. I am referring, for instance, to 3D printing where you have plastics coming out of printing. Even if you think of the amount of data that will be produced by individuals with personalised medicine, or indeed the application of very simple, very low-cost robots for elderly care at home, again you do not need enormous bandwidth for these things, but you need an environment with digital connectivity. The Victorians did not really

know what electricity would do to the world, and it is impossible today to run a business without electricity. I think we are in absolutely the same camp.

**The Chairman:** This is a suitable moment to say thank you. I apologise for the interruptions. You have been very long-suffering about them. We have valued what you have had to tell us a very great deal.

**Mr Caio:** Thank you very much indeed.