Dr Mike Short

Interviewed by

Jonathan Sinfield

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At the

DEPARTMENT FOR INTERNATIONAL TRADE

Welcome to the Archives of Information Technology. It's Friday 17th August 2018, and we're in the Department of International Trade at 55 Whitehall, London. I'm Jonathan Sinfield, an interviewer for Archives of IT, and today I'll be talking to Dr Mike Short. Post 40 years' experience in electronics and telecommunications, holding senior executive positions with Cellnet, O2 and Telefónica, Mike joined the Department of International Trade as the Department's first Chief Scientific Adviser in December 2017. Mike is a former chairman of the Global GSM Association, the UK Mobile Data Association and president of the Institute of Engineering and Technology. Mike was awarded a CBE in 2012 Birthday Honours List for his services to the mobile industry. Mike is currently a visiting professor at the Universities of Surrey, Salford, Coventry, Leeds and Lancaster, where in recent years he has led the development on collaborations in areas such as smart cities, digital healthcare, cyber security and driverless vehicles.

Good afternoon, Mike.

Good afternoon.

Mike, perhaps you can tell our listeners when and where you were born, please?

I was originally born in Woking, Surrey, back in the mid-1950s. Some of my education was disrupted a little bit because my father worked for IBM for many years and that took us around the country, so I had the privilege of going to about five different primary schools and two secondary schools. One of my secondary schools was in Paris, France for two years when he was a vice-president of IBM Europe. But that meant I had a disruptive secondary school education, but notwithstanding that, I still managed to get a reasonable degree at the end of it all.

[0:02:02]
Right. And thinking about your education then, you mentioned when you were in France, but did you study A levels in the UK as well, or…?

So I did, I originally wanted to do all the sciences, but because I did all my O levels in one year, coming back from France, I got a good set of O levels but when it came to A

levels some of the O level grades were not strong enough to let me do the A levels I wanted. So originally I wanted to do A level physics, they said grade 5, not good enough. Originally I wanted to do double maths with physics, they said sorry, grade 3 not good enough. So I did A levels in pure and applied maths, in economics, and indeed geography.

And whereabouts did you take those?

So I went to Vyners Grammar School in north-west London, which is Uxbridge, near London. I was there from passing my eleven-plus to the age of fourteen, left to go to Paris for two years, and then came back for the final three years of my grammar school education. One year of O levels and two years of A levels.

And when you think about those informative years, what subjects did you like at that juncture in time?

So I always loved the sciences. I had a full set of French GCSEs as well, having studied in France in French. So I'm fluent in French, I enjoyed the French. But they said my French was too good for an A level in French. But anyway, I finished school age seventeen, seventeen years and ten months, and went to Lanchester Polytechnic, which is now Coventry University, aged just, what, just turned eighteen really. In some ways, looking back, maybe I should have taken off a year and done a little bit more of a top-up in my preferred areas of sciences.

[0:03:55]
Right. And what did you study at university?

My polytechnic degree is in economics and maths and that was a three-year degree, I finished in May 1974. I'm still in touch with some of my former college mates from those days. We had a great time at the polytechnic, as it was then. I was treasurer of the Students' Union in the second year, alongside my course, and I was on the Board of Governors in the third year as the student governor in my final year. So I had a very active three years while I was doing the economics and maths degree.

And, so and can you think of any particular influences or individuals that particularly influenced you during your education?

So, during my A level years I spent more time in the youth theatre, running some of the lighting for the local youth theatre, that got me very interested in presentations and electronics and areas to do with theatre management. I took some of that knowledge into Lanchester Polytechnic as part of my degree, and in fact directed a play while I was at the Polytechnic, and used to run various student festivals and activities while I was also there.

[0:05:10]
Right, okay. And so after three years, where did you, what was your first job?

So just before I was twenty-one, having sort of graduated quite young, I got a job for a year with Burroughs Business Machines, well-known IT company from those days.

Yes.

It was setting up a facility to print computer stationery and I was employed to be their first graduate buyer to basically buy the consumables for the factory down in Stroud, Gloucestershire, and helped to also set up a new factory down in Cardiff. And this was a boom time for computer printed stationery. So it was an exciting possibility. After doing that for a year, I then joined Philips Industries as a graduate trainee and that gave me a more formal graduate training programme that took me more deeply into my first love, which is electronics, and I went to Mullard, Hazel Grove near Manchester for a year, and then worked in Philips head office for a year. And after that I quickly was assigned a job as a factory buyer for Philips Traffic Systems that at the time used to make traffic lights, railway electronics and motorway electronics. Very proud that at the end of my four years there I was actually managing that factory quite simply to include production as well as procurement, but also the installation of some of those traffic systems out in the field. And because of that I helped to grow that business and I was asked in the latter part of the five years to merge it with another Philips subsidiary called Pye Business Communications. I didn't want to

move to Cambridge fulltime, but once the merger was complete, I was fortunate enough to work for Landis & Gyr, their local company was called AGI.

Right, okay.

And that was in payphone manufacturing. And they particularly wanted me as a deputy director there, because they wanted to move from the old electromechanical payphones – you may recall them, push button A, push button B – into electronic payphones that could handle different coins, dare I say it, decimal coins, and also be more flexible in terms of the newly privatised or liberalised telecoms market that BT was a primary customer of for them.

So AGI had nothing to do with Philips, that's a separate company?

It's a separate company, part of Landis & Gyr. We just used to call it AGI while I was there.

[0:07:42]
Yes. And what prompted you to move on from Philips?

Essentially, having merged two Philips subsidiaries together, I was less inclined to move from south London to Cambridge with the merged business. You know, they offered me a job there, but I thought well, why not stay in London if there are other opportunities. And this AGI, part of Landis & Gyr, opportunity came along and one of the things they offered me was also the chance to go to the States to look at some of the telecoms businesses in the States, to see if they could speed up the growth in electronic payphones, and also sell more to companies like BT. So I went to Chicago, I went to the West Coast, Silicon Valley and to New York, for the first time in my life. One of the things I observed there back in 1982 was some of the first mobile phone trials. And, you know, I could soon see that payphones would be competing one day with mobile phones. Now, back in 1982 that was not really well understood, but I could see it from my kind of fresh approach. And I decided there and then that whilst I enjoyed the AGI work, that I would want to get towards mobile phones, because I saw a longer term future in that.

So AGI was your first interaction with telecommunications?

First real interaction, yes. Although, I think in traffic systems, you know, the traffic lights were more and more interconnected. In urban systems they were more networked, not as networked as they are today, and we were already talking about city traffic systems that would require more telecoms knowledge. But we also in the Philips Traffic Systems days were going digital. You know, we were using the first microprocessors, we were designing circuit boards that would control big railway systems as well as motorway systems.

[0:09:40]
In your early days and in the subsequent… how important was your education to your career path, would you say?

I think the education was vital as a launch pad. Most of the jobs I took did not require an electronics degree, did not require a computing degree. There weren't so many of those around at the time. What they really wanted was someone who could understand technology, was not frightened by technology, but could also understand the business impact. So what I've done all my life is always been curious about new technologies and how they can be applied in different fields. So everything I say today will probably reflect that.

And you rose to, you know, very early on to heading up departments.

Yeah.

What would you put that down to, what would you say the strengths that led you to get those positions so early on in your career?

Well, I think I briefly referred to some of the theatre work I did in my late teens, and actually, when you start to put teams together, whether it's in the theatre or on the sports field, you actually realise how do you bring the best out of people. And I

always, you know, tried to do that in a team-like way. So, if I saw a problem I would find the best people to fix the problem or bring them together to try and do that.

And what size of teams were you working with at that stage of your career?

I think in Philips Traffic Systems at the age of twenty-seven I was managing 45 people. In the AGI part of Landis & Gyr, at its peak I was running a factory of 200 people. So I was able to handle both the technical side and the large team side fairly early on, perhaps because I had some inner confidence, I don't know. Some of the training that Philips gave me, gave me exposure to lots of things early, in electronics or in team management. They were prepared to take risks. Clearly, companies like Philips were also aware that a lot of the electronics manufacturing was moving towards Asia gradually, so they needed people who could move with the times rather than any old-fashioned production techniques.

And how would you describe your management style?

Very open, looks at what the problem is and discusses with people around me how to solve the problem.

[0:12:03]
Okay, thank you. If we look at the early part of your career, if there's one, one success, what sticks in your mind as one success during that period that you're perhaps proud of?

I think transitioning from an educational world to a work world, I think, to me I think is a natural progression, looking back. But if I wanted to pick out a success I would say, well, seeing something like mobile phone trials in the USA and knowing that they would impact the payphone world I was in. So knowing, you know, that I would have to think about a move at some point and I would plan towards it. So if anything, I'm quite a long-term planner as well.

Right. So you were with AGI for what, two…

Just two years.

And then you moved on?

Yes, so in late ’82, early ’83, some of the BT people, newly liberalised but not quite privatised, did say to me, look, we need people like you who are able to understand how design and production works, but also how costs are controlled. And they said would I like to consider joining BT, a bigger organisation, and that to me was appealing, because it would allow me to find my way into mobile, but also find me into a longer term career, which I thought was necessary by the time I was twenty, twenty-eight, I suppose.

[0:13:36]
So which area of BT did you join?

So I initially joined BT Central Procurement in London, in Temple House, central London. They initially put me on buying things like major telephone exchanges, which I found a little dull at first, but they quickly then moved me on to buying cable TV products, to assemble some of the first cable TV systems.

Right, okay.

Then to running an office from BT Labs at Martlesham, which is the big R&D centre that BT had then. And then involved placing contracts with R&D organisations, with universities, with some international collaborations. I was also involved in a joint venture between BT and Du Pont, called BT&D Technologies, which was all about opto-electronics, and it was the start of opto-electronics in this country.

Right.

I then got involved in the 1987/88 timeframe in buying some of the first mobile phone infrastructure. So mobile phones in this country launched in January 1985 and BT was supporting Cellnet, as was then, because BT owned 60% of Cellnet. I was the person in BT who was running a team of about fifteen people, looking after all the

multi-million pound contracts. After a while the Cellnet people said, well, rather than it being bought from the BT side, can it be bought from the Cellnet side so that we have the procurement more centred around logistics and building supply chains within the UK.

Right, okay. So is that when you formally transferred over to Cellnet, as it were, albeit they were part of BT?

I moved fulltime to Cellnet as a director in July 1989, but I had been supporting Cellnet from BT from '87 onwards. So that's why I said I had 30 years in mobile, from '87 to 2017.

And Cellnet at the time was, as you said, 60% owned by BT and…

Forty per cent by Securicor.

Yes.

And our major competitor was Racal-Vodafone, which was mainly owned by Vodafone, but Racal and Millicom and others had different shareholdings.

[0:15:46]
So, when you moved across to Cellnet, that was, what, pre-launch of GSM, etc?

I was headhunted to be a director of GSM to help launch GSM.

Right, okay.

So from '85 to '93 was roughly an analogue mobile world, or a first generation world. But the first generation digital, called GSM, was launched in 1993. So from '89 onwards I was planning formally within Cellnet the launch of GSM.

Right, okay. And what were, for example, the challenges you saw at that juncture in time?

I think the first challenge that should be acknowledged is that the two shareholders were not entirely in agreement on timing of GSM. But equally, BT would have preferred more of 100% of what was owned, rather than 60%.

Right, okay.

So there was a slight tension there. Secondly, because we had a successful growth business in analogue cellular, having invested a lot in analogue, we didn't want to jump into GSM too early, until everything was right. So until the handsets were small enough and cheap enough, until the analogue network had depreciated in value. So we had to balance quite a few things there in terms of capital costs and depreciation, but also handset cost. We also knew that we needed a minimum amount of coverage before we launched. You know, once you've got an established 1G network with significant country coverage, you don't want to go backwards and launch something new, even though it was digital. If it's got less coverage it's not going to fly very quickly. We also knew we had to prepare for competition, because in addition to the two operators, Cellnet and Vodafone, there were also the new emerging competitors called Mercury One2One, also another company called Unitel, and another company called Orange, which subsequently became Everything Everywhere.

Right, okay. And at that time, who were the world leaders in GSM? I mean I think GSM, what was it, invented in Finland in '91 or something along that time.

Well, in truth, mobile was probably first patented in the States, analogue, but the leaders in mobile technology in digital were companies like Nokia and Ericsson.

Right, okay.

And clearly there were some strong players on the handset side and some strong players on the infrastructure side, we had to deal with both. But if I take the UK market from 1986 to 1992, the UK was the second largest mobile market in the world, second only to USA. And given that Japan had launched mobile ahead of the UK, that was quite remarkable, but that was also because we had a very vibrant set of

distribution channels, so companies such as London Car Telephone or Carphone Warehouse, that retail market and that wholesale market was not typical in most countries.

[0:19:00]
And was there, with the evolution of GSM, was there much European co-operation at that juncture in time?

There was a huge amount of technical co-operation, but one of the unusual things was that most of the European countries were monopolies, they didn't have competing operators. So it tended to be you had to work with the BT or the PTT at the time, which was a monopoly in France or Germany, Italy or whatever. The UK had had seven years of direct competition before anybody else in Europe. And that led towards ways of thinking about how did you do marketing, how did you do pricing and commercial offers competitively. How did you work at the wholesale and the retail level. How did you encourage distribution. What did you do about credit checking. I mean I remember in about 1990 some Germans came across and said, we're very pleased we've got credit checking down from six months to one month. And I said, well, we've got credit checking at point of sale down from twenty-four hours to less than twenty minutes. I mean that was the nature of the gap in thinking. We were competing for customers, whereas in Germany they just thought it was important to improve credit checking.

And, at that early stage, were you getting involved with cross-country deals, or not at…?

So I signed the first 50 roaming deals for what was Cellnet, and most of those are still in place today, even though the terms and conditions and the pricing has changed since. I was also nominated from 1991 to be the Cellnet representative on the GSM Association, that was the main initial European association, to get all the operators to work together. That was for operational standards around introduction of GSM, that was also for roaming, that was also for the promotion of GSM. And having done that as the representative for three years or three and a half years, I was made deputy chairman and then chairman. So I was actually chairman of that association from

1995 to 1996. That now supports 9.9 billion customers and by 2025 is likely to support 25 billion customers. So the sort of growth goes from zero, pre GSM, to 9.9 we can see in the last twenty or so years, but there's still growth to be had towards the next big wave of connected machines that we're expecting by 2025.

And at that stage, the early days of GSM, we hadn't, texting hadn't come in yet, had it?

No, so I started that. So initially texting was in the technology and in the technical standards, but to actually implement it, you needed to be able to send text messages from one network to another. So initially, texting had different names on the different operator networks, so Vodafone or Mercury One2One and so on. I pulled the operators together in about 1998, so this was five years or so after the launch of the GSM networks, and I said shall we try something different as it's not working well today. And we started to say, well, yes, let's all call it the same thing. So instead of calling it SMS, let's call it text, let's do a cross-industry campaign that says this is how you do it, so we teach people to text. We had a campaign which was called, 'Teach your Mum to Text'. We also did some interviews and put a bit of money into publicity, but we also particularly made sure that we sent text messages to each other. So a Cellnet customer could send a text to a Vodafone customer and vice versa. And when you start to make it available to all and promote it with certain handsets and certain publicity, you know, from there on it booms. And it went from something like 30 million in 1998 to a billion in 1999, just in the UK. And it peaked at about 150, 155 billion about four years ago. Clearly now for messaging, people have got other alternatives available to them, like instant messaging or email or things like that.

[0:23:30]
And today when people have smartphones in their hand, they think nothing about watching TV on their smartphones, but my understanding is you were involved in some of the first trials of mobile TV.

Yeah, so we knew that we were moving from a verbal to a visual world, and the first illustration of visual was text. The second illustration was email, and the first 2½G handsets, like the BlackBerry, it was Cellnet that brought those into Europe and was

the first company to do that. So Cellnet's always been innovative with smartphones, whether it's the Microsoft XDA or even the Apple iPhone, we were the first in the UK to buy and resell the iPhone in the UK. But irrespective of the devices, we went through texting, through mobile internet for email, through to subsequent trials in mobile video. With mobile video we wanted to understand what type of programmes customers would watch, how long would they look at a small screen, did it matter if it was a black and white screen or a colour screen. Did they want to look at the internet? So we were testing different things. And those Oxford trials that we did in about 1996 or thereabouts were pivotal, and actually, it taught us a lot about people's habits now, in terms of how mobile video is used today. And the biggest driver of 4G and 5G networks today is video. That is the biggest driver. That's because of capacity, but also variety of content that people look at. Back in 19… no, it was 1996. So back in 1996 we could see that people wanted to see sports highlights, so play back the goal. We could see they wanted to see music videos, they wanted bite-size chunks. But today they watch iPlayer, catch-up TV, they watch complete football matches. They might have a bigger screen to do it on, like a tablet, they also may use Wi-Fi in some cases, it's not just cellular, but from those days of about 1996/97 we've seen a real boom in video.

Yes. And you say the first trials were undertaken in Oxford for that?

Yeah. A partnership between Cellnet and the BBC and Nokia, and that taught us all a lot. But today, in the developed nations, you're getting a huge growth occurred in mobile video. The bigger growth occurred earlier than that, actually there was mobile email, and that really took off with better smartphones, like the iPhone or the BlackBerry.

Evolution of GPRS or…

It started with GPRS. So as soon as you had a bigger screen, like a BlackBerry, you could see, you know, stronger sentences or rather than just texting in individual letters.

[0:26:30]
And earlier on in the interview you talked about the challenges of effectively having two organisations own Cellnet, and in '99, 1999 that changed when BT bought out Securicor.

Yes, and that led to different approaches, because BT then had full control and it introduced new managing directors at the time. It also introduced new priorities, so I gave some help to BT when it came to bidding for licences overseas in the 1990s. So I helped to win a licence in France and in Malaysia and did some pioneering work in India and Japan, that also gave me some other international work which was really interesting. When BT owned Cellnet a hundred per cent, we were integrated more fully into the BT family and they wanted us to do more what are called today, conversion products. So looking at how do you sell fixed and mobile and broadband together. That's more obvious now, but at the time that was still quite revolutionary.

And there was an image change for Cellnet, or it became BT Cellnet first.

Yeah, so about fifteen years ago we went from being BT Cellnet to O2, and that was partly to help the demerger of the mobile businesses of BT at a time when BT was under some financial pressure. So BT sold Yellow Pages, it demerged the mobile business almost entirely into a new business that became called mmO2 initially, but O2 was the brand. So we had a presence in Ireland, The Netherlands, UK and Germany, that was the start of mmO2, and I was made vice-president of mmO2, so I had to handle the technical side of the flotation, if you like, making sure the prospectus didn't claim things we couldn't deliver, making sure the technical due diligence was appropriate.

[0:28:36]
And when that was launched, BT were still the owners, or principal investors?

After demerger they were no longer the owner, we were in effect a stock price on the London Stock Exchange in our own right.

Right, okay.

That lasted for four or five years until Telefónica subsequently bought us. But in the period when we were stand-alone as O2, an individual company, I set up the Brussels office for regulatory affairs, because increasingly issues like roaming or spectrum policy, some of the dos and don'ts of distribution, some of the access to capital, all depended on having a better dialogue with Brussels. So, set that up. I also ran quite a few of the external affairs relationships, so that continued in the standards arena, that also continued in the planning for 4G – sorry – 3G, then 4G. So, the more recent generations of mobile we typically call 3G and 4G, spectrum releases were critical in that timeframe, we needed to make sure we had the right spectrum.

Perhaps you can remind me, launch of 3G, which I know you were involved with as well.

Yeah, so I personally launched 2G and 3G in the UK. 3G typically is called UMTS, but 3G is the easier term. That occurred after, in around 2004, that occurred really because we could see this beginning of a boom in data, we could see a requirement for high speeds, we needed more capacity as well, but the higher speeds were key for delivery of better mobile email.

I mean, even talking about your career up to that juncture in time, you've always been involved in research and development as well?

Sure, yeah. So I always, from about the late 1980s through to last year, have been the kind of lead on strategy, lead on the technical strategy, lead on the standards. So some of that required us to place R&D contracts with some suppliers, but also some universities. And you do enough R&D to keep any business going, don't you? [laughs]

Yes, although some people would say there's not enough spent on R&D, but in that business, presumably if you don't, you're out of the business in a short period of time.

Yeah. I think sometimes the pricing or accounting of R&D is in the price of the infrastructure you buy. So actually identifying what R&D is the most important

thing, and then deciding on how it comes to you is then important as well. So, for example, we had major contracts which I negotiated with companies, like Nokia or Ericsson, and we sometimes said, well, we'll buy this base station if it does *x, y* and *z* on top, or if you deliver some better development support to make it get introduced gracefully. We also introduced radio planning techniques to optimise the use of the equipment. We also did R&D in the Wi-Fi space to make sure that we could integrate Wi-Fi and cellular together. So I'm not claiming I did all the pure R&D myself, but I was often looking at the strategy to say, who do we negotiate with and how. And that's started getting closer, particularly in the last fifteen years, towards universities, because we realised, having moved from the analogue to the digital world, that moving from the voice to the data world required different skillsets. Some of the voice guys, traditional BT engineers, very good as they were, may not have been as literate in the world of mobile data. I initially observed that with texting, but more so with mobile email and mobile internet.

[0:32:21]
O2 was a stand-alone organisation for what, five years?

About five years, yeah.

And then Telefónica came along, as it were, or you approached them. What was the attraction for Telefónica at that juncture in time?

Scale.

Scale?

Skill and reach.

Right.

Scale, they knew that as Telefónica, being in Spain and with a significant presence in Latin America, that they were sub-scale in Europe. They also knew they had some customers that they couldn't serve very well by not owning more networks. So scale

was quite important. Skill, I think they realised that we had seven years, if not more, experience of competing in the very aggressive market called the UK, and that history of competition, they wanted to have some more of that spirit of competition in their own company, they wanted better access to those skills of marketing as well as technology, they wanted better access to how you influence governance in different areas as there was a market. So skill was the second important factor. And thirdly, they particularly had their eye on Germany, and in fact today the German business in Europe is a very big one, it's the biggest mobile operator in Germany. But the origins of that are O2 Germany. So the assets that they were buying were really the four networks: UK, Germany, Ireland and The Netherlands, and their particular eye was on the UK and Germany for scaling up in Europe.

And how was that change for you, because you held a senior position in all these organisations, but suddenly having new owners, Spanish owners in this instance, but what type of change did that mean for you?

So because I'd been, because I'd been high profile as chairman of the GSM Association, globally, and on its board for seven years, I was the only person that they knew in O2 when they bought us. Now, that might not sound significant to everybody, but that's what I was told. So, in some ways I feel they weren't just buying the company, they were buying the people they knew and some of the attributes of that company. And I was quickly kind of reassured when they bought us that they wanted to do more of what we had been doing, so that's the reason I stayed. They didn't try and replace me, they didn't try and move me to Spain or anything like that, they just said, keep doing what you're doing.

And they made their headquarters in London as well, didn't they, European headquarters?

Yeah, yeah, yeah. The set up the headquarters of Telefónica Digital, they saw that we'd invested in what was the Millennium Dome, and that had already been renamed the O2. They could see that O2 was well branded and recently rebranded on the shops, so we'd got rid of the old BT and the Cellnet bit and it had all been rebranded O2. They could see no reason to change that, so they kept a lot the same, in terms of

people, in terms of brand, and indeed, the headquarters of Telefónica Digital. And we set up internally centres of excellence that got better exchange of knowledge going, and I had a hand in that. So how do we exchange knowledge about standards or things that they were less familiar with. They, because they were more like BT in their outlook, had tended to concentrate on fixed line and fibre, whereas we tended to lean on wires. So there were exchanges of the technology, but they tended to be more on areas, well, how do we serve global customers better when there was more disruption. You know, we didn't have a global sales team, but they did and we were able to leverage that. They also had a more global procurement team, we were able to leverage that. But it still meant I dealt with government public affairs in the UK, I did less in Brussels than I had traditionally done. I did more on the strategy for 4G and 5G.

[0:36:30]
And just for our listeners, I mean that Telefónica deal was £18 billion wasn't it?

Yeah. A lot of money.

Significant sum of money.

I mean I can't say, I can't say I brokered it, but I could see that BT didn't do as well when it demerged O2 as Telefónica did when they bought O2. Because it was an asset at the time worth at least 18 billion. Valuations have dropped in recent years but, you know, markets do change.

And they obviously valued the brand name, because as I say, they kept it in the European, European arena.

I mean they also promoted my managing director at the time, so Peter Erskine had been the group managing director of mmO2, he was retained as a non-exec director. Matthew Key, who had been the CEO of O2 UK, he was promoted to head up Telefónica Digital globally. So, they're examples of keeping it stable as they learned more about the organisation that they'd bought.

Alright. Yes, because we learn so much that unfortunately so many takeovers do not work out, but with this one, just reading aside and from your comments, would suggest they wanted to keep the management and the brains intact, as it were.

They wanted continuity because they couldn't replace all the people that were in place, but equally, they wanted to deliver a longer term strategy, which is where they are at today, which is to serve global customers, to have scale, to have better reach into key countries, and to have access to innovative skills.

So with Telefónica taking you over, you're obviously with Telefónica now through to 2017, so what were the main highlights of your career during that period of time?

Well, I didn't travel internationally as much when I was within the Telefónica family, so I didn't do so much outside Europe. But even within Europe there was a lot to do, so some of the preparation for 4G required some thinking about, which markets strategically were going to emerge and when, how should we change our supplier base, how do we optimise the capital we had to actually, you know, maximise development of customers. We also, having demerged from BT, went from being number three in the market to number one in the market, by customer number. So in this period we overtook Vodafone for the first time. We also kept ahead, until a few years ago when Orange and T-Mobile merged to form EE or Everything Everywhere, and until they merged we were the number one in the market. Today we're probably number two in the market in terms of growth customer numbers, but in terms of revenue we're probably number one in the market today.

[0:39:36]
If we think about your time in the mobile industry, is this something you look back at, you would say, if you had your time again you would do something different?

There's very little, I would say, I would do differently. I think I enjoyed the international experience I had and I contributed where I could. I think, I had offers to go and work permanently overseas, I chose never to kind of leave my family behind and emigrate, I chose never to do that. So I regularly was able to serve some of those international markets well by just travelling from the UK. So I did turn down job

offers to work in the States or in Asia. I was happy to still be based in the UK. So I haven't got any regrets. I think I've had one of the best careers you could possibly ever have. I mean I've learnt something every day, I've always been happy to put in long hours, I've met really interesting people, some who've worked for me, some I worked with. I've had opportunities that most people would never have the chance to do. I mean, take the Mobile Data Association just for a minute, not just launching texting, but we, you know, exposed me to being on television, on breakfast TV or on *Newsnight*, doing TV interviews. I never thought I'd do that at university. The CBE I probably got also because I launched charity text in the UK, that raises £150 million a year for charity, just through sending a text message.

Right.

You know, if you think about £2 or £3, that's lots of them.

Indeed, yes

But we put in common short codes to make sure that they were well understood. We made sure we got rid of the operator charges, to make sure that the operators contributed towards this social responsibility. And finally, we convinced Gordon Brown to remove the VAT on texts where charity short codes applied. So, you know, I got a CBE, who can complain about that?

Absolutely, yes. That was a huge honour. That was in, what, June 2012, you were awarded that?

The CBE was in 20, yeah, 2012. And the Olympics, I was involved with the Olympics. Some of the planning for London 2012 actually started eight to ten years before 2012, but the Mobile Data Association was one of the bodies that helped get the mobile operators ready for what would be a plan for 2012. When we knew we'd got it, with six years to go, we were able to put together a crack team that worked together so that the mobile aspect of the Olympics went very well, as well as the performances. Some might argue London 2012 made London congested, but actually there were no incidents. Security was good, despite teething problems. Transport

was great, despite initial worries. Telecoms was also great. That's not the same that can be said for all the other Olympics either side of 2012.

[0:42:33]
And the MDA, that's a trade organisation of UK suppliers?

A small trade association just in the UK, but it had lessons for other countries. It had at its peak 100 members, but maybe the mobile operators and then the specialist service providers.

And you were chair of that organisation?

I was chair for ten years and – 1998 through to 2008 – and we got cross-network texting going in 1999, we got the short codes up and running in the year 2000 and charity text was up and running by 2002.

[0:43:10]
And you mentioned the Olympics, so again, so our listeners will be interested, I'm sure, the role of the mobile industry within the Olympics, what would you say are the objectives and what happened?

We were nervous if any one operator had been the lead sponsor that the mobile networks would fall over. So (a) we wanted to avoid any one operator sponsoring it, because we knew we had to collaborate. So it's a reputational defence, if you like. But then we thought, let's work together to try and maximise the experience from a customer or visitor attraction point of view, and that really taught new customers, like Transport for London, or security personnel, new techniques of using tablets and smart phones, so it was a good training ground for workers during the Olympics. The other good thing we did was we were able to in effect put in place network coverage for a city the size of York in the east side of London for an eight-week period and then reduce the capacity afterwards. Transferring a city the size of York into east London is not easy at the best of times, but we did all the telecoms for a city the size of York, in effect, for that eight-week period. Yeah, ramp up peak round there.

And that could happen because of collaboration and shared resourcing?

That's how it happened, but the need was there because of the visitor numbers. You know, if you imagine a new Olympic site, hadn't traditionally had visitors in it. Some of those facilities, whether it was the pool or the boating lake, even some of the non-London venues, some of them had not had their mobile coverage optimised, even for Wimbledon, the Olympic tennis at Wimbledon, they hadn't had… So for that 2012, a lot of the sports venues were optimised. And subsequently we've seen the experience of O2 and traditionally at Twickenham, taken from Twickenham to, not just London 2012, but to other sports venues around the UK and around the world. Some of the specialist suppliers we used have been adopted by others in other countries, so there's been an export benefit. EE have subsequently sponsored Wembley Stadium for football. You know, they've seen the benefits and lessons from the Olympics in big sporting venues.

[0:45:33]
And during that time, 2011, 2012, you were president of the Institution of Engineering and Technology.

Sure.

Perhaps you can tell our listeners a little bit about that organisation and what your involvement was?

So, I'm a long-standing fellow of the BCS, the IET, the ITP and the Royal Academy of Engineering. But for the IET, I've mainly used that for work reasons rather than personal reasons. So it's been very important to look at the professional skills of engineering and how they cross over into other sectors. So some of the work I've done with connected cars or connected highways, or smart cities, it's sometime useful to know who are the customers of mobile. So I've met lots of engineers in these other sectors who are increasingly using mobile and digital, and I've learnt about it. The most obvious example is smart meters, so I had to win a major contract about eight years ago, smart meters for the UK. And initially we as Cellnet did not – or as O2 rather – did not know enough about the electricity industry. So we found ways

through the IET of getting to know all the electricity companies, to talk to government and to say, well, this is how we would do a smart metering programme if allowed to do so. And we kept that up for a few years and then in the end we won a major contract. So that O2 contract is for two-thirds of England. In the middle of rollout still today.

[0:47:04]
Yes. Do you think that's a success at the moment?

It will be a success. I think it's had teething problems, but I think some of those teething problems you expect in any major programmes. Some of them could have been predicted better, but generally, I think it's going pretty well, to be honest. It's not delivered as quickly the benefits as expected, because of the slow ramp-up, but I think they're coming to be proved to be suitable.

I suppose one of the biggest challenges for smart meters, thinking from a consumer's perspective, if you switch suppliers some smart meters suddenly become dumb and it seems that would have been highly predictable, but, yeah?

Well, I think there are conflicting objectives. The initial objectives around a smart meter was to get a better handle on what the energy in every home would be, and to give customers more visibility of their consumption. Subsequently there have been other objectives added in, like how do you give customers more choice to switch, how do you make switching quicker. Also, other technologies have come along since. And if you add those things in, they are some of the reasons for the teething problems that I've just described. It's the right direction of travel. In fact, it's probably the best illustration of how the internet of things is going to make a big mark on developed nations such as the UK. I mean by the end of this year all new cars, all new cars shipped in the last eighteen months, will have the connected car capability. And it's not always described in the same breath as smart meters, but any new car will have an automatic breakdown alert system that lets the breakdown services know you've broken down and you can be rescued because of that connectivity. It will have other unforeseen benefits, even if it has some issues that still need to be faced.

And talking about the IET, again, it's an organisation in what, 150-odd countries, it's not just a UK-based organisation is it?

Sure. So I travelled to about fifteen countries during my presidential year. It was fortunate that I was the president during the Olympics, so I was able to also receive lots of people who wanted to come to London during the period of the Olympics to see what we'd done. We did two publications as the IET, which have been helpful for other major sporting events. We did a publication, like a 40-page publication to say what planning did we do in energy, transport and telecoms for London 2012, and a subsequent IET publication that looked six months later about how had it gone. And both of those publications have been widely used in embassies around the world, export events around the world and other sporting programmes.

[0:49:58]
And, moving back to Telefónica, Telefónica have been involved in an accelerator programme as well?

Sure. So about eight years ago I helped set up something called Telefónica Wayra – W-A-Y-R-A, Wayra. That means 'the wind' in Chilean Indian, so an idea in the wind. We liked the name, it had been used in Chile and in Barcelona and in Madrid. What we wanted to do was to get better access to start-up talent that we could use in the digital space. So we put this acceleration into Telefónica Digital, we made spaces available that people could compete for, they could compete with their good ideas and say this is the business case I want to build, it was often a person and a desk, and then it built up in some cases to lots of mentoring, access to funding, maybe some export potential, maybe using Telefónica as a customer in some cases. As with all accelerators they had some very interesting start-ups, but some of those start-ups have raised a lot of money and now Telefónica Wayra is held up as being one of **the** best accelerators in the UK, if not **the** best today.

And, talking about research and development, your involvement with various universities, we talked about Surrey, Salford, Coventry, Leeds, Lancaster. I notice you have the title, visiting professor. Perhaps you could explain your involvement with universities to our listeners.

Sure. So I first became a visiting professor at the University of Surrey close to eleven or twelve years ago, and that's when I realised we needed to have better access to skills. New radio engineering skills, new computer science skills, ones which were trained to a high level in the research arena to investigate new technologies. So I looked closely at the University of Surrey on the basis of some initial work I did there. They quickly said, could we appoint you as a visiting professor to occasionally give lectures, to occasionally describe the history of the industry, to occasionally introduce us to the relevant telephonic people to help grow research in telecoms. So the Surrey link was very grounded in needs with Telefónica in telecommunications, particularly the network side. Whereas the links to Lancaster arose largely from the computer science side. We were beginning to see more e- and mobile commerce over our networks, so we did some experiments with Lancaster University around cyber-security some eight to ten years ago. And they said the same thing, would you mind becoming a visiting professor. Leeds, we've always had a major employment centre of engineers in Yorkshire, of which Leeds is the headquarters for our northern kind of engineering function.

But that's Telefónica's…

It was O2's, but now Telefónica's, yeah. And as an engineering centre we wanted close links to the University of Leeds so that some of our staff would get regularly trained and topped up in that area. And it was helpful for recruitment as well, locally, rather than Surrey-based. And the other two, Coventry and Salford came at different directions. So I'd been on the board of Coventry University for some nine years or so, having been a board member for nine years, they said, because you've done it for nine years we need to refresh the board membership and would you mind staying linked to us as a visiting professor. No problem. I studied there originally. And lastly Salford, I'd done some work with them on the media side or content side, and they said, given you've given some lectures at Salford before now and you've helped us, would you mind being associated with us formally as a visiting professor and occasionally give a talk. All five asked for talks today, but all five had links to Telefónica which were relevant.

And was it Surrey who… that is the 5G Innovation Centre?

So I'm a co-founder as a visiting professor at Surrey of the 5G Innovation Centre. That meant putting O2 money into that, putting O2 resources into that. I did that by agreement with Vodafone as well as the University of Surrey, but I also helped bring in some of the suppliers who we wanted to work with there, and I also made sure that we were highly active with the local enterprise partnership, which is called Enterprise M3.

Right.

I was, and I'm still on the board, I have been on the board of Enterprise M3 for the last six years, but I was chairman until May this year, of Enterprise M3, and we have put some EM3 LEP money into that, largely to help SMEs understand what 5G is and to test some of their kit and products and solutions. That in turn has led to other wide 5G trials across the UK, funded largely by DCMS. DCMS has got a 5G trials and testbeds programme that covers about six locations today, including connected car testbeds, including factory testbeds and including network demonstrators. Other universities are in this space, like Bristol and King's. I speak to them regularly, I'm just not formally a visiting professor with those two universities.

[0:55:17]
And, talking about education's constantly in the news, courses that are offered at university today, how well do they prepare our students for the digital world, would you say?

Some of them are a little too academic, but by and large I think they provide a good baseline for entering into the world of work. I would say though, that because technologies are changing faster now than ever before, there is a greater need for lifelong learning than ever before, and therefore a greater need for networking than ever before. So looking at online resources to top up your education, looking at webinars that might give you more guidance as to how certain things work, looking at certification for engineering or computing is all useful. So I don't think the undergraduate degree of 40 years ago that I studied is as modern enough as the needs

for lifelong learning are today. And probably I've got by through doing that lifelong learning approach, personally by saying I think we need to look into this and get involved with universities personally to try and make sure I stayed topped up, either with institutions or with universities, and learn as I go along.

So I suppose being a member of the IET and BCS and other organisations obviously you're a member of assist in that both from a learning and a networking perspective.

Yeah. So that's why I retained fellowship before, mainly BCS, IET, Royal Academy of Engineering, also the Royal Geographical Society and the ITP.

[0:57:05]
And in 2017 you left Telefónica?

Yes. I felt that after 30 years, you know, it was about time, as I was probably the oldest person in the business, that I moved on. You know, I think it's a young man's or young woman's world. And, you know, I was thinking about a graceful, you know, slope towards retirement, and then I was approached and said would I like to consider being a chief scientific adviser. And I think if it had been pure science or pure advice, I would have said no. But this one, the Department for International Trade is more interesting to me, given the things I've done, because it's business facing, it's supporting the world in a post-Brexit sense, it's bringing together the export and market access needs I've seen as being necessary. It's bringing together some of the skills I can bring and in some cases leading missions is something I've done in the past anyway. So it's not a difficult job. I think it's really stimulating. The most stimulating thing about it is it touches every sector where the UK is strong.

Yes.

It's not just telecoms any more. So my digital background helps them as more and more sectors go digital. I've been on one trip a month really, the last seven months, to different places like the USA, Spain, Turkey. In the autumn I'm going to the States again, probably to Saudi Arabia, probably to India, you know, I'm not on a plane

every week, but one big trip a month, often leading a mission, supporting a minister in some cases, helping to get export deals in other cases, that sort of thing.

And you did mention Brexit there, clearly there's challenges and hopefully opportunities as well with Brexit. Can you summarise what you see or the initial, certainly the initial challenges of Brexit from a technology perspective or…?

Well, I think we need to stay friends with all the markets we want to trade with and from, so that means collaboration needs to be maintained. I think just because we're coming out of the European Union doesn't mean we're not going to continue to trade with Europe. I think some of the R&D I've seen has been very successful, has been highly dependent on scale and collaboration, so GSM is actually the most successful R&D programme that has ever come out of Europe, I would argue. You know, there's nothing on that scale that can match it. It's got much greater reach than the euro. So, I'm very keen on collaboration for the future internet or the future of e-commerce, that collaboration will need to continue. But similarly, we could look to defence and say, well, NATO will continue to work and we collaborate on the defence and security side in NATO. I'm sure we're going to continue to collaborate on life sciences, because a lot of the multi-nationals are global in nature. I'm sure we're going to continue to collaborate in quite a few areas in the creative industries where the UK's known to be strong. FinTech, that's more related to your background, FinTech I'm sure we'll continue to collaborate. That tends to be more bilateral, city to city or country to country. So I think we'll continue to collaborate in all sectors where we have some strengths. Government has a role to step out the way if it's in the way. It has also some role to step in if it can help. So at the Farnborough Air Show, which I went to about six weeks ago, I put a day in down there, quite simply to make sure that the engineering firms we're supporting down there feel they're getting the right support or not. Some of the science collaboration has led to a huge order book and 180 billion dollars' worth of orders were announced at Farnborough. So that's the real work of trade, how do you maintain that momentum and that collaboration for every sector.

[1:00:58]
Do you see any… you spoke about the need for continued collaboration, as you say, makes obvious sense. Do you see benefits that weren't there before that may be there in a post-Brexit world, or…?

Yeah, there are some benefits if we collaborate with other countries. You know, whether it's more with the Commonwealth; Australia, India, Canada, for example. Can we also diversify sources of supply, which may give us more choices, may reduce costs in some cases. I think until some of the negotiations from Brexit settle down, it's difficult for us to see all those benefits. You know, it seems troublesome when, you know, the negotiations are not complete, but I think some of the signs are looking good, that negotiations are coming to an end. Frankly, we need to be ready by the end of March on the European Union front. But I think we also need to be sure who we want to partner with for a variety of reasons. And we've certainly got staff overseas, in overseas countries, looking at their appetite to both receive goods from the UK and work with the UK, even export to the UK. Inward investment continues to be above the rate it's historically been, so if anything, inward investment is on the up already. That doesn't always come across in the newspapers, but it is. We've, as DIT, had more completed inward investment projects in the last year than we've had in the previous couple of years. So there is no loss of appetite to work with us. I think though we do need to conclude the negotiations to make sure that some stability returns.

Thank you.

Whatever your politics are. [laughs]

Exactly. And I assume, I mean your role is apolitical, I assume?

I'm apolitical, yes.

[01:02:56]
What would you say is a proud, your proudest achievement in your career?

Launching new things that customers value.

Right. So a series of generations of…

Digital… well, digital traffic systems, digital payphones when they were all analogue before that, digital GSM in the UK, launch of 3G, preparation and preliminary launch of 4G, mobile TV trials that guided us into how mobile video as a market's going to grow. Yeah, launching new things that customers value.

Looking forward in time now, what innovations are around the corner that are coming into view or of practical use, would you say?

I think we're going to see a lot of work based on prevention of healthcare issues, particularly around genomics and prevention techniques through measurement. I've done some work with UCL on in-field or rapid diagnostic testers in the field of Africa to help prevent the spread of HIV or ebola or Zika. I think when you add in the genome banks, as they get to be more sophisticated and cost effective, I think we're going to see a huge change in cost effectiveness of prevention and therefore care. I think some of the areas to do with cities, clearly as congestion gets worse we need to have a better dataset to help minimise congestion and indeed pollution of cities. So I can see data collection affecting cities in a big way. I can see AI having a big difference in all sorts of fields, whether it's been in energy management or in identifying new innovations, or in helping healthcare, subject to access to data. Biometrics I can see helping us with security in ways we don't really believe or understand today, I think we're just scratching the surface of biometrics. We already see the use of fingerprint recognition on computers and smart phones today, but that's just half of it. Eye recognition's coming, face recognition is certainly building up rapidly. This may help to make us more secure. I think that in turn starts to say, well, you know, what about the human side of it all. I think we can get better access to information more readily than ever before, you know, I think the internet's had the same power as the arrival of the printing press on this planet and I can see the internet giving us much more information. We need to guard against disinformation, or as Donald Trump would call it, fake news. So how do we check the provenance of information to be more accurate. I think areas like blockchain and distributed ledger

technology are really interesting. I've seen some trials for trade where goods, perhaps from the USA, are going to China, and they can be fast-tracked through free ports in Hong Kong and Singapore, but the supplier in America gets paid by every step along the way. So not only do the goods get delivered quicker through fast tracks, but the release of money goes through more efficiently. I think in FinTech we can imagine also AI and distributed ledger technology playing a much bigger part. Insurance, your industry, I think it needs a bit more of a digital dividend, not just in IT systems but in terms of the way that policies are written and distributed. I noticed only this week Amazon moving into insurance, and that's really going to shake up the motor, home and anti-theft insurance markets.

Yes.

[laughs]

Yes, shall I say, some share prices have changed today as a result of those announcements, yes.

But I mean I was predicting that about a year ago because, you know, from an O2 point of view, I helped to introduce some of the first pay-as-you-go driving insurance products using mobile, where you pay as you go, you get rewards for pay as you go on insurance, as opposed to it being an annual policy based on the driver and historical behaviour. So I think there's a lot of room for change in all sectors because of digital. Maybe that's a quick summary of my answer.

[1:07:19]
Yes, yeah. Mike, going back to professional organisations, you mentioned you're a fellow of the BCS, formally known as the British Computer Society, again, another worldwide organisation. What would you say is the relevance of the BCS today and what do you get from the BCS today or individuals considering joining the BCS should look for with such an organisation?

So my father, who was at IBM for many years, was the first BCS member I ever knew, and I naturally followed in his footsteps. I was unable to join IBM, because in

the 1970s they had a policy that you couldn't join IBM if another family member were in it. Now, in this decade that we're now in, I think those rules have probably changed, so I think anybody getting into a career in IT needs to do networking, particularly around their areas of interest, BCS is very good for networking of IT professionals. I think particularly understanding knowledge of how IT deployment developed and deployment could work, it is a very good knowledge base. And BCS has other knowledge facilities, whether it's the magazine or online materials and so on. Using that is a very important part of the networking equation. Getting certified so you're recognised by your peers is another really good mechanism, and I remember the old British computer driving licence, which I thought was a very good initiative, but actually in modern day terms it's, I think, increasingly about the internet and increasingly about how does computing play a part in every sector. So thinking about certification not just through the BCS but across into the sectors you're interested in to me is a key part of lifelong learning, and the BCS is a key part in that. To me, I've had more of a traditional engineering career in telecoms, so I've also used the IET to help me with my lifelong learning and my access to knowledge and my networking. So I think the BCS and the IET I would cite as being the two key ones. If you're choosing an academic career with IT you might also want to think about some of the royal societies and see how they could help you. If you want a more sector based career, there are also sector based institutions that are more sector specialist as well, and I think they're also a very useful complement to the work of the BCS and the IET.

[1:09:52]
And you've touched on there about some advice for individuals in starting or contemplating a career in IT, is there any other advice you would give to an individual who…?

I think anybody starting on a career needs to accept that it's not going to be one job for life any more. Clearly, many jobs are more likely because you might want variety, you might not want to stay with the same company or in the same place all your life. I'd therefore follow my passion and always be curious. If my passion is in a particular field, how do I really get stuck into it, what do I need to do, and think about that. Find other people who are doing or who may have tried it and started it and get to know them through networking. I think also, remain curious so that you're aware

that shocks may come along, whether it's a market reaching its sunset days, or whether it's a company not moving with the times. You need to add value in your career and therefore staying up to date is important on the technology front as well as on the sector front, making sure you do not end up in a sunset industry at the wrong time.

And thinking of the industry as a whole, again, we have touched on that during the interview, but opportunities and challenges for the IT industry in the next ten years?

I think there are huge opportunities for the IT industry. I think I would define it more as a digital industry though now, in the sense that it's not just about computing hardware and software, it's increasingly about services and it's increasingly about digital services for every sector. So whether it's ICT in automotive or in aerospace or in healthcare or in life sciences or in energy, I think there are huge opportunities. I think if you want to specialise in one, that's your choice, but be ready to move into a more multi-sector or different sector type environment. And that requires lifelong learning and an interest in new areas.

And particular challenges facing the digital world today?

I think one of the challenges of the digital world is it moves very fast, so that provides both opportunities and threats. I always believe in getting in something that keeps moving but provides growth opportunities. If it's moving towards an end of life, then I would worry about that. I also think the digital world is going to open up new countries and new markets in ways that we've not yet foreseen. What I mean is look at the internet penetration, for example, you can see some countries have very low internet penetration, whereas the UK's got high internet penetration. Well, that means that the UK has got a lot of knowledge that can be used in other countries, but it also does mean that the lower internet penetration countries can leapfrog if they do something clever. When I did my primary education, Korea was nowhere near the hi-tech economy that it is today. When I did my secondary education, other countries in Europe were lagging the UK, quite a few of them have caught up today. So things do change geographically and by sector, so be prepared for surprises.

Well, thank you very much, Mike. I very much appreciate your time today and thank you on behalf of our listeners, and thank you from myself as well. Fascinating insight to your career. We wish you well with your new role and success and navigating the challenges and opportunities that Brexit currently offers as well. So, thank you very much, Mike.

Thank you.

[recording ends at 01:13:35]