JP Rangaswami

Interviewed by

Kerri Mansfield

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It's the 5th of July 2017, and we're in the Hall of the Worshipful Company of Information Technologists. I'm Kerri Mansfield, Head of Capability at Digi2al Ltd, coach and business consultant. Today I'll be talking to \J/P Rangaswami, Chief Data Officer at Deutsche Bank, and Adjunct Professor of Electronics and Computer Science at the University of Southampton. And we're going to talk about all the other things that you've done in your life so far, as we go through today. Welcome.

Thank you.

Thank you for coming here. Thank you for making time for us.

[00:34]
Your public bio rather glosses over big chunks of your life, and moves swiftly on to lots of your achievements. Your life sort of starts in 1980. But I'm sure that it didn't. Can we take a step back and talk about those early years and how they shaped you?

Sure. I'm going to be 60 this year. I was born in 1957 in a, a journalistic family in Calcutta. And, that's where I went to school and to university with the Jesuits. I spent fifteen years with the Jesuits.

How was that?

A fascinating experience. We, we actually used to get caught climbing into school. [both laugh] And, it was a different age. And, one of my grandfathers was the professor of chemistry at Madras Christian College, and, so there was, like, an academic streak in us. And, I was brought up in a house with thousands of books. And, for us, learning became a very natural part of our lives because of the culture we were in. With the family business being journalism, information and printing and publishing, the house I was born in had a very large printing press in the basement.

Wow.

OK. And even now, I have conversations with people like Mike Jenkins…

Yes.

…because of the interest in, in movable type, in things like, you know, linotype machines, and learning how to proofread at a young age. You know, actually with hot metal.

Yes.

Watching galley proofs and page proofs getting made. It was, you know, it was the later stages I guess of the printing revolution. [laughs] But it was fun to be there.

Yes. I'm sure you could walk straight into the Worshipful Company of Stationers and, if you wanted to.

Well I, I still, I still collect, you know, fonts and type and, some of the smaller machines, although some of them are large enough to warrant a garage. But, really the first 20-odd years of my life were spent in Calcutta, in India, working, you know, I studied sort of, economics with mathematics and statistics, and the primary subject was listening, learning about development of economics. So a strong numerate bias to it.
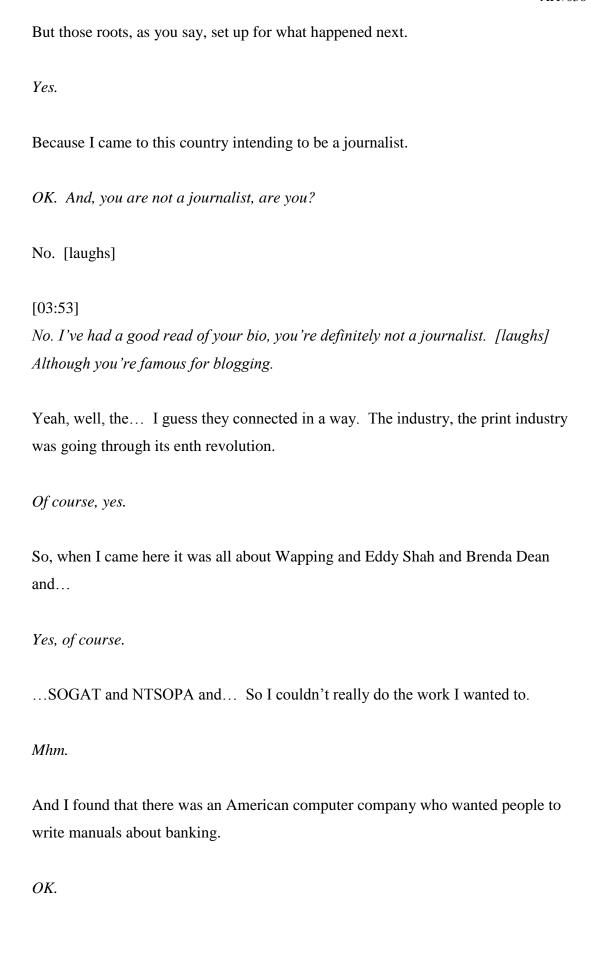
Yes, very much so. Yes.

[03:17]
And, I think I must have been, over teen, nearly nineteen, when I first touched a computer that I could call something I used.

Yes.

And it was a, a Commodore that a very rich friend had, and, that was the introduction to anything that looked like a computer.

Mhm.

But those roots, as you say, set up for what happened next.

Yes.

Because I came to this country intending to be a journalist.

OK. And, you are not a journalist, are you?

No. [laughs]

[03:53]
*No. I've had a good read of your bio, you're definitely not a journalist. [laughs]
Although you're famous for blogging.*

Yeah, well, the… I guess they connected in a way. The industry, the print industry
was going through its enth revolution.

Of course, yes.

So, when I came here it was all about Wapping and Eddy Shah and Brenda Dean
and…

Yes, of course.

…SOGAT and NTSOPA and… So I couldn't really do the work I wanted to.

Mhm.

And I found that there was an American computer company who wanted people to
write manuals about banking.

OK.

So they were looking for literate and numerate journalists [laughs], to write international banking systems manuals and reference journals.

Yes.

And…

This seems to fit very well.

[04:49]
And sort of walked into that. But, this was early '81, and at that time, the personal computer hadn't quite turned up.

No.

The, what they call WYSIWYG was not part of publishing. So, what you actually did was, you marked up your text in a markup language, right, very SGML like.

OK, yeah.

So, you typed into a dumb terminal, was a classic 80 character screen. Because it was going to go, to get coded onto Hollerith cards, and then sent for processing. But what you did was say, OK, now, I want to make this bit bold, so I'm going to mark the area in bold with control characters. This in italics. I want a page number here. I want a page thrown here. I want a new para start here. And so, you used a generalised text markup language.

Did that mean visualising it all in your head…

Correct.

…how you wanted it to look, and then, program that in?

You did not see what was going to turn out. You had to take the raw text and mark it up.

Mm.

And so, that meant that before I learnt anything about coding, I had to learn about markup languages.

Yeah. Yeah.

[06:19]
And, they sent everybody on some basic training, so I had to learn ALGOL and FORTRAN and, you know, I think, technically they called ALGOL 68 and FORTRAN 77. So it dates me. And… But a lot of the people around me were using COBOL for their business architectures, and, the ones who were more agile were using Pascal, and I learnt Pascal. But, the original work was all just writing those manuals, and, what was strange about it was, ten years later when, or, a dozen years later when HTML became common, it was easy for me to understand because, it was just, SGML moved on.

Moved on, yeah, the next generation, yeah.

It was still a text markup language.

Mm. Yeah, absolutely.

And… So my entry into computing was as, was on writing manuals.

As… Yeah, combining your passions for journalism and mathematical talents.

And what remained was this interest in information, which sort of, you know, many years later makes me a chief data officer. But the theme song was still, you know, how do you, you know, today we use terms like, you know, fake news and stuff like that. But actually, it doesn't change some of the disciplines. You know, do you know

what the data source is? What is the problems with that source? A journalist might call it corroboration.

Yeah, exactly.

You still talk about sources in journalism, and you talk about sources in computing.

Yes, you do.

And then, how do you know that what you have got didn't get changed?

Mm.

So, how do you prove immutability? So, so like you have problems for buying and selling things at auction, you know, where did you get this from, how do you know it's real, how do you know it's not fake? Well, the same is true for information. And the same is true for data. So, it's like, everything changes and yet nothing changes. So, you know, in the early years we were still living, you know, at least when I came into the industry it was dumb terminals, mainframes that took up entire floors, and, you know, disks and disk drives that were, you know, whole sets of platters that gave you a hernia to…

The size of these tables. Yes.

Yes. To pick up, and… And, the machine rooms had to be, you know, specially managed in terms of the reinforced floors and…

Dust and heating and, everything.

[08:58]
Yes. And so, you know, that was what I walked into. And, in those days, people I guess were still making money from hardware, and the software was free, and the services were free.

Yes.

So, the, the company I joined, the division I joined was one of the first to actually say, 'We're going to make money out of software.'

OK.

And, that was a strange thing.

So that was a very different thing, yes. Yes.

Right. And, you know, and it was like a… So I, I walked in at a key turning point, in that people were beginning to say that the margins in hardware were going to disappear, and that people were going to make money out of software and services.

Mm.

And, they, you know, I think in '80, '81, if you were there you realised that, for the first time people were talking about, you know, selling something that was an app. I mean the word application product started getting used. To now, people download apps every two seconds.

[10:08]
Every two seconds, yes. Absolutely. One of the things I've noticed, you mentioned journalism and I mentioned your blog, your blog says you're a retarded hippie at heart. What does that mean to you?

I guess, you know, the… It's, the bringing together of a lot of, of ideas. I… During the Sixties and as I was growing up and some of my basic ideas were being formed, when you're… You know, at the Summer of Love I was ten, so it wasn't as if…
[laughs]

Hopefully you weren't too involved in that. [laughs]

[laughs] No. Yeah. So… But, you know, in India, you had begun to see that there were probably about four characteristics that made me call myself a, you know, a retarded hippie. One was, there was a real attempt at peace to all men, and, I felt then, growing up in Calcutta we had already had a few wars, so I was used to, you know, lights out and black-outs and air-raid warnings and sirens, and, when I was fourteen there was – thirteen, there was a war around the corner which had three million refugees turn up as Bangladesh fought for its independence. And, because those were formative years, we had the complete change in the Middle East, and the Vietnam War was still dragging on.

Yes, Yes, yeah.

So, part of, you know, what I grew up with was this idea of, people talking about peace but there being a lot of war.

Mhm.

But, a sense that, at least what I called a hippie, wasn't sort of, you know, just a tree-hugger with utopian ideas. But I had, I, I was a pacifist at heart, right. And, I liked the cosmopolitan mixed nature of the world I lived in.

Mhm.

The second element was this. Some sense that some of the hippie culture was about being able to live communally and to share.

Mhm. Yes.

And, that sense of sharing becomes quite important when you grew up in an environment like Calcutta. There was a… There was quite a lot of rich people, but there was far more poverty.

Yes.

So, you know, you don't know homeless until we see people on the street, or you see three million refugees turn up.

Yes, exactly.

And you don't know homeless, or you don't know beggars, until you see, you know, some of the stark differences between the haves and the have-nots.

Yeah.

So, there was something that influenced me about saying, there is power in community.

Mhm.

And the third element was, and it was almost British, because there was a stiff upper lip element to it, you know, that, we should comply and mustn't grumble. That while change was needed, there was inability to move beyond today. So there wasn't, you know, the essential hippie wasn't a, you know, wasn't a Victor Meldrew.

No.

OK?

Yes.

They could see beyond…

Yes, the immediacy.

And, so there was an optimism, not necessarily unbridled.

Mhm. Yes.

And, this fourth element was, that optimism was founded in a sense of the future, for which many of the tools, when you look at the birth of the Internet, the birth of the modern computer, the, the way the, you know, the UI was being designed, where networking was being built, the tools that, possibly through the defence industries, in terms of the original investment, then became complete game-changers for our lives. And many of those tools were founded in stuff that might have been researched all the way from the Thirties and Forties, but came to fruition in the Sixties.

Came to fruition. Yes. Mhm.

So… And I became a Grateful Dead fanatic, and, I learnt more about open source as a construct and a mindset from watching people like the Dead than I could have learnt any other way. So by the time the Nineties arrived and open source was becoming a reality, I was more sort of settled for it.

Yes, you were ready for it.

A sense of community, a wish for peace, a belief that there was something beyond today, and a willingness to operate for a positive future. These were some of the things I call hippie-ist.
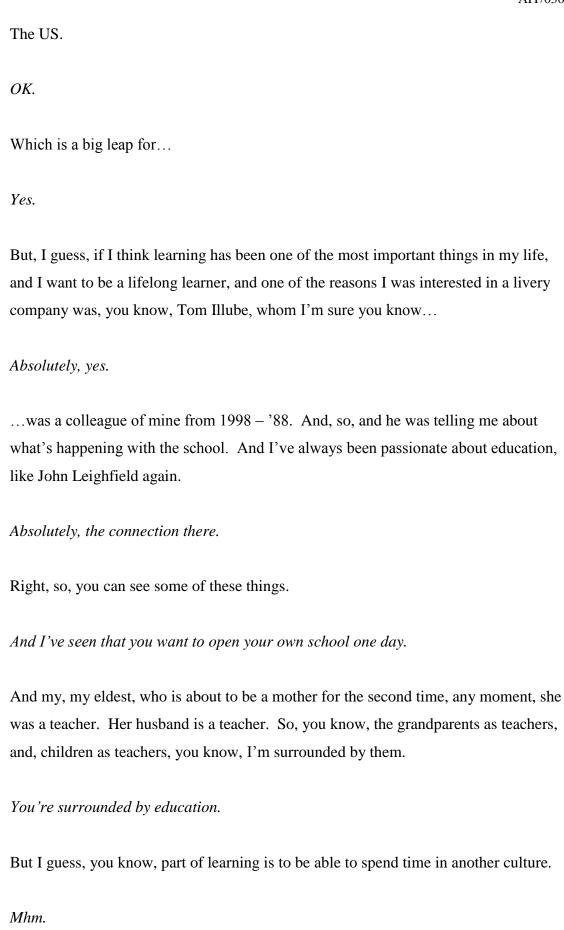
Hippie-ist. Yes.

And I still maintain a lot of that.

[15:15]
Absolutely. Absolutely, I think that's a very good thing. And a brave step to take, to move to the other side of the world, to a country that you didn't know, as a young man. And what advice would you offer to other people thinking of doing that today?

 Well my daughter is just about to do it.

Where is she off to?

The US.

OK.

Which is a big leap for…

Yes.

But, I guess, if I think learning has been one of the most important things in my life, and I want to be a lifelong learner, and one of the reasons I was interested in a livery company was, you know, Tom Illube, whom I'm sure you know…

Absolutely, yes.

…was a colleague of mine from 1998 – '88. And, so, and he was telling me about what's happening with the school. And I've always been passionate about education, like John Leighfield again.

Absolutely, the connection there.

Right, so, you can see some of these things.

And I've seen that you want to open your own school one day.

And my, my eldest, who is about to be a mother for the second time, any moment, she was a teacher. Her husband is a teacher. So, you know, the grandparents as teachers, and, children as teachers, you know, I'm surrounded by them.

You're surrounded by education.

But I guess, you know, part of learning is to be able to spend time in another culture.

Mhm.

I think it gives you, being able to speak a second language challenges you, needing to speak a second language challenges you. Being in a completely different culture challenges you. And, it, it makes you more open in a way, you appreciate the world around you differently. I've now visited maybe 60 countries in my life, having visited none for the first 23 years.

Yes.

And, so, the advice I would give is, that on the one hand your learning increases tremendously when you can experience other cultures, therefore doing it is important. On the other hand, remembering your roots and being rooted is also very important.

Very important too, yeah.

So, you know, I have tried to say, you know, my children have grown up, I have three children and they have all grown up in one town.

Yes.

OK? All three were born…

So they've had a solid foundation.

Correct. And, and then, if you have that foundation and you've built the relationship, that gives you the springboard to be able to respect your roots, at the same time as learn something new.

Learn something new.

And I was lucky that, you know, I spent my entire childhood and youth just in two houses. That's a privilege.

Yes.

You know, that, I was 23, and… No, really it was three. I was born in this house with the printing presses but I left there when I was, two. I have no memory of it, but it was in the family for the next twelve years, so I knew it.

Yes. Yes.

But I grew up just in two houses. And, you know, the school I went to, like, probably over 70 of us who started, sort of, like, proper primary school in 1966, we meet now, OK?

That's nice.

We've kept in touch. And, eighteen different countries, and, over a 50-year period, and even a fortnight ago I was with one of them at the cricket. A month ago somebody came over from Calcutta and four of us went out for a dinner. So, being able to balance that, having strong roots, gives you an, an ability to explore.

Yes.

[19:11]
And I think, you know, that's part of what even makes me interested in, you know, the, wanting to be involved in archive projects. For a while I was a trustee at the Computer History Museum in the US.

Yes, I saw that.

But, I couldn't travel there regularly enough, so…

How did that come about, becoming a board trustee there?

Well they, they approached me. But at the same time, I'm involved with Web science, which is like, almost one of the latest and newest disciplines.

Yes.

So… And this… And I think that's the same answer, to do with giving people advice about migration and travelling. You have to somehow balance a good knowledge of roots in order to be able to experience completely new things. Not that you can't experience new things without the roots, but the two help.

[20:10]

But the two help. Because you've got a, you've got a base to start from haven't you. You mentioned school and education being important. I've read, and I can't remember if it was in your blog or somewhere else, that you plan to build a school at some stage in the future. You have a plan. And that's obviously something you and Tom Illube have in common. Can you describe that dream of a school to us?

Yes. I mean, you know, I've been, I've had friends build schools, I've had, I met a lot of educators in India. I think it's the only culture I know of where there is a day set aside called Teachers' Day, and it's a holiday.

Oh? Yes. Yes.

OK? The 5th of September is Teachers' Day, and it's a holiday. So the culture still has a great deal of respect for teachers.

Mhm.

And, being part of that culture has made me feel always that, learning is a very important part of what somebody does, and that, if I ever wanted something to help transform the world, then, I've never, you know, I've never seen anything better than giving people a chance at education.

Yes. Would it be a specialist school?

Well, the, the thinking about the school, and I've studied many models, one of my, one of my frustrations was saying, everyone keeps telling me that teenagers are in a growth phase, and therefore they are, they always want to sleep late, and, stay up late,

and it's what teenagers do, and it's part of how they're going through their growth. But it's rare to find a school that opens at eleven o'clock or twelve for teenagers.

Very rare, yes.

OK? And, so, the idea that we may want to look at schools and timing differently, was interesting to me.

Yes.

Then, until the Industrial Revolution, and, I guess many people will have seen Ken Robinson's sort of videos on education et cetera, maybe, what I learnt about schooling in India is that, there was, you know, a village school room, or sometimes it was a village school tree, you know, under which the students sat. And, two things occurred to me when I was trying to look at that, and, and I don't know the right or wrong, but it appealed to me that, education happened with mixed age people, OK?

Yes. So all the children from the village went to the same place.

Correct. And therefore, the school house, or the school tree, whatever, the school place, appeared to have children of different ages.

Yes.

And if you do that, you can't do chalk and talk easily.

No.

Right? So, that means that teaching becomes a facilitation of learning. And, you know, the teacher becomes a moderator, a facilitator, a coach, a mentor, a guide, going to groups of people of different ages, and saying, 'Consider this,' 'Have you thought this?' or, 'What are you trying to do?' or, 'Let me help you.'

Exactly.

And, buddy systems, children learning from each other, supported by each other, in a mixed age environment, appealed a lot to me.

And that would be much easier to do now with technology.

Yes. And, and the idea that we don't want fourteen testosterone-ridden boys all in one room – or thirty, fourteen-year-olds or whatever, it's the same, that's quite a problem to manage.

Yes, absolutely.

Isn't it easier to have mixed age, OK?

Mm.

And, we don't segregate on age and sex in society. Why do we want to do that at school? Would life not be more natural? So, some idea that the school room, school house mindset was interesting. That teaching in a way was almost less important than facilitating learning. The teacher…

Yes, absolutely.

You know, and, the best teachers I knew were all great learners as well, OK?

Yes.

So how do we sort of get around that was part of the challenge.

Yes.

[24:26]
And then, proceeding from that to saying, if learning is the right approach, how can we use technology?

Mm, yes, exactly.

Be able to bring expertise in.

Yes.

Because now it's possible, you know, like the growth of the MOOCs, or, you know, the Khan Academy kind of approaches, or, there's a guy called Sugata Mitra who, he came up with the term minimally invasive education. How children learn dramatically just through self-discovery.

Yes. Once they know how to learn…

Correct.

…they… Everything else is out there isn't it. Yeah.

Yes. And… So, it's not, you know, I am not going to demean the teaching profession, because I am a product of that profession, and I had a great, you know, experience at school, and, I also…

Yes. But it's an evolution isn't it.

Yes. But saying that there are some things that intrigue me.

Mm.

So, I am not, I don't want to change the world of education worldwide, but to say, what would it feel like if we could build mixed age schools where the children worked with each other, where the eighteen-year-old in the class was there partly to make sure the fourteen-year-olds behaved, because, those fourteen-year-olds will be more scared of the eighteen-year-old than they would of the teacher.

[laughs] Far more. Far more, yes.

And the six- and seven-year-olds had role models in that discipline.

In their class, yes.

Because, they wanted to help. And of course, in the class. And there wasn't any gender segregation, there wasn't any age segregation, and they learned collaboratively with each other.

Yes.

And, the teenagers would turn up for their classes later than the infants.

Exactly. Yes.

And, you know, the infants would come at, like, 7.30, because, [laughs] the parents would be quite happy…

The parents were off to work. Yes, exactly. Yes.

Yes. And… But they had been picked up at three, or whatever, and the older ones may turn up only at eleven or twelve, and they would stay later. And, it was still that community feeling.

Mm.

OK?

Yes.

And the teachers would be, like, world class experts, being able to be sometimes in person, sometimes via live TV, sometimes, you know, streamed, sometimes pre-done videos.

Yes.

And all those options were there.

Yes.

And the students were all connected, they were able to, to share, saying, 'Did you see that?' And somebody says, 'Well he's talking nonsense.' And someone else says, 'Well actually not, because I was reading this the other day.' And they are able to annotate and discuss the same way as they annotate and discuss things in the rest of their lives.

Yes, absolutely.

And, so, all that mix of saying, one of the reasons for technology to exist is to reduce barriers, OK? You know, I love the idea that people who didn't have access to many things, you know, if you were physically challenged, if you were, if you had mobility issues, if you had attention challenges, if you couldn't hear perfectly, it didn't matter what, we're now able to use technology as bridges to bring people into just the opportunity to be educated, that we couldn't earlier.

Yes. Mm.

And then saying, well why can't we do that even more? And just, think about education differently.

Yes.

[27:58]
I am also fascinated in reading that, a lot of the online courses, lots of people attend them; not everybody finishes them, OK?

That's true, yes.

And then saying, well, I wonder why.

Yes.

You know? They're more interested in learning than in the certificate. OK? And what's important to you?

Yes. And, and there are quite a few universities that are now doing just the learning part, aren't they?

Correct.

And not the, the finals and so on.

Correct. And maybe that's the important thing, because, if education isn't about learning, what is it about? And, and wouldn't it be easier for the teachers as well, OK, if you have, you know, mixed age, mixed environments, buddy systems. Peer recognition and respect as well drives a lot of children. So they will behave differently.

Totally, yes.

You know, when they have role models at one age, and older children who are looking on…

Looking… And that will give them a chance of learning about leadership as well.

Correct. It's… Why haven't I done it already? Because I think that, you know, there will come a time when it will feel right, but on the way, I try to support educational charities, I try to get involved where I can. So, many years ago, a couple of times I've done school governor type work; I have tried to support some people through school and university. And, so, I've always been close. And maybe I will never build that school, but, what I might end up doing is, I have collected a very large library, and it's

not just books, but, you know, mechanical computers, the, gramophones, printers, calculators, things that work without electricity, that we now see as digital. You know, even cameras. The idea that many of the things we do today, in a digitised sense, people have solved problems for in analogue terms, being able to share all that and let people see, this how these things used to be made.

Yes.

And, literally thousands of books. I am approaching 50,000 now.

[30:24]
And so, so that's a theme that's gone through from your upbringing as well, hasn't it?

Yes.

It's, it's normal to have thousands of books around.

So I've been influenced by those roots. And, the print, the interest in printing then became the interest in information. The grandfather, professor, made me have that continued interest in education, the Jesuits and how they tried to build around. And the school wasn't like a posh private school kind of thing, we, it was a full spectrum of people.

But nevertheless it was values and so on that were introduced.

Yes. And that, it all helped.

It does.

So… And, you know, and that, that helped be who I am now.

[31:03]
Who you are. So what happened after the first role writing manuals, how did you move to your next role, after the system manuals?

Well, it was a bit at a time, right? Writing the manuals meant I landed up being one of the experts about what was being built.

Mhm.

Which qualified me to be someone who would test it.

OK.

So, I started testing these things.

Mhm.

But when they test, when you tested them, or you wrote the test scripts and you did the testing, they broke. And sometimes salespeople wanted the stuff to work faster than they were ready [inaud]. So you suddenly, you started, not just testing, but fixing things so that you could write, you could build demos.

Mhm. Yup.

And suddenly I found myself in sales support, OK?

Right, yeah.

And that meant, you know, you were the person who walked around actually demonstrating the system while somebody else did the talking.

Yes.

And, before I knew it, I became a project manager, not… actually implementing the stuff that I had partly built, but others had done a lot more of the building.

Yes.

And, so, the, the testing, to building test scripts, to building demo scripts, to actually doing the demoing, became implementing.

Yes.

And then you had a whole different ballgame because, some of my earliest projects were implementing systems during Big Bang, when Broadgate was being built, right?

Yes.

Right? And project managers were a bit different then, because, you know, you, you had no mobile phones.

No.

[32:51]
OK, this is 1986, '87. So, you would get a pager message that the van coming down with, you know, 2,000 terminals, was stuck in a traffic jam on the M6. And, there was a loading bay time. And then you would walk to the site manager, and the site was a bit like [inaud].

Well absolutely. Yes.

And he'd say, 'Well if you miss your window, your next window is two months away.'

Oh.

And then sort of saying, ooh, this is going to be a problem, you know. But, you know, this is life, how do I fix it? You say, well, you're going to have to convince one of these guys after you to take your slot, and for all of them to move. To make it simple, find, when do you think you will arrive…

And go find that one.

Go find that one. And do the exchange.

It's a little bit like buying a house, isn't it?

Yes.

Yes.

But, but you know, but you had this sort of chain. And, you know, no project management teaches you about having to sort of, influence, convince, somehow cajole people into saying, 'I know it means that you're going to do it three hours earlier, but you might then, you know, I'll buy you a pint.' [both laugh]

Exactly. I've always liked RSJs! [laughs]

[laughs] Yes. But that was the way, you know, project management was. So, I became a project manager, and, then, from that, into saying, if you have good relationships with, with customers, then they start saying, well, go into sales.

Yes.

[34:30]
OK? And, so, suddenly I had gone from writing manuals, to being able to test systems, to building the systems, to demonstrating them, to implementing them, to selling them.

To selling them. Yes.

And, then, you suddenly, to designing them became important, because you know knew something about the market in-depth.

Yes. .

And suddenly after a fifteen-year journey of going from writing manuals to designing systems for banks, and before I knew it I was in a bank, right. And…

How did that feel?

Well it it's the dark side in away. [both laugh] Because, you know, I was always involved in banks being the people who paid money to, to get us.

Exactly. And now you're buy side, instead of sell side.

Yes. Correct. I mean although technically the bank call themselves sell side, in technology terms, I was, I had moved to the buyers.

Yes.

OK? And, and again you know, I was just a consultant, and they brought me in to, say, prepare for the euro, prepare for Y2K.

OK. Yeah yeah.

[35:41]
So, I joined the bank, but as a program director.

Yup.

But when you start running these what they call death mount projects…

Mm.

Right?   Because nobody wanted to do them.

No.

OK? Everyone had grown up to say, you know, 'I want to do the, the exciting stuff, and, you know, I want to build a trading system, I want to be working on this kind of PC, I want to do this,' and, I was saying, you know, preparing for the euro, I mean, how boring can that be, or preparing for Y2K, how boring can that be?

And we don't know what's going to happen. Yeah.

And they were like, big, grinding compliance programs. But what they did was, you got to know everybody. You knew the systems estate. You had to know every single piece of kit in the bank, you know, where it was, where it came from. You had to know something about the contracts that underpinned those services, the licensing, the architecture, the dataflows.

Yeah. And which bank were you in at this time?

Kleinwort Benson.

Mhm.

Which became Dresdner Kleinwort.

Yes. Yeah.

OK? So I had gone sort of, you know, mainframe through midrange through services onto banking, and then, actually with a bank, and, you know, I've now moved the clock nearly two decades to service training to work for a bank, and, I spent ten years with them.

Yup.

[37:04]
And then I left saying, I want to understand more about… You know, the, the Web was upon us, and, the new… So digital giants were forming. So, you know, Amazon

and Google and eBay had formed. Facebook and Twitter hadn't quite come along.
You know, and, we hadn't even dreamt of an Airbnb or an Uber.

Exactly. But it was beginning to gain the public on it.

Yeah, but, a networked economy, where big digital platforms were beginning to come
through. And I wanted to understand more about cloud services, right, understand the
Web in its, in its depth, more so than what I learnt in the previous fifteen years. And,
so, I joined BT.

Yup.

And I became Chief Scientist there before I left, and, that was now trying to say, why
was communications and telephony a different industry from computing? OK? How
did this happen, you know?

It's, it's like, twins separated at birth.

Correct. And…

Taking different lines isn't it.

Exactly. And then saying, well… So, sometime in the Sixties they went and
separated. And by the late Eighties we were using terms like, ICT began to emerge.

Yes.

OK?

That's true. Yup.

And then saying, wow, now, so these weren't two industries after all.

No.

And… And that decade was spent looking at how, you know, by the early Nineties we were, you know, I was seeing CRM systems being built with what they called computer integrated telephony.

Yes.

OK? So scripting then, you know, automated call diallers, and being able to build services that the person receiving the call would know who was calling.

Yes.

And now suddenly the computer world and the telephony world were beginning to merge.

To merge, yes.

And that convergence was at the heart of what I was also coming through to see as the Web. So I said, OK, let me understand more about that.

Let's have a look at that. Yes.

So I spent, four and a half years or so at BT.

Yup.

[39:18]
And, by that time this idea of cloud computing was really taking off, and, so now companies were saying, you know, software was becoming a service.

Yes.

OK? So you didn't have to have, you know, disks that you put into places, you know, and had to load software. It was a service that you consume.

Yes.

And, that, you know, the idea that we were going back to… Because when I joined the world of computing, we had people like ADP. They had, you know, you could, if you didn't belong to one of the big computing companies, you could rent time on timeshare.

Yes, of course you could. Yes, I had forgotten that. Yes.

OK? You know, that people all over the place, at universities and all that, if you couldn't afford a big mainframe…

Yeah, they'd go rent it wouldn't they.

…you would rent it.

Yeah. Yup.

And, even researchers were buying time.

Mm.

So, I had seen these companies, I had seen the model. I'm saying, wow, you know, we're going back to some sort of sharing.

Mm.

And it intrigued me, because, the idea of consuming and not buying licences and having to buy lots of hardware, but that somebody would deliver you a service, as if you were buying almost anything else, just made sense. And that made me go join the salesforce.

Yes.

OK? And we were one of the sort of, leading cloud source companies.

Yes, absolutely. Yes.

[40:40]
So now seeing the real shift to say, over a 25-five-year period from saying shift-in and hardware margins would keep the world alive, to saying it was about software, to saying it was about service.

Yes.

And, so I bought into that, and that suddenly, you know, I found myself, you know, beginning to articulate, I had spent, you know, the best part of 35 years in the industry.

In the industry, yes.

And, the later parts of that, as more things got connected, because, you know, the logic was a bit like, when I started, people were still using the Thomas Watson, 'I think there is a market for five computers in the world.'

Yes.

OK?

Yes.

And at the mainframe level, no one thought there will be more.

Yes.

Then by the time I joined Data General, you know, we were listening to, well not just Ed de Castro but people like Ken Olsen were saying at Digital, why would there be a computer in every home?

Yes.

OK? Because they were thinking about the office computer and the mid-range.

Exactly.

OK?

Yes.

[41:54]
And then, the PC revolution, which started maybe 1976/77, but my experience, it was '81, '82.

Yes.

As that sort of marched on, you know, by the time Bill Gates and, and Steve Jobs had done their bit, sort of saying, of course everyone would have a computer in their home.

Everyone wants one. Yes.

But why would everyone want to connect to the Internet?   OK?

Mm.

And then suddenly, you know, that changed, and, by the late Nineties, you know, the Web was there.

Yes.

But you had, even then they had Steve Ballmer saying, you know, 'Are we really going to have everyone with this kind of smartphone?' [laughs]

Yes.

OK? And then look at us now, you know. My cat knows how to use my iPad. [laughs]

Yeah, exactly. [laughs] Yes.

OK? And, so we now live in this world where, you know, we are using touch, we are using voice, we are using gesture.

Yes.

The keyboard's disappearing in front of our very eyes.

Yes. Yes.

So I feel it's full circle. And now it's back again to saying, data is the new oil.

It's the new oil. Yes.

Information and its accuracy, its provenance, have become important.

Yes.

So I've watched the computer become huge, become smaller, get everywhere. And, now, many of the blue chips are saying…

That's sort of disappearing isn't it. Yes.

It's sort of disappearing. And it's not about the computer any more but the information, right?

Information that's in there.

And that's why when I'm sitting here saying, you know, this is the Worshipful Company of Information Technologists… .

Yes.

OK? And the I has become…

It's become the big thing, information.

…the big thing.

[43:30]
Well I noticed in your TED talk that you mention open source and disruptive technologies.

Mm.

Can you tell me a little about that?

Well it's, I guess by the time, I told you I was influenced by, you know, watching and hearing stories about the Grateful Dead, OK?

Yup.

And, even when I was a youngster, one of the things you really treasured was finding someone who had got, like, a tape of the Dead.

I must look them up, I don't know anything about them.

They played more concerts than pretty much everybody else put together.

OK.

If you go to the Internet archive, they have their own tab.

Wow.

OK? So they were a performing band, not a recording band.

Yes, not a recording band. Yes.

OK? They recorded, but, they were known for their endless concerts.

Yes. Mhm.

And, there was something about the way they set up their concerts that was different, which is, the first few rows, and I've attended many concerts, not as many as I'd have liked because, I was old by the time I got to see them, and so my, my time of watching them was in like, between '67, '68 and '85 I didn't watch them.

Yes.

And '85 to '95 was the bulk of it, and then after Jerry Garcia died I saw another, maybe, dozen concerts. But, you know, I haven't seen one for a few years now, and they, they don't play any more.

No.

But, they used to have taping rows, OK. Where everybody else would say 'Shh,' you can't, over there, you actually put professional gear down on the first few rows to tape it, and they encouraged people to trade those tapes.

Right.

OK? And, so, you would actually know who the, the best tapes were, and these were not the official records. These were effectively, you know, official-unofficial tapes.

Yes the, the fans that were taping.

Correct. And there's a community of traders, and one of my, my oldest cousin became a big collector, and I was amazed at how, even in India, you could get hold of these tapes and watch that market. And then, much later on, this idea that, there is power in community, which goes back to these flipping roots…

Goes back to the hippie, yes.

…became more visible in software, right? So, you know, it's a different data point I guess. When I was, when I started with computers, you had people like IBM and the bunch, OK, Burroughs…

The whole… Yes.

You had UNIVAC, NCR, Control Data and Honeywell, I think, that original bunch.

Mm.

And, that was without counting the minicomputer, because the PC hadn't come yet.

Yes. Exactly, yes.

But, the stacks were proprietary. If you built something on a Burroughs computer, it wouldn't work on an IBM or, or an ICL for that matter.

Absolutely.

Yeah. And, and that meant that all your discipline, all your skills, were not fungible. You were a Burroughs programmer, you were an IBM programmer, you were a... You know, or a DEC programmer, or a… And…

So they had not only got the customers bought in, but the staff…

Correct. And so the skills…

It made it less mobile for them. Yeah.

[46:58]
Exactly, no fungibility at all. And, sort of, you know, a number of things happened you know. I guess, probably American Antitrust, you know, anti-competition law, they were forcing IBM to be very careful, because they were constantly getting beaten up because how big they were. And, they gave away almost the right to Microsoft to exist and build a whole new business.

Yes.

Because they couldn't afford another monopoly.

No.

And, people were going after AT&T, and the break-up of AT&T and the Baby Bells as they call them et cetera. But part of what happened then was that UNIX became free-to-air, you know.

Yes.

This System V became available. And that mixture suddenly meant that, in the rest of the world people who could not afford to buy the proprietary architectures, they were working in UNIX you know. And so we used to use terms in the mid-Eighties like open systems.

Yes.

OK? Not open source.

No. No.

And, I think somewhere within this idea that openness leads to greater collaboration, greater connectivity, greater sharing, that created an environment where the barriers to entry for people to innovate kept reducing.

Yes.

So that's, it's, it's in that environment where suddenly you had ten different types of UNIX. You had sort of, POSIX and AIX and, HP-UX and all that. And then…

Yes, [inaud] and… Yeah. MX and… Yeah.

And along came people like Linus Torvalds to say, you know, 'We've got to simplify and get a kernel that's nice and pure.'

Yds. Exactly, yes.

Right? Before that you had, you know, sea shell and bone shell kind of discussions.

Yes.

[48:43]
Everyone had fragmented. And then, the Linux community began to change some of it.

Yes.

And you saw the power, and then, you know, a decade later, you know, early 2000 I met Brian Behlendorf, and, you know, he was responsible for Apache, and…

OK.

So you started seeing how communities were building a stack where things that were truly commodity were coming out of an open community, and the speed at which it was getting improved was, none of us is a smart as all of us, and what I think Eric Raymond calls Linus' Law later, which is, in a community, bugs get found more quickly, improvements happen more quickly, because of the power of inspection. So the phrase used to be 'given enough eyeballs, all bugs are shallow.'

Yes.

OK? And that's the same principle as security through transparency, rather than security through obscurity.

Yes. Yeah.

OK? Somehow, through transparency there is power. So, improvement and adaptation happening at pace.

Mhm.

People being able to add functionality, because, the number of use cases were diverse.

Yes.

So, the power of the, of the, the software, grew at sort of breakneck pace, a ballistic pace.

Yes.

So those were the things…

That made it open to everyone to use it

Correct. Open meant open to competition, open to change, and, Doc Searls, one of my favourite sort of philosophers in that area, you know, used to say, nobody owns it, anybody can use it, everybody can change it, sort of thing.

Yes.

And that NEA? kind of rule

Mm.

And, one of the things that he and I sort of, used to, again, theorise about was this thing called the 'Because Effect', OK?

Yeah.

People like IBM, at the change when you moved from proprietary to open systems, the switch that was made was, rather than make money *with* something, because it was proprietary and I owned it, I made money *because* of something.

OK.

OK?

Yes.

So IBM make a lot of money because of Linux, but they don't own Linux.

They don't own it. Yes.

OK? But they did encourage a lot of people to contribute to Linux, right?

Yes.

And then it paid off for them. But they managed to contribute to something that was community owned, and it spawned a lot of people, you know, like the Red Hats of this world…

Mhm. Yeah, exactly.

…to say, there is… You can still make money, but you make money *because* of something rather than *with*.

Yes.

And, that known propriety environment is I think the heart of open.

Yes. I think that's good. I like that. Thank you.

OK?

[51:35]
I'm going to go off topic sideways.

OK.

You like cooking.

I love cooking.

I recently read your, a little bit of your book about the ragù from Bologna.

Yes.

Particularly because I've just been on honeymoon to Bologna.

OK. A great place. [laughs]

[laughs] A great place. My personal question is, how did you get in all the kitchens that you wanted to there? [laughs] Did you just ask? How do you go about doing something like that?

Yes. The… I had never been to Bologna, and, to me spag bol was something I didn't particularly like, OK? It was OK, I mean…

Yes.

You know, it was like being told, you know, I'm going to have, you know…

Yeah, pizza.

Yeah, pizza, or chilli or something. I mean, they're all great, but, I wouldn't, you know, walk a mile to have a spag bol.

No.

And, then I found out that, you know, Bologna had the oldest university in Europe.

Yes.

And that some of the greatest understands of the human anatomy were taught there. You may have been to the same theatre. [laughs]

Well, we had, I was only there for a week, and it was a honeymoon. But yes, we found out a little bit about the city while we were there, yeah.

And then they had this lovely walk in the city, plan, you know, the porticos. So one, you know, .there is a sense…

What a marvellous idea.

Yes. And, you know, mixed dwelling, so that…

Yes, there's no downside to that city.

Yes, correct, no, there isn't a downtown.

Mm.

So, it was OK to have shops and offices on the ground floor and people living up there. And, during the day the, the tables weren't out there; by the time we early evening came, it was like sidewalk cafés.

Exactly. And if it's hot or if it's raining, or if it's snowy, and you've got the extra room. It's just genius. I can't imagine why it isn't universal.

So having learnt all that about Bologna and preparing to go there, I sort of said, and these were the people who gave us spag bol; there must be more to it than that.

[laughs] Yes.

OK?

OK.

So, the first place I went to, I said, 'So, what's this?' And they said, 'You know, you're talking about ragù. But our ragù, you know, is different.' 'And why is it different?' 'They said, 'I will show you.' And it looked this golden colour, and not red.

Yes.

And, I said, 'And that's not spaghetti.'

No.

They said, 'No. Because we want some sort of, ridging on the pasta in order to be able to collect the bits of sauce.'

Yes.

And this made sense to me.

[laughs] Yes.

You know, you want a surface that's not too, sort of, smooth.

Exactly, yes. Smooth, yes.

So, they said, 'We use this thing called gramigna, which is like a, a comma shaped thing, you know, just a little squiggle.

Yes.

And so gramigna. And said, 'And why is this not red and tomato-y?' He said, 'Because we don't put that much tomato in it.' 'I see.'

Different ingredients, yes.

Can I see?

OK.

OK?

Yes.

Because, I was looking at the dish. I wasn't to see how you make it.

Yes.

And he said, 'Well you finish your food and I'll take you in.'

Wonderful.

So I went in to the first place, and, then, I said, 'But, you know, that's not beef.' He said, 'No, that's pork. And, I do 50-50 beef and pork, and it's not just pork, it's sausage meat.' So, ah.

Ah.

So, I said… He said, 'The dish is called *gramigna alla salsiccia'* Good. Now suddenly, I was interested.

You were interested, yeah.

And, so much less tomato, sausage meat, kind of herby mix.

Yeah.

And then suddenly, because it's that sausage meat environment, I found out the guy was using some white wine.

OK.

OK?

Yeah.

And then saying, oh, white wine…

Rather than red, yes.

…rather than red. And then he was able to use milk or cream, which you wouldn't use with red wine.

You wouldn't. But the funny thing is, I saw Delia Smith saying, the only way to make spaghetti bolognese… And then you put half a pint of cream in.

Yes.

And so she's right, isn't she?

Correct. And then, the fact that these guys were saying… You know, and each of these choices, you know, sausage meat, naturally balancing beef and pork, herbs getting perfectly balanced because it was in the sausage meat, the fatty nature of that, because you can't, you know, lean sausage meat is a bit hard to find...

[laughs] It doesn't happen.

It doesn't happen.

Yes.

Means that it's OK for you to add white wine. Because it's white rather than red, it's OK for you to add cream because, instinctively you wouldn't put a big dose of cream where, with red wine. And then that created a beautiful golden brown colour.

Yeah.

And, and he said, 'You would spoil it if you put too much tomato.

Yes you would, it's overpowering.

Correct. And so, once you saw one, and sort of saying, well one swallow doesn't make a summer, I do like to test it out.

So you went on a mission. [laughs]

I went on a mission. And I looked, and said, all these guys, they had little changes, you know, they, they would change the *soffritto* a little bit. You know, what was the base of, you know, carrot and celery and, onion, what was the ratio of that? How would they soften it, to this sort of, under-fried level? When would they bring in the meat? How would they get the meat to seal level? And then once sealed, in what order, when do they add the garlic, when do they add the herbs, what's fresh, what's powdered? And, they had, you know, they were prima donnas, they all had slightly different…

They all had their own version. Yeah.

But I could watch all of them, and taste.

And you have a JP version?

Yeah. And, well, actually, through the blog, one of the guys I met, his grandmother was Italian, and, so he found her recipe. So I use that as a base, and I, and I still, you know, a bit like they say the Grateful Dead never played the same song twice, identically, I never cook the same…

It's never going to be exactly the same.

Yes. So then you know, oh what's, what am I short of today? And what shall I substitute, or shall I leave it? And, when I really want to cook it, I cook it for eight hours, OK? Like almost overnight.

Yes, I saw that, that you had got pictures of how it starts, and where you want it to end up. Yeah.

Yeah. And then, you know, you,, you learn other things about, you know, how your… You know, there is very little difference for me between language in communication stance and mathematical formula, a recipe, and a computer program.

Yes.

OK? They all are some form of symbolic logic in a way, to say, take these, do this with them, to get this.

Yes.

And, wait for this much. Do this so many times. So, the…

Yeah. Repeat this for this length of time. Yeah.

The looping, the repeating, the, the tempos. Music, again, the same thing.

Yeah, exactly. It's following a logical fashion.

So, at a level of abstraction, I think of all of them. And I'm interested in all of them. Right?

[59:02]
I think that's nice. How do you, the projects that you give your time to, how do you look for those now? They obviously fit the same fundamental foundation.

The… I've been very lucky that for most of my life people have paid me to do things that I would have done for free if I didn't have to earn money. OK?

[inaud].

No, but, but it's, you know, when, when you get paid to do something that you are passionate about anyway, it's actually great…

Yes, Well, as Dame Stephanie says, she doesn't do work because she'd rather do something else.

Yes. Yeah, and that's, that's the that's the way I feel. And, somehow, without a specific plan, I think the only plan in my life has been, I wanted to be educated, and I wanted to continue to learn.

Yup.

And then, that learning has taken me on a journey where, I've moved industry, but always kept this sort of, information thread running through.

[1:00:04]
Yeah. Well you're back in a bank now, as the Chief Data Officer. What does that entail as a job?

Well if you imagine what a bank does, OK, it doesn't make anything in physical terms. So it has customers, and it has some capabilities, and it provides things to those customers using those capabilities. And all of it is reflected in data.

Mhm.

Right? When someone, you know, pays a bill now, they might say they're using a credit card, but what I see my wife doing is intoning a set of numbers saying, 'Can you give me the long card number please? And now the expiry date. And now the three digits on the back.'

Absolutely. Yeah.

So, actually, sixteen digits followed by four digits followed by three digits is, somehow a transaction.

Yes.

OK? And that says, move money from this ledger, this account, to this one, and as a result, something gets credited, something gets debited, and some good or service wing their way somewhere.

Yes.

OK?

Yup.

So, banks, what banks do there, you know, I've heard my CEO say it, I've heard other people say it, but it's, they're [inaud]. [laughs]

Yes.

And, the lifeblood of what happens in a bank is data. The regulator wants to know that you are reporting things accurately. Where did this come from? How do I know you didn't change it? You know. Where is it going? How do I know that you've added this up right?

Mhm.

The customers want to be able to be served, you know, wherever they are, whenever they want it, however they want it.

Absolutely, yeah.

So, 24/7 banking, using phones and all that. Well, what are you actually doing? You are sending data around…

You're running a big data centre aren't you. Yeah.

Yes. Correct. And, then, being able to, you know, the business of banking, a lot of it is to do with an underpinning of trust, and some premium for managing risk. Right? These things are very data-intensive.

Yes they are. Very much so.

So, you know, a part of me says, 'I'm still in the information business when I'm Chief Data Officer of a bank, because, sort of saying, can I be sure that the sources are authoritative?

Mhm.

Can I be sure that the journey of data from the source to the object is protected, is pure? If there are privacy issues or confidentiality issues, can I make sure that only the people who have the entitlement to touch this or see this are the ones who can? If encryption is requited, can I make sure that it's done to the right level?

Yes.

And can I make sure you only see your data and not somebody else's?

Yes.

And, that was right across, OK?

Yes.

If there is a need to be consistent about market behaviour and all that, can I make sure that those rules reflect it correctly from a data perspective?

Right.

So, you know, the, the chief data officer role may sound new.

Mhm.

But the reality is that as more and more people get connected, as we live in a hyper-connected world, the amount of data that we are generating is huge.

It's absolutely enormous isn't it.

And it requires new disciplines to be able to manage that right.

Mm. Mm.

You know, to archive it for, to make sure data protection is carried out, to make sure that, you know, financial crime, fraud, are correctly prevented, to make sure cyber security is right, et cetera.

Mhm.

There are all sort of, you know, bees flying around the honey for data.

[1:03:54]
Yeah, exactly, yeah. There are all the threads that you pull together. And in, simultaneously to that, you are the Professor of Electronics and Computer Science at Southampton University.

Well I'm an Adjunct Professor there, but, you know, I've been able to meet some of the cohorts, the, you know, the doctoral candidates, and been able to see the projects or what they do. Get the chance to be able to speak to them at scale, you know.

That must be very exciting.

Yeah, because, again, you know, the, at the heart of that is a deep belief in Web science, OK, saying that… One of the saddest things that I was told by my granddad was, that I might be living in peak longevity generation, right? That throughout history as far as we know man's living longer than the previous generation. But that may be about to turn, OK? We have problems with nutrition, problems with health, the remaining illnesses and condition, medical conditions, our immune system imbalances whether it's, you know, diabetes or cancer or heart or, you know, Crohn's, or IBS.

Yes. Mhm.

We're now living at a time when our medical conditions are more complex, right?

Yes.

We have real challenges to do with energy, with water, with nutrition. And, all that's happening at a time when, for whatever reason we are seeing some pushback against globalisation, and, these problems are global.

Yes.

They need collaboration.

They do. Yes.

OK? And, the Web and Web science and taking the emotion out of it, learning how to study data, to have dispassionate scientific evidence for being able to do things, to base decisions on, on evidence, becomes very important. And we are having to do that with much larger quantitative data than we have ever done, spanning cultures and time zones, with very different political overtones and undertones.

Absolutely, and behaviour patterns.

[1:06:05]
So suddenly a scientist today has to learn not just about, you know, a data scientist now has to become a Web scientist in many ways to, say, learning about privacy, learning about confidentiality, data protection and stuff. Learning about law, learning about usage and, you know, the, the sort of, the UI/UX kind of challenges.

Yes.

Learning about ethics and morality within it, you know, anthropology.

Yes.

So now, there is a, a cloning, you know, of many disciplines. When you want to study what humanity is doing, as the social sciences become capable of generating data that are worth studying, we can start applying scientific methods to a much wider array of data.

Yes.

And that's what Web science is set up to do.

Yes.

And it was my interest in Web science that led me to start getting involved with the University of Southampton, and where that comes out.

[1:07:09]
And where that comes through. So, do you have more goals for the future? I mean we've talked about the school, but are there other goals that you would like to…?

Well my, my first grandchild is two and a half, and, my second grandchild is due any moment. I have always been fascinated with this idea that, well the original ideas to do with innovation and technology were to do with, you know, necessity being the mother of invention.

Mhm. Yes.

So, early teaching suggested that, one reason why people invented things was because there was a need, a problem to solve. And another reason became, well I saw something and I saw its use elsewhere. Now the common example I give for the, the first is, you know, things like inventing aircraft engines and then jet engines. Now I want to fly; how am I going to solve that?

Mhm. How you are you going to do that? Yes.

Yes. And you also have to learn about, you know, resistance and wind and wind speed and, what kind of lift you need to be able to do that, the ballistics, the aeronautical design. All kinds of things to solve.

Mhm.

And the other extreme you see, I saw something I could see a use. The best example I can think of is things like, you know, the… Oh, what do they call that? The word. And I've lost it. But the, you know, the two tapes you pull apart. Velcro.

Oh yes.

OK?

Yes, yes, Velcro, yes.

Saying someone watched a dog, you know, run through a bush and run through grass and all that, and they collected burrs.

Yes, they did. And get stuck, don't they.

So this idea that you have very cohesion, because the burrs would stick to that fur as they go out.

Yes, they've got all the little hooks on them haven't they.

Yes. And they go through bushes, go through rivers and all that, and the burrs will still be three.

Yeah.

But, you could just pull the burr off very gently without damaging the burr or the dog.

Or the dog. Yes. Yes.

And that became Velcro.

Mhm.

OK? And… But, a guy called Kevin Kelly kept talking about a third element, which is that, innovation, innovative technology, also exists to speed up evolution. OK? And I think one of the first examples he gave was, well, you could have evolved to have bullet-proof skin, OK?

You could, yes.

Over millions of years, keeping getting shot, keeping dying, and, however we responded to those challenges. Or you could just invent Kevlar.

Yes.

OK?

Which is much more immediate. Yeah.

Correct. So, the idea that part of what technology does is speed up evolution is there.

Mm.

[1:10:02]
And currently, I'm, you know, for personal reasons, I mean like, I have a very expensive device in my chest, OK, it's called an ICD, an implantable cardioverter defibrillator.

Right.

But my left ventricle doesn't work.

OK.

OK? And…

So technology has taken over.

Yes. So I'm, I'm partly bionic in that sense.

Bionic. Fantastic.

And, you know, that was eleven years ago, and, and I can live a normal life.

Mm.

Because someone did something, and, did something. And, all around me sort of, you know, whether it's the, the contact lens in my eyes, or the, you know, the tooling in and around my heart, or, the way people have used sort of, ultrasound to deal with, you know, to sort of, physiotherapy pain issues as well as…

And we've got robots performing operations haven't we.

Yeah. And, and so much of, you know, my life has been at least accentuated and enhanced with technology, I can see a, a very different future in how we deal with our health.

Mm.

And if, if my first focus was on education, I think, I'm very close to thinking, learning about better health habits, teaching people to be self-sufficient in that, learning how to build community. So, sufficiency does not mean isolation. But we are going towards an environment where the sharing of information, the ability to learn, the ability to share that learning, the use of non-invasive technology, even in the home or on the person, we are already in the midst of a revolution in health.

Totally. Totally.

And that revolution is going to accelerate with, with the I, right? Machine learning, supervised and unsupervised. And all that goes back to better understanding of data.

Mm.

[1:12:20]
And then, as you talk about robotics and, you know, autonomous things from cars through to, you know, surgeons.

Yes. Because they don't get tired, do they, computers.

Yes. But…

We get tired, after a day's work.

Yes. But, but we have to learn about ethics.

Yes, absolutely.

We have to learn about morality. As the things we build become more and more autonomous, we also have to understand the ethical environment for them. So on the one hand I'm really excited by the, the promise of the future of the industry that has kept me, you know, fed and watered pretty much all my life.

A roof over your head all your life. Yes.

On the other hand, I see the need for, sort of, for deeper cross-disciplinary understanding of the human and social side of these things.

Yes.

And that also becomes, where is that going to be solved? Through policy. How is that policy going to be arrived at? Through research. How are we going to be able to share that? Through educating.

Mhm.

So, it all becomes…

Full circle isn't it.

…full circle.

[1:13:25]
It is full circle. What advice would you give to young people coming in to IT today?

I think, three things. First, you know, come in as a learner, knowing that change is a constant in the industry, and that you are going to have to keep learning. OK? So many things that we've, you know, even, I've spent 37 years in the industry, so much has changed during that time, and the pace of change is quite scary.

Yes.

Right?

It is.

And you have to get used to that and be normal with it. The second is, when you do anything, think about whom you are empowering, which disenfranchised community you are releasing into franchise. OK? Because, if through acknowledging information technology we are not empowering people, then, we shouldn't be doing it.

We shouldn't be doing it. Yes.

And the third is, believe in the power of community in doing it. The most great inventions and innovations have happened because people have collaborated.

Yes, they've dome together.

Sometimes they've competed, but they have done that in community.

Mm.

And, the power of community is essential, and it goes all the way back to the hippie roots. [laughs]

[1:14:52]
Of course. [laughs] It's always back to the strong foundations. Did you have mentors along your journey, and, I mean formal or informal?

Almost entirely informal.

Mhm. And how did they help you?

I think, my first mentor was my prefect of discipline at school. And, it was his job to be prefect of discipline. It was a guy called Father Camille Bouche. And, he taught me how to lose.

Mhm.

And it was really important for me, because, there was a sense of blue-eyed boy up until then.

It can be a very difficult lesson.

And I… And therefore I would have tears in my eyes in just coming second. I had tears in my eyes in being challenged about anything. And, accepting that it's OK not

to win, and that it's OK not to be right, to be wrong and to accept you are wrong, and to learn.

Yes.

Right? My ability to go into… You know, one of my other mentors, although she may not even always know she's been a mentor, was a woman, is a woman, named Esther Dyson. Esther, sort of, Freeman Dyson's daughter, and a great technologist. And, and she had this lovely typed line in her emails, 'Always make new mistakes.' OK?

I like that.

So, moving from this learning to lose, to accepting making mistakes is OK. It's repeating mistakes that's not.

It's repeating them. Yes.

OK? How do you learn from them?

Yes. Once is a mistake, twice…

And that became part of the mentoring. I've been very lucky with bosses, and, the… You know, and rather than name each of them, which would be a long list…

No, of course, yes.

[1:16:47]
I think I took away three lessons from the collection of great bosses I've had. One is, understand your own limitations, OK? So, you don't have to excel at everything. Working in a team, if you understand your strengths and your limitations, then you start getting people who complement you, rather than compete with you.

Yes. Competing, yes. Absolutely. Yeah.

And, that was a big lesson.

Mm.

Because I was trying to be all things to all men up till then, and early on I could learn to understand my limitations.

Yes. And quite a relief to put that down.

Right.

Yeah.

And then, the second thing was, this idea that the best strategy is to hire good people, and learning from that that good people meant that they had to be better than you at what you did, and this idea that you learn from the people you hire, made the whole idea of coaching and mentoring and leading very different, right? That's it's imperative that you hire people and you attract people who are better than you.

Yes. because they're the specialists in that area. Yup

And so… Then, you know, I was talking to someone a week ago, and he recommended a book which I have ordered, I haven't seen yet, may not be released, called *Multipliers*, and this idea that leadership, one of the things that good leaders do is, they don't suppress the talent under them; they multiply that talent.

Multiply it, yeah.

And then you heard phrases like 'standing on the shoulders of giants' and stuff like that. But I've been blessed with quite a few bosses who looked to build me up, and not to suppress me.

Yes. Not… Yeah, not to be the big 'I am', but, to…

And, and then the third element, which was a harder lessons to learn, was prioritisation and focus.

OK. Yes.

And that, because I was energetic, enthusiastic, optimistic…

And have a wide range of things you're interested in.

Yes.

Yes.

It was very easy for me to get lost, OK? So I can be very, very busy achieving not much.

Yes.

And then, part of that was to say how do I ask people around me to help me execute.

Yes.

Right? And I remember the late Eighties I read a book called *Leadership is an Art*, I think that was the name, by a guy who, of all things, ran businesses that made chairs. He belonged to Herman Miller. His name was Max De Pree. And his sort of leadership statement, which was short and succinct and very sweet, you know, the first job of a leader is provide strategy and vision. The next is to say thank you. In between me is a servant and a debt. OK? So the idea of servant leadership to say that you are there to help the people who work for you. You lead them by being consistent about the vision. And you are there to help them get barriers out of the way. And you learn from them because they are better than you.

Yes, exactly.

And you also learn to be simple about prioritisation and focus, don't try to do too many things.

No.

I'm compressing it all, but, it's like saying in 37 years of working in this country, I had teachers…

You had marvellous teachers.

…who, who encouraged me at every stage, but who taught me just those few simple things, you know, people are the most important asset; they've got to be better than you. Leading is serving. You understand your limitations. Prioritise. Make mistakes but don't repeat them.

Yes, yeah, wonderful lessons.

Yes. And you know, and, and I've just given the ones that I walk with.

[1:20:56]
Yes, that spring to mind straight away. Yes. Absolutely. No, they're good. I notice you're a cricket fan.
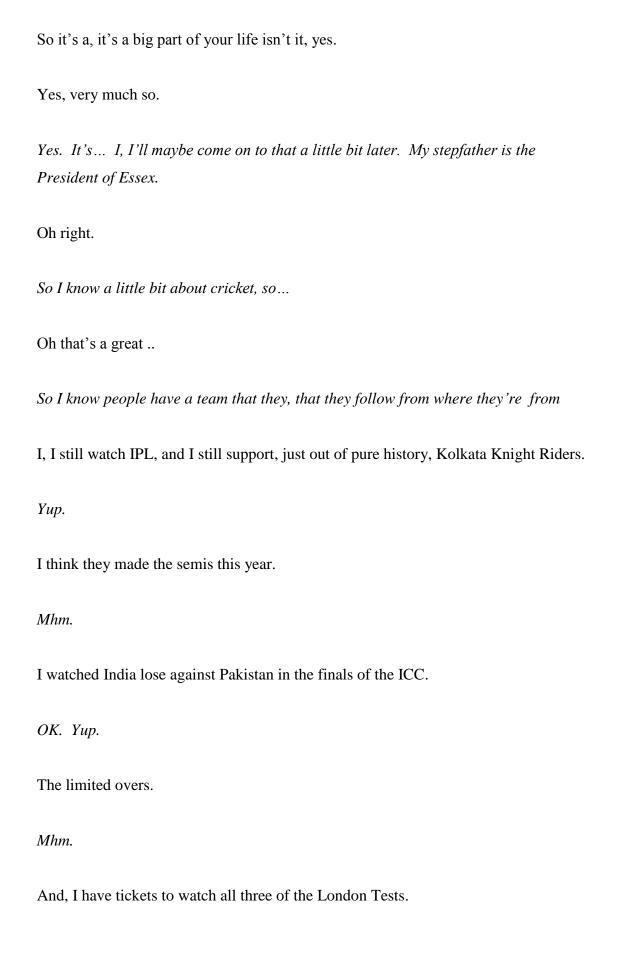
Yes, and I will be at Lord's on Sunday. [laughs]

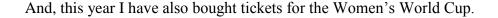*[laughs] I was just going to say, who's your home team?*

Well, having spent 23 years in India and 37 years in England, I only watched India lose between 1966, December, when I watched my first Test, and 1979, '80 I watched my last. I never really watched India win. But, after coming to this country, I watched India win a few times.

Which is good.

And, I failed the Tebbit test.

Oh I see.

OK?

Yes.

I…

I was thinking more in, are you a, are you a Surrey fan , or an Essex, or a Gloucestershire, or…

I, I happen to have seats at Lord's and at the Oval.

Very nice.

So, Middlesex and Surrey.

Middlesex and Surrey. That's not a bad combination.

Yeah. So, you know, it doesn't matter which side of the river I… But, I support England against everybody but India.

Yes.

So… But when England play India, I, I'm torn, and I probably say my roots support India, but I have watched England play far more often than I have ever watched India, and, I don't hold any season tickets at Indian grounds.

No.

But I love cricket.

So it's a, it's a big part of your life isn't it, yes.

Yes, very much so.

Yes. It's… I, I'll maybe come on to that a little bit later. My stepfather is the President of Essex.

Oh right.

So I know a little bit about cricket, so…

Oh that's a great ..

So I know people have a team that they, that they follow from where they're from

I, I still watch IPL, and I still support, just out of pure history, Kolkata Knight Riders.

Yup.

I think they made the semis this year.

Mhm.

I watched India lose against Pakistan in the finals of the ICC.

OK. Yup.

The limited overs.

Mhm.

And, I have tickets to watch all three of the London Tests.

Oh OK.

And, this year I have also bought tickets for the Women's World Cup.

Right. Yes.

And for all the, the T20s.

Yup.

And…

I, I'm OK on the T20; I couldn't do a full Test. A T20 I can do.

Yes. I, I… In Calcutta I have done all five days and the rest day in between. And in England, the best I've done is three days. I've done a Saturday, Sunday and turned up for the Monday, when the Test went to Monday.

It changes, doesn't it. When you go to a Twenty20, it's fast-moving, fast pace, a lot of noise, a lot of energy around. And, a five there is much more like a game of chess, isn't it.

Yes. But... But I know something, and it's…

It's all the tactics and…

At some point I'm an old fuddy-duddy. I don't know whether I'll go to cricket once they stop wearing whites. [laughs] OK?

I agree.

The five-day test, the wall of attrition that, you know, that you could play for five days and have 90 overs a day, and, at the end of five days it could just be a draw, or it

could be the most exciting, nail-biting win by one or the other, or even, as has happened at least twice a time, the madness of data to do with cricket.

Yes.

You know, the Bill Frindalls and the Wendy Wimbushes, you know, stat or eat your heart out cricket, is where the statistics are. [laughs]

Well, I, I mentioned my stepfather. I said to him the other day, 'How was cricket yesterday?' And he said, 'Oh it was terrible.'

OK. Ask him this question.

'We lost by three runs.' And I said, 'At what point?' He said, 'Oh it was in the last ball of the game.' So up till then, the whole day had been great.

Yeah, everything…

But on the last ball, it was a bad day.

Yeah, well you can ask him this question of mine. I used to call them un-google-able questions. But obviously as soon as you write about it, they become google-able.

They're goggle-able. Yes.

But, one of my favourite pastimes is, saying, imagine the world of Test cricket individual innings to be bingo courts. OK?

Right, yeah.

So the lowest anyone has ever scored is zero.

Yup.

The highest that anyone has ever scored is 400.

Mhm.

And, there's almost nothing between, 364 and 400, because there's been, 64 or 65 and 375, and 380, and a 400. And, so, we've had over 2,200 tests now. What's the lowest number that no one's ever scored? [laughs]

What's the lowest number that no one's ever scored? I'll ask him.

OK?

Yes.

No batsman has ever ended his innings, out or not out…

What's the lowest number that no one has ever scored?

At cricket. OK?

Yes.

Knowing that the smallest number, zero, and the largest number is 400. It's a number between zero and 400.

Yes.

And obviously, every now and then someone goes and scores it, and moves the lowest number up.

And moves the lowest number up. Yes, exactly. Yes.

So it's, it's a moving target. Right?

Yes. Yes.

But that's the kind of statistician stuff. [both laugh]

It's been an absolute pleasure to meet you, and to have an interesting and wide-ranging discussion, and I just want to thank you for having the time to come to us and being so honest and candid in your answers. Thank you very much.

Oh a pleasure.

Thank you very much.

[End of Interview]