

House of COMMONS

MINUTES OF EVIDENCE

TAKEN BEFORE

TRADE AND INDUSTRY COMMITTEE

PROGRESS TOWARDS THE KNOWLEDGE DRIVEN ECONOMY

Tuesday 20 January 2004

MR PHILIP VIRGO

SIR JOHN CHISHOLM and DR ADRIAN MEARS

MR JOHN HIGGINS, DR PHILIP HARGRAVE and MR JOHN WOODGET

Evidence heard in Public Questions 1- 82

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Oral Evidence

Taken before the Trade and Industry Committee

on Tuesday 20 January 2004

Members present

Mr Martin O'Neill, in the Chair

Richard Burden

Mr Michael Clapham

Mr Jonathan Djanogly

Mr Lindsay Hoyle

Linda Perham

Memorandum submitted by The Institute for the Management of Information Systems

Examination of Witnesses

Witness: **Mr Philip Virgo**, Strategic Advisor, IMIS, examined.

Q1 Chairman: Good morning, and welcome to our inquiry into the knowledge based economy. We are grateful for the information which you gave us, which is extremely fulsome. Perhaps we could start off with what seemed to me quite a controversial point that you were making. In your evidence you point to the OECD research which ranks the UK workforce as bottom with regard to workforce skills as measured by qualifications. Would the conclusion to be drawn from that statement be that the UK does not have the skilled workforce necessary to compete in the global economy?

Mr Virgo: If we are talking about formal qualifications, almost certainly yes. It is not a new picture. I have some papers by the Transport and General Workers, MSF and one of the other unions in the Nineties comparing the UK craft skills base with those of the French, Germans and others. It is a longstanding issue, and goes back to the collapse of the apprentice training schemes. Certainly, if you measure the workforce in terms of technician qualifications - let us call it NVQ3 in NVQ-speak - and going up into NVQ4, because the top end apprenticeships really were graduate equivalent in the old days, that is the area where the UK has the massive gap. What we have done is we have put all our spend into NVQ2 and below, bringing people on to the bottom rung, and also into graduate and professional, but that gap in the middle is the area where for, some would say, a century, but certainly for 20 or 30 years, we have neglected it. That is where the Germans and French have major schemes, and that is the area where the Koreans, who are now top of that, have put virtually all their effort into, in that it is not just first entry; it is the ongoing qualification. We have this idea that you get them to university for a couple of years and they are then skilled. When we are talking about ICT skills, the half-life of the skills is now about 18 months. If after initial training they are not on a workforce updating programme, professional development programme, what-have-you, then their skills will have atrophied inside two to three years, and that is the area which is outside all our current policy objectives. Nobody has measured on delivery, it is not part of the targets of the Sector Skills Councils, so it is no great surprise that that gap exists.

Q2 Chairman: Part of what we are about is to assess the character of the White Paper five years on. I say the character of the White Paper because the White Paper was a statement of good intent; it laid down objectives, milestones, call them what you will, some of which are no longer relevant, so that is why I am saying the character rather than the detail of it but, on the other hand, since we tried to draw this line in the sand in 1998 that Peter Mandelson gave out as a dream, do you think that much has happened to change the nature of the labour force in the ensuing four, five or six years to meet the kind of concerns that you have just expressed?

Mr Virgo: There was only one programme that did, and that was actually the Millennium Bug Busters programme. The interesting thing about that was that it was a Treasury initiative, not anybody else's. I helped with some of the papers that led towards it, but the fact is that it was announced by the Chancellor and the officials in the Department did not actually know what they were going to do. That one required industry quality control in a way that no previous programmes had, and it actually put through about 40,000 people in basic PC technical skills, which was not part of the previous programmes, because they had to have the basic skills in order to be able to do the Y2K checks. But that is the only programme, and the interesting thing about that was that it was a ring-fenced, very specific programme, under industry-driven quality assurance. A lot of the leading people from industry in the skills area were in that programme, checking the providers, and all the things that did not happen with the Individual Learning Accounts were done on that programme.

Q3 Chairman: The problem was that at the end of the day - I am having to choose my words carefully here - no bugs were found.

Mr Virgo: Suffice to say, a number of them were found and got rid of, but I do have to say immediately after the 1997 election I was called in to brief Neil Kinnock without being told in advance, and the question I was asked was "Is this Y2K for real or is it just another consultants' rip-off?" In retrospect, a lot of it was for real, and there were some very embarrassing things found, but an awful lot of Y2K had actually been fixed years in advance. One of the things was decimalising systems. John Pinkerton, who was one of the leading lights of the industry, insisted when we did decimalisation that we checked for Y2K compliance, and that was back in 1971, so a lot of people had done stuff earlier. What we had was a lot of new systems, particularly minis and micros, which had been produced by people who thought, "It's all going to be re-written in two or three years' time, therefore we will do Y2K 18 months in advance."

Q4 Chairman: Really, what you are saying is that the OECD figures are largely unchanged over decades, and that the situation has not improved materially as an act of government policy. It may have improved coincidentally, as a consequence of the Y2K programme, but that was not the purpose of the programme.

Mr Virgo: Correct. I have the 1978 Meadow study, and I have studies going back over a very long period. That pattern is there coincidentally. There are sporadic activities: the TOPS programme, the Threshold programme. These are in the late 1970s/early 1980s, after the Meadow study. They made a start on it, but always we went back to this one of a focus on bottom-end social inclusion, top-end university. That bit in the middle is going to be left to industry, but industry has never had the incentives to do it. Grants and levies did not work. They were popular with personnel departments, but not with others. One of the long ones has been the tax position of training, the fact that elsewhere in the world, if you have trainees, they are outside the equivalent of National Insurance, they are outside Income Tax, because they are trainees. If you are training yourself as an individual for a new career, you can set that against tax. We had that briefly in the early years of this Government, but then everything was wrapped up into Individual Learning Accounts, and when Individual Learning Accounts were scrapped for the lack of quality control on them, that went into abeyance. So the Government did in its early days, and I do not know if DTI was involved in that, but certainly there were actions on that in the early days, but that too is a longstanding problem of enabling industry to invest. In other countries training contracts are a major issue. In this country everybody thinks they cannot be enforced. In fact, there is a very good Scottish test case, *Strathclyde Regional Council v. Nell* which says that the local authority blue book contract, which is a straight-line depreciation on training costs, is indeed enforceable, but an awful lot of people think they are not, so you have people who think that they cannot safeguard their investment in training. There is a lot of mythology around it, but there are a lot of points of leverage to make investment in training a business and so on which are not being addressed.

Q5 Chairman: It does not say much for market forces, does it? You would have thought it was self-evident for businesses that they should have workers capable of taking on the best in the world, yet all we seem to worry about is whether or not we are going to get a tax break or whether the Government is going to give a hand-out. This is not burgeoning capitalism in its naked self-interested form, is it?

Mr Virgo: Many of the things that in other parts of the world cause people to do this do not apply in the UK, and the result is that if you are investing, or you are wanting to invest in your workforce, unfortunately, it is more advantageous to invest in your workforce in India or Korea than your workforce in the UK, so you can argue that naked capitalism means you look at the tax positions around the world, you look at the infrastructures around the world. When I was doing work on why employers do not train, the big cost - and this was when I was at the National Computing Centre - was the cost in time more than the cost in money, yet an awful lot of the training in this country, particularly that in the public sector, is all based on trying to cut the cost per hour of delivery, where for an employer, where the real cost is the student time, the employer wants to cut the time taken. The ideal is Aldous Huxley: you inject the learning while they are asleep, and the following day they are skilled, but what you find is that people are quite happy to pay hundreds of pounds a day for hands-on intensive training, while an awful lot of public money is going into low-cost delivery, where you may be taking a week or more to deliver that which the private sector would try and cram into a couple of hours' intensive module. There are a lot of bits of this training business area where we have massive gaps between what the private sector is doing and what the public sector is doing, and we have a total understanding gap which has to be bridged because what we have is an awful lot of public money almost certainly being wasted, quite apart from this idea that you can train for stock. Unless you use the training pretty quickly, you have forgotten it by the time you need it. The private sector says, "When I first came into the industry, you trained as little as possible, as late as possible, and sent them over the top" - these were training people who had come out of the armed forces - "before they have lost their enthusiasm and their knowledge." You do it in modules.

Q6 Chairman: It is a bit like the General Haig philosophy.

Mr Virgo: Yes.

Q7 Linda Perham: Since the White Paper was published in 1998 the Government has refocused its skills policy on setting up Learning and Skills Councils. I know you said earlier and in your evidence that the level of skills is NVQ2 and below and there is a problem with the intermediate level skills. Do you think the Learning and Skills Councils have made any difference to that gap?

Mr Virgo: They have the potential to make a great deal of difference, but one of the problems is, when you look at the targets they have been set, they have been set targets at NVQ2 and below, and those are the main targets on which they are funded. What they have not got is targets for the technicians' skills, which is the big gap area. The other area where they have the potential to make a massive difference is in this understanding gap between industry and the public sector training arena, because there the biggest problem is that the public sector has massive numbers of coordinating committees to identify employer needs and so on. There is one chap I know in Microsoft who has 3,500 requests to attend meetings next year. All of them are criss-crossing over about 15 issues. One of the things is to use the Learning and Skills Councils to pull together all of these liaison tasks so that employers can actually make time to attend these meetings rather than face large numbers of requests which they cannot possibly, so they ignore the lot. I am thinking of the Sector Skills Councils rather than the geographic ones. The geographic ones are for the smaller employers; the sector skills ones are the ones that will pull together the data nationally and grid across. The Sector Skills Councils in our area, SEMTA and e-skills, are now operational. I am not sure if Skillset, which is the multimedia one, is operational or not. Most of the others are. There are a lot of skills, like, for instance, the computer forensic skills for addressing e-crime, that do not fit within the frameworks at all. They have the potential to make a great difference, but they do need the resources and the authority to pull together all those consultation processes fragmented across a large number of bodies, and also the funding, because with thousands of small firms, the only way of identifying their needs is to use old-fashioned market research, and old-fashioned market research is actually very expensive to structure properly. When I ran the West London Tech skills survey, we had a budget of £130,000 to survey our local employers. Most of the studies being funded by the Department for Education and Skills have a budget of about £20,000. There is no way you get valid data with that kind of budget; you just re-work published information and you do a Noddy survey with a couple of percent response and think that means something as opposed to "This is what the enthusiasts think," says he, as an enthusiast.

Q8 Linda Perham: You say they have the potential, but do you think that can be accelerated or helped in any way by anything the Government could do, apart from the resources issue, obviously, which is always a problem?

Mr Virgo: I think one of the first ones is government as an employer using them to help spec its own requirements, and also to work with its suppliers on the skills it expects from them. We have Intellect here, but one of the things is what the government is doing about the skills it expects the contractors who are going to deliver to government, what it is doing to ensure that they have the skills in turn, and this is the old-fashioned one of government as an intelligent customer. I am thinking here as a customer for the things delivered by industry and not just as a customer buying skills and training from public sector providers.

Q9 Mr Clapham: Mr Virgo, you suggest that the DTI has the responsibility for professional and technical skills that are required in a knowledge driven economy. Given that, what do you feel are the particular workforce skills that are needed by business in the workforce in a knowledge driven economy?

Mr Virgo: In terms of the initial training base, the concepts of structured programming and simulation and essentially structured disciplined thinking are a precondition. A classicist would say it is Latin, but it is structured, disciplined thinking, it could be physics, it could be mathematics, because that is the precondition on entry of being able to structure a complex project, whether that is a multimedia, whether it is software, whether it is a coms network. I am thinking of the professional level. Then on top of that it is the ability to acquire new skills very quickly. When we are talking about the technician level, I have a copy of the old 1917 educational handbook, which is the kinds of sums and elementary things that you expect any craftsman to be able to do when he matriculates at the age of 14. This is the craftsman type of thing about how to deliver something to time, to budget and to cost. The sums in there are all basic: "Build a windmill with the following materials. Decorate a room" or what-have-you. But it is this ability to put your skill in context and then the discipline to handle it. Then again, for the technician, it is the ability to acquire new skills rapidly and have the mental habits. That is why I say the area where we are lacking the emphasis is on the workforce updating,

whether technicians or what-have-you, but at the very beginning you have to have the basic habits of thought so that you can actually acquire those new skills quickly. So that initial bit has got to be got right. It is not an either/or; it is actually both, yet we have concentrated at the top and the bottom and not the middle, and we have totally neglected the updating.

Q10 Mr Clapham: Would you say that it is the same for all sectors, that it is the structured, disciplined thinking approach that is required?

Mr Virgo: That seems to cut across a great many sectors. When you are looking at content, you also have the creative flair side, which is almost the opposite of that structured, disciplined thinking. In that area it is quite clear that people who understand it best are quite firm that you cannot do a hybrid. If you try and do a hybrid, you get a mongrel not a thoroughbred. What you have to have there is a situation where the creative people and the disciplined people understand each other sufficiently well to work together, and that is actually rather why Skillset is a rather important Sector Skills Council, because that is the one that is trying to marry skills in bringing multimedia together with the creative flair.

Q11 Mr Clapham: Finally, can I just take you up on what you said about the gap, particularly its relationship to the technical level. You say the ability to acquire new skills quickly is enormously important. How would we go about ensuring that that capability is there and embedded in that area of the technician?

Mr Virgo: It is all to do with that initial training, but I think it is also to do with one of the most important things, which is to ensure that they do actually enjoy that initial training and think that training and acquiring new skills is something that is fun and useful and so on, and not just a duty. I have to say personally I have strong feelings about exam systems and exam trauma and the rest of it. One of the things is this situation that you have people who once they come out of the system take the view "Never again. I have done my exams and my education." One of the most important things is that they should feel that their annual updating exercises, their lifelong learning programmes, their modular training, is something that they want to do and enjoy doing, and it is a motivational thing. Once again, there are issues of tax incentives to the individual coming in under motivational things. It is something that they want to do and, wearing my own union hat, something that they want their union to negotiate for them and ensure that it is part of the package that they are getting from their employer.

Q12 Mr Djanogly: Are there enough public and private sector training opportunities available?

Mr Virgo: That is a very good question. There were. I have some market research data which says that the private sector market has actually shrunk by about 30 per cent since 2001, with the fall in spend on training over the last couple of years. I do not know, and I think one of the answers is that it will depend on bringing the players together in networks. Hence one of the things in that evidence about trying to create a global learning network, so you actually bring the skills together so that you are not duplicating effort in producing materials; what you are actually doing is making the best use of the people you have on the personal sides of training and motivation, because of course, distance learning and all these other things are a great tool, but they are not the be-all and end-all. A lot of training does require personal contact. What you can do is prevent people having to duplicate effort just producing dozens of different ways of imparting the same piece of knowledge.

Q13 Mr Djanogly: Where does the duplication come from?

Mr Virgo: Duplication comes from the fact that nearly all public sector programmes seem to include an element for developing course materials. They do not include any budgets for buying course materials from elsewhere, and that is built into an awful lot of the funding programmes. They assume you begin by developing material, as opposed to taking a lot of what is already there and licensing it.

Q14 Mr Djanogly: Is this one of the main reasons why the UK is performing so poorly in relation to other OECD countries workforces?

Mr Virgo: It is certainly one of the reasons why we do not get value for money in an awful lot of instances. Those NVQ courses that we have got, because that area of that material is now a major export business for Australia and New Zealand and Canada, and they are using it to feed their universities with overseas students, because of course, you cannot get a visa to go and study in America, so everybody else has inherited that market. It is interesting that people like Pearson and Reed Elsevier, world-class UK-based

knowledge industries, have most of their development in Australia, New Zealand and Canada, because they are developing material for world markets, not for NVQs.

Q15 Chairman: So really what you are saying is every time we start a training course in the UK, we re-invent the wheel?

Mr Virgo: Yes.

Q16 Mr Hoyle: Obviously, if we are going to drive and continue to drive the knowledge based economy - and there has been mention of the need for professional and technical skills to be enhanced - what role can the DTI take to ensure that there are real training opportunities? Also, to back that up, what role do you think the professional bodies such as IMIS can take on in promoting these opportunities, if we are serious, rather than just a re-print of the 1917 educational handbook?

Mr Virgo: Yes. The first one is that DTI is the sponsor body for the IT skills, so it has to work with DfES. It is also the sponsor body for most of the knowledge industries. A couple of them it shares with DCMS, but that one of pulling together and streamlining the consultation processes, is, I think, one where DTI has a major role and bodies like the Information Age Partnership have a very important potential role to play. When it comes down to the professional bodies, the areas where I have clearance for IMIS to put work in, one of them is in fact to try again on the issues of tax incentives and so on, because it is one where the UK is out of line with the countries where our overseas members are. It is one of the reasons why we have the embarrassing situation that our qualifications are available in most of the old Commonwealth, because that is historically where we have done it, but they are almost unavailable within the UK. In the old Commonwealth they are used as feeders for some of our universities, and that is why the universities are very happy to put the effort in to keep them up to date and so on, because overseas students pay full fees. So that is one area, but the second one is the need to bring together the workforce updating programmes, some of them with big companies - British Aerospace use a virtual university and things of that kind, the National Health Service University, others much smaller, the alumnus updating programmes that some of the universities are now beginning to do, and also the continuous professional development programmes of the professional bodies, which is why we give a very high priority to that. But in that context one of the most important things is actually to quality control them, because we have a tendency at the moment to try and up the nominal number of people who are qualified. These foreigners have large numbers of people who are qualified. They certificate; we do not certificate, therefore we must issue more certificates. But if we certificate prior learning or supposed experience without quality controlling it, we actually destroy the reputation of the certificate. One of the things that I am looking at within IMIS is the danger that if you go down those routes of freer accreditation in the UK, you destroy the reputation of our qualifications overseas. What we are seeing is that in most of the areas we are working in, we are not ahead of them in terms of the skills and the quality of our education system. Very often they are ahead of us. The only thing that we can actually sell to them is that our accreditation systems are - I was going to say "less corrupt" but that is pejorative. In some countries where we are dealing that is actually what they are buying, an honest accreditation of the individual's competence. But certainly, if we water down the standards of our quality control, then we lose that ability to do those overseas accreditations, and looking at it from the point of view of re-skilling our side, if we can sell good-quality accreditation on world class material elsewhere, we can also get access to that material in the UK, and that leads to the third area where I have a remit, which is to try and promote much better local access to world class courses. The UK Online programme has come to an end, but the Learn Direct centres have to ensure that in these learning centres - we have about 6,000 in the UK - you have much better local access, particularly for small firms, and through things like the SEMTA programme for small engineering firms, that there is much better access locally so that you do not have to go off to the far end of the country to study something; you can do it locally, and if you do have to travel, you travel for a weekend module or something of that kind. So those are the three areas we are giving priority to and I have a remit to try and explore with others how to do that. Certainly a lot of the members of the Conference of Professors and Heads of Computing at the universities are very interested in trying to move into this area because they see it as the way out of the multiple resource crises that they are finding at the moment.

Q17 Mr Hoyle: Are you taking the DTI with you? Are they taking on board your aims and objectives wholeheartedly, or is it a little lacklustre?

Mr Virgo: I believe that they are definitely interested in carrying these concepts forward, but of course, at the moment they are undergoing a fair amount of reorganisation. My feeling is that some of these concepts that would have been very difficult 18 months ago. In fact, when they were first floated 18 months ago, the response was that it was an interesting idea but far too difficult. Now it is "Yes, this is difficult but how do we do it?" For instance, on the community access points, I know that DTI ministers are very interested, I know

that other ministers are interested. Frankly, I would not have started it if I had not known that there were a lot of people looking for ways forward in that area if the problems can be overcome.

Q18 Richard Burden: You mention that one of the main considerations for any business thinking of locating to the UK is going to be the availability of skills locally. What is the pattern that you identify in terms of regional disparities? You have talked about intermediate skills being a fairly general problem, but are there any particular pressure points you see on that regionally, or are there other regions where you feel there are other skills gaps that are significant?

Mr Virgo: You are thinking about the situation in the North-East or the North-West? Is that what you mean by "regionally"?

Q19 Richard Burden: Yes.

Mr Virgo: When it comes down to technician level training and ICT technician level training, if you look at the North-East, it has some world class centres of excellence that most people do not know about. For instance, Tyne Tees University is the largest multimedia faculty I think in the Western world. This is on the back of the old CAD centre in industrial design. It is massive. Yet I think hardly anybody in any of the academic areas is even aware of the sheer scale because an awful lot of its training is direct to students coming in from the Far East and going straight back out to the Far East. The worry of the chap who runs it was that in the old days their students used to go down to London and never return. Now they go to the Far East, and it is not that they never return; they come back every couple of years for an update and they also send their relatives. It is good for funding but it is not actually helping the UK economy. On the other hand, there is a major programme for building a multimedia valley around the Middlesbrough area and, quite frankly, the documentation looks quite good. There are parts of the UK doing extremely well. There is some multimedia and coms stuff in south Wales which looks good, but how far it is spread I do not know. I think the more the regional centres are trying to carve their own way as part of their own economic regeneration and perhaps vying with each other the better, but I receive regular documentation on the plans and programmes of One NorthEast and also the problems they face. I think that some of the regional initiatives are extremely good. In the Manchester area I hear the politics of all the various people fighting each other, but again, I feel quite certain there is massive potential for regional activities, but it is the case that they are driven regionally, bringing together the regional universities, centres of excellence and so on. So they are in fact the regional broadband consortia of the Department for Education and Skills, and some of those are extremely effective and extremely powerful, because while they are there to provide network infrastructure, they also serve to bring together all the educational players who want access to that. They are potentially extremely powerful. That is a DfES thing. One problem that I see is the fact that the DTI regional aggregation boards will end up clashing with the DfES regional broadband consortia to do the same thing instead of cooperating. There is an issue of bringing together those initiatives locally. We have an awful lot where the funding is fragmented out and then locally you have to try and gather it up again. There are issues there. I am afraid that was a slightly incoherent answer.

Q20 Richard Burden: I was just struck that the words "regional development agencies" did not pass your lips.

Mr Virgo: I think One NorthEast is a regional development agency.

Q21 Richard Burden: Do you think there is any more the RDAs should be doing?

Mr Virgo: My local RDA is SEDA, and we can argue what they could or should be doing but certainly with the ones where I actually know people working within them, they are doing as much as they can with the remits they have. I think the bigger problem is to make it much easier for the RDAs to pull together initiatives in their area. At the moment they are gathering up the pieces that have reached the bottom of the funding pots of DTI, ODPM, the various European pots and so on. Some of them are trying to work at a higher level, particularly against Europe, so they have their regional offices in Brussels to get at the Brussels money earlier. Some of the more effective of them are using the lever of the Brussels money to blackmail their way further up the funding agencies in the UK to get at things at an earlier stage. Yes, there is a lot more one can argue they should be doing but I think an important part of that is to make it easier for them to do things and pull threads together. There I have not got any specific recommendations but I feel sure that there are a lot of people in the RDAs who would have ideas as to how to make it much easier to deliver results for less effort.

Q22 Richard Burden: Do you think there needs to be any further consideration given to the boundaries between the province of LSCs and the province of RDAs?

Mr Virgo: I think there is a great deal to be done to try and ensure that they can work together and fudge their boundaries. It is not a case of moving the boundaries - and this applies in an awful lot of areas. It is not a case of moving the boundaries, but of trying to make it much easier to work across those boundaries so people are not so worried about them. In that context, yes, I totally agree it is that one of bringing together the initiatives of DTI and DfES and others much more at the intermediary level where at the moment we have coordination at a high level and you have these people trying to bring the bits together at the bottom. There is not enough at the middle level but I have to say I do not have any ideas as to how to actually pull that together. It may be that the Gershon efficiency review may have things in that in a much broader context.

Q23 Linda Perham: You proposed tax breaks as an incentive for employers and individuals. I think you said earlier that with employers it is the time rather than the money, but certainly for individuals that would make a difference. Is there any evidence where that has taken place in any other country that it actually works?

Mr Virgo: In most other countries the problem does not arise in the first place because the trainees and the individuals following the schemes are under a different regime anyway. The UK is different in that we do not have those regimes that have sat in other countries for a very long time.

Q24 Linda Perham: Is there anything the DTI can do to encourage the Government to change the culture here?

Mr Virgo: There is something both DTI and employers can do, because within the Learning and Skills Councils I think there are five regional pilots which enable the employer to reclaim tax and so on, but these are only for small firms and they are only for level one and level two, but they are pilots and they were deliberately intended by Treasury to test out these ideas and see how they would work, and I think it is a great pity that they are not much more publicised. You actually have to look up the small print and the Treasury papers to find out how they work.

Q25 Linda Perham: We talked earlier about the levels that LSCs operate at, and it is the low level. These are needed at intermediate levels, are they not?

Mr Virgo: Exactly, and my feeling when they were originally announced was that I certainly wrote to IMIS members saying "Find a way of exploiting these, then find a way of telling Treasury ministers how great they are. Now ask them to extend them upwards."

Q26 Chairman: The only drawback with tax credits and tax breaks is that you are actually paying tax in order to benefit from them. If you are in a business that needs to improve performance in order to start making a profit, the fact that you have to make a profit, which you are not already doing, is not much of an incentive.

Mr Virgo: You are paying the National Insurance of your trainees whether you are making a profit or not. We have looked at National Insurance and at Income Tax, and of course, if the trainee is exempt from Income Tax, you can give them the same after tax pay at less cost to you, but also, of course, because in our concept it has got to be a professionally recognised scheme, you have got to deliver the training; you cannot cheapskate on it. So it does actually affect organisations which are not yet paying Corporation Tax.

Q27 Chairman: There is a distinction here between the tax that is paid by the company and the tax which the company pays on behalf of individuals, either in terms of some kind of payroll tax like National Insurance or that portion of wages which the company would set aside for tax. That is helpful, because it did not come out of what you said before.

Mr Virgo: Yes. I apologise.

Q28 Richard Burden: You have mainly covered what I was going to ask you, but it is about the employer training pilots and extending them upwards. You said "Find a way of extending them upwards." Do you think the basic model there is sound, and it is really just a question of will to extend them upwards, to tackling intermediate skills, or is there some modification to the employer training pilot schemes that you think would be needed if it was going to hit the intermediate skills gap?

Mr Virgo: It will need modification for going upwards. I would argue that in going upwards, you actually need to involve the Sector Skills Councils and via them you need to involve the professional bodies and trade associations so as to have your industry quality control of the courses that are available, because if you try and do it through the current mechanisms, there are lots of them, there are lots of people on them, but there is very little employer input on them. The modification is actually to build a much stronger bridge with the Sector Skills Councils and have employer quality control on there, but there the big problem is that you have got to find ways of doing quality control that is relevant for small firms, because the Sector Skills Councils will almost certainly, when they are properly functioning, have good inputs from large organisations. The inputs from small firms are very difficult to organise. SEMTA has a long track record in trying to organise this, and I think at that level you have to work through the trade associations and the professional bodies, because certainly in the professional bodies a lot of those who are active are the individual practitioners, who are small firms, and the trade associations are effectively the only way of getting inputs from that trail of small firms. Obviously at the geographic level, there are the chambers of commerce, but the chambers of commerce have a problem when it comes to specific skill areas.

Q29 Mr Clapham: A little earlier you touched on distance learning, and I know that you are very keen on widening opportunities by way of distance learning using the internet. Could you say a little about how this will actually work and whether you feel the service should be provided by the private sector or the public sector.

Mr Virgo: My feeling is that it has actually got to be provided by partnerships, public and private, at all levels. When I was looking at the concepts of what a community learning centre should be and how it should operate, if we take the model of a reasonable size town, the learning centre needs to bring together the local training needs of let us say the pub chains, the banks, the high streets, the rest of it, people who have a national need to retrain and update lots of people locally. So there are lots of private sector national networks. Then you have the public sector ones of the councils and the rest of it, and you have to cut across the boundaries, and if you can bring together those budgets, you then get quite a lot of money coming in but you then obviously need to locate it on the libraries, schools and the rest of it. So in a sense you have a village college concept. When one looks around the world, these models work when you have geographically isolated communities because that has always been the only way of delivering in those communities. What we also need to do is to recognise that in our inner cities we have a lot of communities which are equally isolated, sometimes geographically because there are no bus services and all the rest of it, but it is that one of aggregating things across boundaries. The other thing to bear in mind is one of the great advantages of having people together in a learning centre as opposed to doing it from home is that they help motivate and support each other. There are things on distance learning that you can do perfectly well in isolation, lots of them, go and practise and so on, but there are other things that are much better if you are in a little learning community. You may be studying different things, but you are motivating each other, and that communal side of learning is something that one should encourage. You do not throw the baby out with the bath water.

Q30 Mr Clapham: So you would see distance learning in the context that you have just explained it as being very important, for example, in some areas of the UK where we are dealing with regeneration and where we want to develop new skills?

Mr Virgo: Very much so. Those are particular areas where the Prince of Wales study concept of the study centre is actually important, because in many of those regeneration areas home is not a safe place to study. The learning centre is. I used to work with what was then Haringey ITEC, which was next to Broadwater Farm, and the ITEC was an old City of London Board school with massive steel doors and the rest of it, and it was quite clear that if there was any problem, the kids at the ITEC were going to turn out to defend it, but it was in those days a fortress of learning in a beleaguered area.

Q31 Mr Djanogly: The White Paper suggests that retaining skilled workers is a concern for businesses in heavily knowledge-based industries. Do you think this is a particular problem?

Mr Virgo: It is a problem that comes and goes. In this context, I mentioned earlier the *Strathclyde Regional Council v. Neil* case, which essentially is about the enforceability of the old local authority blue book rules which basically say if you are paying for somebody on a course and you amortise the cost over 24 months flat line, that is an enforceable contract. Certainly when you are paying for people to acquire skills in short supply - in particular there were some in the telecoms centres here I remember people - and these are mature people who have gone off on a mature course - at the end of it are worth four times as much on the market as they were when they started. At the time EDS was the organisation that did the training contracts and there was a lawsuit with TAS, and that is where this Scottish case got the publicity, because that was the one that was used in the out of court settlement, which of course could never be publicised, but we had it

written up in the journals of PITCOM proceedings afterwards. A long time ago, when Ross Perot was bringing in his training contracts, because he was losing 40-50 per cent of people after his key training programme, he said afterwards that his objective was to cut the wastage rate down to 10-15 per cent. If he lost less than that, it meant his training was not good enough; if he lost more than that, it meant that the terms and conditions afterwards were not good enough. There has to be a certain amount of turnover. If the turnover is below a given level it is not healthy but if it is above a given level then it is wipe-out, you do not bother to train, and you poach from elsewhere. Nowadays you do not bother to poach within the UK; you contract it out to another part of the world. So that issue of retaining your investment is partly contractual, but an awful lot of it is to do with career paths, terms and conditions and so on. The contract is a part of it, and Perot's argument was the contract concentrates the mind. I should add that I went to business school under a contract of that kind back in 1971 whereby I was due to repay to ICL the cost of sending me there if I did not work for them for 18 months, which meant that I did not seriously consider joining anybody else, but equally ICL looked and found me a really good project to do when I went back and I got hooked and I stayed for three and a half years.

Chairman: This has been very helpful and if we need to, we will come back to you, Mr Virgo. We are most grateful for the time and trouble you have taken both in your presentation this morning and in the evidence you gave us. Thank you very much. It is a very good start to our inquiry. You have probably caused us more problems than we have solutions for.

Memorandum submitted by QinetiQ

Examination of Witnesses

Witnesses: **Sir John Chisholm**, Chief Executive and **Dr Adrian Mears**, Technical Director, QinetiQ, examined.

Q32 Chairman: Good morning, Sir John and Dr Mears. We have been looking at evidence from the World Economic Forum called competitiveness ratings and we get the impression that Britain is falling behind. On the other hand, you look at Porter and we may not be quite as bad. So it may be it just depends on to whom you look for comfort. Your submission incorporates the World Economic Forum ratings and you say that this drop in the ratings may be due to the R&D investment gap between the UK and other countries. Is this gap getting worse? It seems that there are always calls for greater levels of investment. We know about the issue. Are we addressing it or is it getting worse?

Sir John Chisholm: The World Economic Forum paper itself said that the R&D gap is one of the issues leading to our relative performance. You mentioned that there are a number of different surveys of a similar sort - the OECD does its own as well - and what is clear is that we are not, if you like, in the Finland league. There are examples of nations who have done really rather well over the last 10 or 15 years; I do not think we have done especially poorly but we have not done as well as that. We certainly have not succeeded in the way the United States has done of creating what is apparently a sustainable, vibrant, world-leading economy. So whichever way you look at it there is plenty for us to learn about and, in amongst the package of things which one needs to worry about, the continuing under-performance, particularly in the industrial foreign league, is clearly one of the issues.

Dr Mears: On Michael Porter, I suppose he is slightly more optimistic than the negative views you get if you read the DTI economic papers, which you can get rather depressed about. However, Michael Porter does make the point that OK, the UK has pulled its socks up in the last two decades but we do now face a pretty major change in what is going to make us competitive. We were competitive previously because we did tend to have low wage rates and freedom from regulation. Now we do have to be competitive based on added value and innovation. His story is not that positive. He says, "Don't get depressed, but nevertheless the UK has got a pretty serious challenge".

Q33 Richard Burden: In the last three years there has been the introduction of tax credits for R&D investment to encourage that. Originally that was for SMEs but there was quite a big demand for that to be extended and, obviously, it has been to large businesses. How effective do you think they are?

Sir John Chisholm: They are undoubtedly helpful; there is no question about that. They could be more helpful, for instance, if one looked at the rules more closely. Particularly, you will see in the paper we

submitted that we said extending them to the knowledge-networking element would be very helpful. They are a bit restrictive on that front. On their own they will not solve the whole problem. There are nations - Finland for instance - which do not have significant tax credits (in fact the reverse) who have done extraordinarily well over the same period. Equally, for international companies making decisions as to where to invest, tax credits are one of the things that they take account of. So tax credits are helpful.

Q34 Richard Burden: What more do you think needs to be done? You mentioned Finland. Obviously they have a different cultural background and the rest of it, but what are they doing right that we are not?

Sir John Chisholm: That is always the big question. One of the things which we point to in Finland is that the role of VTT in Finland - the national RTO - has been absolutely crucial in the creation of the technology base which they have exploited with phenomenal success through Nokia and others. The national understanding of what they could invest in, and invest in not just the discovery (because there is not a lot to discover in mobile phones) but actually the innovation process which gets you to marketable products, is a key part of that success.

Q35 Richard Burden: What role do you think RDAs have in encouraging investment? In your own case, you are part of the central technology belt that *Advantage West Midlands* have been promoting, and they are quite bullish about the relationship of their technology corridors and their cluster strategies and so on. Do you feel that actually does have an impact in helping network things to the extent that it will actually lead to an increase in investment of the kind that you think will be needed in the West Midlands?

Sir John Chisholm: RDAs can undoubtedly be extraordinarily helpful in knowledge networking in exactly the way we have instanced in our paper. If you look for international comparators, there is no doubt that after the Second World War one of the things Germany did very well was the regionalisation of technology; the Fraunhofer Institutes, which were sponsored by the individual Länders, did an extraordinarily good job at capturing the innovation potential of the regions, drawing companies together with the research centres and creating a surviving economic base from a total mess. So the business of pulling together a regional cluster is clearly extraordinarily helpful in terms of economic growth. In this country RDAs seem to us to have quite an important role to play.

Dr Mears: One of the important differences in RDAs is to have a technical knowledge. One in the North East has created five centres of excellence, and this is because in order to do the coupling (?) from university into industry it actually needs to have people with the technical knowledge to do the bridging. That is what the Fraunhofer have got; the Fraunhofer are 57 scientific institutes with scientists and they also tend to have further people in universities. They are technically very expert and that expertise is important for doing the bridging. So if the RDAs try to do it acting as abstract knowledge brokers without the real understanding to translate the information from universities into industry etc, to help industry to understand how to use the information, then they will not be as effective.

Q36 Linda Perham: In your submission you mentioned the concept of open innovation, saying that one of the weaknesses of the closed model is that internal research goes straight into products and services and you are not picking up on something that has already been invented - reinventing the wheel etc. The Government and others are now actively encouraging more efficient means of technology and knowledge transfers. Do you think the open model is more effective and, if it is, what are the main factors that influence its effectiveness?

Sir John Chisholm: I think, quite clearly, it is more effective. The classic, erstwhile linear model, where you poured money into discovery at the front end and, somehow, by a magic process, you got wealth out at the end is widely discredited. If you look at what has happened in industry, in the 1950s and 1960s many large companies had their own research organisations, they did their inventing in those research organisations and then pulled that through into a product. They do not do that any more, for the reason that it has not proved successful. Companies now pay a lot more attention to widely networking and sourcing innovation from many different quarters. That has proven to be a more successful model. So success depends upon that open innovation infrastructure which enables companies to understand how best to develop and where best to develop their products. That seems to be a much more successful model.

Q37 Linda Perham: Is there not a problem with intellectual property rights or patents, if you are going for that model?

Dr Mears: The closed innovation model is based on protecting the knowledge, so it is linear, and it did work well in the middle of the last century - laboratories like Bell Labs and the invention of the transistor and those sorts of things. So that was a good model 50 years ago, but, as Sir John has said, industry has tended to move away from it because - and this is certainly true of the IT sector in the US - it is much better to just take technology from other suppliers and bring the right technology together (you could say stealing the knowledge but certainly accessing knowledge) to apply it; it is much more successful, certainly in the IT sector, than having your laboratories do the linear model. In some areas the linear model has worked quite well until recently. Pharmaceuticals is one area where it has worked well because it is a linear process: discover a drug and go through all the problems of getting it clinically trailed etc. Even that now is changing because with genomics pharmaceuticals is much more complex and has to involve biomathematics; it is no longer real life science, it is becoming information science. So that also now is altering and you can see the drug companies are placing less emphasis on their own laboratories and more on picking up information via biotechnology and so forth. The closed model did work but, increasingly, things are much more complex now, and you need ways of managing that much more complex information and networking.

Sir John Chisholm: In most economic activity having a licence is just as good as having a discovery. Provided you can access the knowledge through a licence and put that together with other knowledge you have got, you can create just as viable a product as making a discovery and locking everybody else out of it.

Q38 Linda Perham: Losing the chance that the genius who discovers something will still get the credit for it.

Sir John Chisholm: That is a very good point. We have in our national psyche the idea that wealth-creation is to do with the lone inventor in a garret in Leeds who thinks of a brilliant idea and makes a fortune for the country. That does not work; we should absolutely delete that model from our mind. The world does not work that way any more.

Q39 Chairman: It has been suggested that the American model, as it were, has been in part at least successful due to the Baydo (?) legislation where state funded research and the rewards from the exploitation of that are quite clearly laid down between the institution, the individual and the commercial partner who is brought in. Do you think that we need to formalise IP, as it were, reward allocation in the way that they have done in the US?

Sir John Chisholm: I would say that it is not unhelpful but I certainly would not put that as the cornerstone in the US economic success in innovation.

Q40 Chairman: In the sense of, as it were, entrepreneurialising (if that is the appropriate word) or incentivising academics who still seem to be wedded in large measure to the linear model, so long as there is money coming in at one end?

Dr Mears: I am not sure. I think the US is much less the linear model in universities. Richard Lambert, of course, struggled with this issue in his report and what he came through with was a successful compromise. How he has positioned the UK places IP more in the universities, and the purpose of that is to avoid it being locked up. You can see the lock-up problem, for example, in the framework projects, where you put together a consortium but the intellectual property that tends to be locked up in that group often is not exploited but then is not used anywhere else. The disadvantage of giving intellectual property to a company is that it tends to think it may not get widely exploited. The disadvantage of going to the American extreme is that certainly in the UK industry would be much less willing to work with the universities and to trust them. So what Richard Lambert came to was the right compromise.

Q41 Mr Djanogly: You mentioned the importance of open innovation. Do you think that that is something lacking in this country?

Sir John Chisholm: I think we have an issue to do with the kind of model in which you pour a whole bunch of money into discovery and that is somehow going to create wealth. Our thrust is that that is interesting but it is not actually the core of the wealth-creation process. The wealth-creation process is much more in the knowledge networking and, also, in the innovation process which takes you from discovery into a viable and successful product. That is where our gap primarily is. I think our feeling is that we do not need to discover more - in fact, we could do with discovering less than we already do - but what we need to do is to focus on other parts of the innovation cycle: parts to do with having good networking infrastructure, focusing on clusters of successful industries and pulling through expenditure, particularly government expenditure, into products.

Q42 Mr Djanogly: Do we do any of that well?

Sir John Chisholm: We clearly do not do it as well as the United States does it. Ever since the War the US has spent the great majority of government funds in just two areas: defence and health - primarily defence but also in health. If you look at where the US economic success has been built out of, it has been largely out of those consistent streams of expenditure over many, many years.

Dr Mears: There is an argument about the US model (and there is certainly an internal European Community paper which looks at this) that America is perceived as having a much more top-down approach. So the National Institute of Health and the Department of Defense lets top-down contracts to apply knowledge and apply technology for a purpose, and that tends to build the network because it draws in all the activity it needs to contribute. However, in Europe we tend to do things more bottom-up. The framework programme is certainly bottom-up, but that would be true of a lot of what we do in the UK; we ask people to come forward with proposals as opposed to, top-down, saying "We want to develop this, we want to prove this component." The Department of Defense spends \$10 billion a year on component-proving demonstrations; the MoD spends about £25 million. That is a vast difference, and that illustrates the way, in the US, they are using government money top-down to pull technologies into application. That, I think, is one of the really big differences between the US and the UK. It is something we could do in the UK in health care and that is why, in our submission to you, we have drawn attention to e-health because that is a great opportunity in the UK. We have got a strong health sector and we need e-health; it would be a great opportunity, top-down, to drive innovation and, also, improve the National Health Service.

Q43 Mr Hoyle: It is interesting, in your submission, when you state that of the fastest-growing high-tech businesses in 2003 not one came out of the UK, and that something like 27 came out of California. It does show a big difference. I wonder what, really, is the success of the way that the Americans actually exploit science, you say in outline, such as open innovation. Could part of that not be the amount of wealth, the huge market and, more importantly, a greater appetite to actually take the risk, live on the edge and see something through, whereas we are very conservative and we just will not take those risks?

Sir John Chisholm: There is no question that the fundamentals of the United States, to do with having a large, open market and a competitive environment, give a good reward for success - absolutely fundamental. I have to say, when I go and do business in the United States, if somebody could give me a magic wand, the wish I would wish for is that my company would be transposed to the United States and we would be a fantastic success.

Q44 Mr Hoyle: Not the other way round?

Sir John Chisholm: What we have got in QinetiQ, if it were in the United States, would just be a fantastic success. With the size of the market, the ambition of the customers, the environment of real energy and ambition in what people want to do with technology is just so different. Those are things which are absolutely fundamental and go beyond the issue of investing in innovation. However, we do not have a magic wand. We have got to make a success, and there are people, like the Finns, who had an even worse problem than us, who have made a success. So that is, I think, a more relevant example to worry about. They have made a success, very largely, through intelligent investment in innovation. So that is a model we can think about. The points which we note in our paper, we believe, are actually really rather relevant to achieving that.

Q45 Mr Clapham: Dr Mears, a little earlier you explained the role of the intermediary, the RTO intermediary - the link with university - in helping to transfer some of that technology into the productive process. Could you say a little more, however, about the role that, for example, QinetiQ has in being able to energise that productive process?

Dr Mears: QinetiQ is primarily a business for the Ministry of Defence. So QinetiQ and its predecessor, DERA, played a very big role in coupling technology into defence equipment, and that is one of the reasons why the UK is the second defence nation to the United States, and the world, really. QinetiQ is increasing its commercial business and that is one of the reasons why we went into the private sector, but we are able to pull technology through into commercial applications - health care and energy and those sorts of areas. That is something which we are currently building up. There is one thing that I want to say about QinetiQ; taking the RTOs in Europe, they are different from QinetiQ because they are intermediary organisations and they have a lot of government funding, whereas QinetiQ is a plc. That does make it somewhat more difficult for us to do things for UK plc, particularly given that often it is only 50 per cent funding; because we do not manufacture it is very hard to recover that other 50 per cent, so that is an inhibitor for us in playing a larger

role on the civil side, although it is not for defence because we have the Ministry of Defence as our very large customer.

Q46 Mr Hoyle: Could you explain whether you know of any other intermediaries in the UK that work in a similar way that, perhaps, are linked in to RDAs and universities in certain regions?

Dr Mears: Most of the RTOs in the UK are not-for-profit organisations. Another one I know reasonably well is Pera. Pera play a role internationally, and they have a big role in China, for example, to help the Chinese develop their capabilities. So UK RTOs tend to play internationally. The Wildman Institute (?), for example, is an international leader and serves companies all over the world. So the RTO sector in the UK is more international and it is different to TNO or Fraunhofer or VTT, which much more play a role of supporting the development of the German, Dutch or Finnish economies.

Q47 Mr Hoyle: Given what you said a little earlier about the US and the way in which RTOs have developed within that context of large amounts of finance coming in to, for example, NASA, and developing from the top-down rather than bottom-up, where Europe has developed its different model, is there any comparison that you could make to say which of the models seems to be more successful or, rather, what your view is of which model would be potentially more successful for the future?

Sir John Chisholm: I think the key feature which we were trying to point to with regard to the United States' balance of government funding versus the European balance of government funding is that in the United States the government largely funds things which it has a reason to know what it wants: through the Department of Defense it knows it has got a legitimate agenda as to the outcome that it is trying to achieve; NASA, again, has programmes which it is trying to achieve, and it is quite easy to tell in health what you are trying to achieve. In Europe the concentration has been more in putting money into an academic environment where the actual decision as to what you want to achieve in the UK is through a bunch of intelligent people in Swindon deciding that "this idea is better than that idea". It is not government spending for its own purpose, it is government putting out money in the hope that amongst that broad community something good will arise. Of course, there are quite legitimate agendas in that to do with civilisation and creating an environment of intelligent people and all those other good things which come from that broad base of government funding, but the conversation we are having now is specifically about that government funding and its effect on wealth-creation. The US process of the government spending for its own purpose in a consistent way over decades appears to be successful.

Dr Mears: One of the key things about the US process is that they are a very intelligent customer, and that is crucial. The National Institute of Health, which spends \$27 billion a year in health care, has 18,000 staff who are high-calibre researchers in life sciences, clinicians and so forth, and biomathematics and everything. So those programmes are placed by people who really are technically very expert. The same is true of the Department of Defense, which is an example of an agency that is well regarded; it brings in people with real expertise from industry laboratories and industry operations to manage those programmes. So key to the American approach is to make sure that these programmes are managed by people with the right degree of expertise who really are intelligent, demanding customers and who know what is feasible. The tendency in Europe is that we place programmes more bureaucratically and so we would not have the people with the know-how in Europe so easily to let a top-down programme.

Q48 Linda Perham: You talked about knowledge transfer in the defence industry and also mentioned health care. Are there any other areas which are potentially high-tech areas, or high-growth areas of the future which might be ripe for knowledge transfer? I think you mentioned energy, Dr Mears, and transport was mentioned in your submission, but are those the sort of areas that you think would be best for knowledge transfer?

Dr Mears: They are all areas where the issues are complex; they are all areas where you need the open innovation type of approach. Singling out health care, I do not know whether you have talked to David Hughes but in his recent innovation report he looked at several candidates for where the UK really should try and focus in terms of using government procurement to drive innovation. Certainly I and others recommended health care as the top one but those other ones you mentioned also provide possibilities, but I do not think they are on the same scale as health care, partly because of how much we are spending on it and, also, because the transport problems are very difficult and complex. So the ability to have an impact there is less, but they are very important.

Q49 Mr Hoyle: So health care is the main area.

Sir John Chisholm: The business analysis which we referred to, with the 100 fastest-growing companies, if you look at that, the big preponderance is in the IT and electronics area. Despite the whole dotcom boom and bust, and all of that, that is still the area where you see the highest-growth companies emerging, and that is still an area where we are not as strong as we could be as a nation.

Q50 Linda Perham: Should there be government support to move this forward, or should it be left to the private sector?

Sir John Chisholm: Clearly, again, if you look at the nations in Europe which have been successful, such as the Scandinavian countries, the government has played a role. I am always a bit nervous about the word "support" because I cut my industrial teeth in the 1960s and 1970s and saw lots of wasted money in those years. So the Government has to be intelligent about the way it applies its policies, but its policies do have an effect.

Dr Mears: If I may say so, e-health and tele-healthcare are all IT, they are not life sciences; they are about using information systems to manage health care better, connecting the patient in the home to the hospital - networking. So that programme would drive IT, as Sir John has said; it is definitely the IT sector which still has the high growth opportunities. Michael Porter makes the point that the UK success in life sciences tends to mask the fact that we are so weak in IT. You say that the UK is weak in R&D but, of course, if you take out life sciences the picture is even worse. So we really do need to attend to the IT area, and there is an opportunity for government through transport because, again, information systems are crucial to managing traffic flow. So we could really help the UK in the IT area by using government procurement more effectively.

Q51 Chairman: One hears about the work which is done in things like particle physics, where IT is at the very core, but we do not seem to be able to take that out of that rather highly specialised, rarefied area and apply the expertise we have elsewhere.

Dr Mears: It did create the World Wide Web. The element of particle physics there is a very interesting one because it is really very good in open innovation and collaboration; wonderful collaboration between the US, CERN, Lawrence Berkeley and Los Alamos - outstanding - and it is because they are driven by big projects. When you build a detector for the last hydron-ladder (?) that is an enormous, absolutely leading-edge engineering project that derives a great combination of knowledge, so it did not surprise us that the World Wide Web came out of that. That is quite a good output from that community. Again that community is one of the major communities driving the grid (if you know what the grid is), but that will, very soon, mean that we have computing resources all linked, and that will make a very big difference to knowledge and information and its use.

Q52 Chairman: I appreciate that. What I was really trying to say is we have this kind of achievement with the British presence in CERN and places like that, but trying to translate that into other parts of our economy does seem to be rather difficult. Have we, for example, as a country, got out of our role in the establishment of the World Wide Web the kind of economic benefits that, perhaps, we should have received?

Sir John Chisholm: If there is something which we can contribute to that issue, the main point that I would like to return to, if I may, is that our focus is on discovery rather than the innovation process. I just did my own back-of-the-envelope trawl through the 100 fastest-growing companies that we have analysed in our list and put a tick against those whose business was based upon discovery - in other words, business today based on something they had discovered and they are now exploiting - and it is ten out of 100. If you look at the thrust of government expenditure, it is principally based upon discovery as opposed to innovation. So we are hitting the bit in the cycle which appears to be less important for wealth creation. It might be important for other things but it is less important for wealth creation.

Q53 Mr Hoyle: You state that the government agencies have a crucial role in creating market demand for innovation, but as we all know they are usually far too conservative and certainly do not want the risk that this helps prevent innovation. In your previous life you were actually a government agency; do you have any experience of this? What is the difference now between the two?

Sir John Chisholm: I would claim that the Ministry of Defence, amongst the government authorities within the United Kingdom, has been not perfect but relatively good. The UK still has a relatively strong defence and aerospace industry by world standards - second to the United States - so there is something to build upon there. What you do not find so strongly represented in other government agencies is the idea that you have strongly in the United States that their role is to develop programmes which pull through technology

into the economy. Based very deeply in the sort of US governmental system is the role of government expenditure to pull through technology - a great belief in technology - and technology being the cornerstone of the US economic success. The role of government agencies is to invest in technology and help companies pull that through into successful implementation. The point we made in our submission is that wealth-creation is an enormously complicated thing with lots of dimensions to it, and what can the Government actually do which is helpful, because a lot of things it can do turn out to be perversely unhelpful. One of the things which is definitely within its control is its own procurement for its own purpose, and when it is procuring for its own purpose then what we are saying is it could be more intelligent about that in thinking through programmes as to their effect on the economy and the pulling through of technology into the economy.

Q54 Mr Hoyle: Do you feel that you have actually seen real change now, that you have got a feel for the private sector and are willing to take risk and willing to look at innovation more?

Sir John Chisholm: There is an issue about the risk tolerance of a smaller economy like the UK vis-à-vis a very large economy like the US. There is an issue, but I refer again to smaller economies than ours that have been more successful. There has to be a reason for that and part of that is undoubtedly due to government policies which have, to a degree, insulated companies from some of the early risk. I refer to the role of VTT in Finland and TNO in Holland, where both of those are participants through government funding in the innovation process. I once bought a company, in my previous, private-sector life, in northern Germany who were engaged upon developing a manufacturing system product for automating the manufacturing process - an absolutely commercial product. I was staggered to find, once we had bought it and discovered how the company worked, that the absolute kernel of that product they got from the local university - or institute - which was wholly funded by the Länder. So this company's product was actually being developed by someone else who was wholly funded by the Länder. That is the way the system worked; it worked by companies and government agencies working closely together and being interdependent upon each other.

Q55 Mr Clapham: Sir John, can I explore with you a statement made in your submission? It is page 3, paragraph 2.2. You say: "Perversely, creating denser networks of interactions within an existing domain can make it more difficult to think outside the confines of this domain and to recognise new possibilities." Are you saying that the Government's policies of knowledge transfer and collaboration between research institutions and industry could actually hinder innovation?

Sir John Chisholm: I think this is a fairly narrow network point that, for instance, when the European Union decided it wanted to encourage networks it had the idea of networks of European experts; that is an expert in the UK in a particular subject networking with an expert in Holland, networking with an expert in Greece. That may well have succeeded in some other objective of the European Union in encouraging the creation of networks across Europe, but it does not do much for technology because that is, actually, not the network you are trying to create; these people tend to know each other anyway, and encouraging them to work in an European context rather than a worldwide context was interesting for the European Union but it is not particularly interesting from the point of view of creating opportunities for wealth creation. What you want are experts in different fields to network with each other, because that is what they need to know which they do not automatically know.

Q56 Mr Clapham: Given that you have the experts in different fields, that gives you the better connection with the world economy.

Dr Mears: One of the points about networks is that in any network some people are very highly connected - one person in 10 or 20 - but most people are not highly connected. This is important in epidemics; if you can get the highly connected people you can really stop an epidemic spreading. The same is true for knowledge transfer. Most people are not highly connected, and if you saturate their network with people who are like them - scientists like to deal with people like themselves, so if you are not careful you saturate the network just within their own knowledge domain - that stops them making contacts with wider knowledge. That is the sense in which if you really emphasise these connections with people in the same area you actually work against achieving the wider knowledge flyover and open innovation.

Q57 Richard Burden: We touched earlier on Baydo, and I got the sense from you that you did not feel that, in terms of patenting law, the proceeds from that would make an absolutely key difference over here. However, as far as our current patent laws are concerned, do you think generally they help or hinder things, and what kind of changes would you like to see, even if it is not the key change that is necessary?

Sir John Chisholm: I would actually stay with where I was before; that we do not see, in the UK, any major inhibitions in patenting law. You can always improve things a little; you can do something about the time in which you make discoveries and the ability to publish before discovery and go back to a patentable proposition - things like that. There are issues of that sort which might be at the margins quite helpful, but I do not think we have the view that there are any changes which make a significant difference. There are significant changes you can make but we do not think it makes a huge difference.

Q58 Chairman: I think we have just about covered everything but there is one thing that has been troubling me. You have referred to Finland several times, and innovation. What I am not very clear about is what comes first: is it the RTO chicken or the Nokia egg, in the sense that we know that to a very large extent the Finnish economy is dominated by Nokia - in the way that Abba dominated the Swedish economy in the 1980s, you might say! Almost a fluke, in some respects; a happenstance of a number of things intersecting: mobile telephony, their particular models and their research. Have you tried to, as it were, unscramble some of the points here to try and establish the comparative weighting between the varying elements? Obviously, Nokia is the kind of commercial success of the innovative process, or the expression of the innovative process in Finland. Could we be, as it were, somewhat distorted by one particular thing, or do you think it is part of a more general innovative culture?

Sir John Chisholm: I think, historically, what happened was that in Finland, as indeed elsewhere in Scandinavia, there were good reasons for cell communications, mobile communications, to be a good way of creating a communication infrastructure in a nation with a widely spread population etc - difficult to lay landlines and what-have-you. So when cellular technology was invented in the early 1980s in the United States (actually out of the military, as it happens) the Scandinavian countries in their legislative environment legislated for cellular networks to come into the country. What happened particularly in Finland was that they had VTT, and VTT was given the role of researching handset technology and, to a lesser extent, network technology. Nokia was in a different business altogether but was one of the companies which were around and they picked up what was coming out of that research programme. So there is a bit of a chicken-and-egg but that then proved to be locally successful and more money went into it, etc, etc. Interestingly enough, if you look at what happened in the United Kingdom it is rather different to that. We also legislated early for mobile telephony to come in in a capacitive way and to compete with BT, which was a good thing, and we created huge industries as a consequence - Vodafone, quite obviously. However, what we did not do is think that we could actually become a world centre for the production of handsets. That business belonged, in our view, to people like Motorola. So that really never happened in parallel.

Dr Mears: Erkki Leppävouri, who is the President of VTT, has an interesting slant on this because he says that one of the key factors in Finland's success - the view from VTT - is that Finland is like a club; Finland was emerging as an economy and everyone wanted to work together as a priority to develop the Finnish economy. Also it was sufficiently small, the technical community was sufficiently coherent and everybody just worked together to make this all happen. It does actually bear on the open innovation model. So he was saying that success came because they could bring everything together. Whether they can do it in the future is a different question.

Q59 Chairman: It seems that the Finns are small enough ----

Dr Mears: Smaller is helpful, yes.

Q60 Chairman: ---- and the Americans are big enough. If you are somewhere in the middle ----

Dr Mears: That is very interesting. Silicon Valley is quite small. One of the arguments about the US is that the US is the top nation because it has the combination of small-scale with doing, at the federal level, the defence and health care. So the federal level pulls down with big programmes but they develop economies at a small scale, which gets you into Porter's clusters as well.

Chairman: On that totally confusing and disturbing note, in the sense of the United Kingdom falls between about three different stools in that, that was extraordinarily helpful, gentlemen. We are very grateful to you and it takes us on. Thank you, also, for giving us the fastest-growing technology companies. If we need anything else we will come back to you because we know where you are.

**Memorandum submitted by Information Technology Telecommunications & Electronics Association
(Intellect)**

Examination of Witnesses

Witnesses: **Mr John Higgins**, Director General, **Dr Philip Hargrave**, Chief Scientist, Nortel Networks and **Mr John Woodget**, Intellect Vice President and Managing Director, Intel UK, examined.

Q61 Chairman: Perhaps, Mr Higgins, you could introduce your colleagues, and then we will begin.

Mr Higgins: Yes, indeed. Good morning, ladies and gentlemen, I am John Higgins, I am the Director General of Intellect, the Information Technology Telecommunications and Electronics Association. I have with me two of our board members: Dr Philip Hargrave, who is Chief Scientist at Nortel Networks, and our Deputy President, John Woodget, who is the Managing Director of Intel in the UK.

Q62 Chairman: Your evidence in some respects seems to suggest that the agenda of the White Paper is exactly relevant to what we need to do in 2004. A cynic might say nothing seems to have happened in the intervening period. In what areas do you believe significant progress to want a knowledge-driven economy has been made? Do you think we have missed any opportunities in the balance sheet over the last four or five years?

Mr Higgins: I think your assessment that, yes, it is the right agenda we would agree with. Can I just begin by trying to say how we see what a knowledge-driven economy is, because we are trying to get to grips a little bit more with what this means. In fact, the sort of expression we almost prefer is a "knowledge-powered" economy, as it were. It is really not a state, so I think it is reasonable we are not there yet because I do not think it is a state where you either are or you are not; it is really an aspiration. It is a basic aspiration, I think, of all economies to transform human potential, or human capital, into assets that we can then choose to do with what we will - keep privately or deploy to have a better health service. That is the aspiration, I think, of all economies. A knowledge economy, to us, is simply one where that transfer from potential capital into assets is done quickly and efficiently. If you think (and I am mixing my metaphors, perhaps) of this as a car of some sort, then what we want is more knowledge going into the fuel tank than anything else, and increasingly so knowledge becomes the driving fuel, the power that drives the car, as opposed to human labour or anything else. So I think we will see increasingly a transition towards more knowledge going into the fuel tank than any other thing. I think we have achieved an awful lot, and an example of that is the creation of the e-envoy, Alex Allen, when the role was created on the model of Ira Magaziner, the special representative to Bill Clinton, and, I think, the appointment of Patricia Hewitt as the first e-minister. I think we have achieved an awful lot, and lots of the bits of the jigsaw we have been steadily working on across industry and government (DTI in particular), so I think we have achieved an awful lot and it is not surprising that there is an awful lot further to go.

Q63 Linda Perham: It is widely accepted that there is a problem with intermediate skills, particularly in ICT. How could that be remedied, do you think?

Mr Higgins: What do you have in mind by "intermediate skills"? Do you mean skills to apply information and communication technology in your everyday job? Is it the skill of the average person?

Q64 Linda Perham: It is the application of skills, the basic training. Not emphasising the basic skills and the higher level but the application, is what I mean.

Mr Woodget: I think that is a good example of where there has been just recently some significant progress made with the Home Computing Initiative which was announced by the DTI yesterday, which has been a long process. In 1999 tax legislation was put in place to relieve employers of the tax burden if they loan employees PCs for home usage. These home usage schemes have been evident in the Nordic countries and started in Norway in 1996, then in Sweden in 1997 and in 1999 Holland developed a scheme. We have not seen much progress from 1999 to present because of some complexities in the United Kingdom. Last year salary sacrifice was allowed by the Government to fund such schemes and the DTI has got behind that, actually motivated by the e-envoy, so it is a good practical example of how all this stuff can come together. It remains to be seen whether this is now going to roll out and be accepted broadly. That is the kind of Government involvement we need with industry to come up with something where Treasury is helping with guidance to tax offices on how to do these schemes and industry actively involved to provide PCs to homes. Just to give you a feel for how we think that can help with training, household penetration of PCs in the United Kingdom - it depends who measures it - is about 50%. It was below 50 per cent in Norway and Sweden when their schemes started, it is now approaching 80% in those countries, so they have 30% more penetration of PCs into the household. This is a simple way of learning, it starts at home very often with the

kids and we think that is a fundamental way of kicking off training. If you look at other countries, for example Spain and Portugal are approaching such schemes and they are requiring these PCs to be a training tool, in other words provided with training software. Some of the schemes in the United Kingdom have been implemented with training software, that is an excellent way of encouraging fundamental IT skills training at home that is taken into the work place

Q65 Linda Perham: It was the UK On-line Project I was thinking of which is good at getting people out or going into community centres.

Mr Woodget: With over 7,000 centres in place that is a good example of something that is helping for those people who do not get access to PCs . Fundamentally the ability to get PCs into the home can reach a much broader part of the population. Of course there are some people who will never be able to afford a PC and I know the DTI is looking at some further initiatives to extend beyond that.

Q66 Linda Perham: The Government being the largest employer is there anything that it could be doing to improve the skills of its workforce?

Mr Woodget: The Government has the same ability to use home schemes for government employees, that would be an obvious starting point.

Linda Perham: Okay. Thank you.

Q67 Mr Hoyle: We talked about the economy and the importance of the engine-room being driven by SMEs and you state some worries about software and services of SMEs and you feel they are not in a position to take advantage of the global market and economy out there, what more can the Government do to ensure that the SMEs have an advantage to take hold of the opportunities that will be there?

Mr Higgins: I think UK TI works with the sector bodies like the Trade Association quite extensively to help build international networks. We are increasingly aware that our smaller members need to understand how to exploit development opportunities in low cost economies if they are to be able to offer competitively priced packages in the markets in which they operate, which might be the domestic market but also the international market. We need to keep UK TI focused on providing services through the sector bodies to help develop international networks so that SMEs can understand how to be effective in this highly competitive, global economy.

Q68 Mr Hoyle: How much of the market do you think we are missing out on?

Mr Higgins: I am not sure I can put a figure on how much of the market it is, I know our smaller companies are finding it increasingly hard to compete. It is a broad generalisation but unless you have a specialist niche product for which there is particular market demand I think you are under increasing cost pressure and you need global sourcing in services as well as in products.

Mr Hoyle: Right.

Chairman: Thank you.

Q69 Mr Djanogly: Your evidence seems to suggest that the United Kingdom has not reached its target in being the best place for e-commerce, how far do you believe we are away from reaching that target?

Dr Hargrave: I think one of the fundamental things is it is essential that economies exchange information and it is essential to make sure that communication infrastructure is in place that does it, therefore this is linked to the roll-out of the new generation of so-called broadband technology. If you are going to do business you have to create networks that are global. The way that you do business involves connectivity; we are talking about broadband connectivity. We have seen a lot in recent times with the broadband initiatives and the Government objectives regarding the broadband economy in 2005. I think we have done a lot and we have seen the take-up and roll-out of broadband. We are at a cusp, and this is a very important cusp, because the broadband that has been rolled-out hitherto has been broadband at a data rate which is just an entry point. Technology is like ADSL that we hear about. They are fine as a starting point, they enable you to work on the web more straightforwardly, they enable entry level tele-working but we are on this cusp of needing to roll out the next generation of broadband where the band widths go beyond what you can do.

That cusp involves putting in new network infrastructure, not just putting boxes in local exchanges, and it is driven by requirements of new civil infrastructure which involves digging up roads. Those are some major, major challenges. We have to recognise we are on that cusp. We should be glad and applaud what he have achieved thus far but actually make sure the policy and direction is in place to enable this next generation of investment. We see countries like Korea, without getting too technical, saying, "make sure every resident can get 20 megabytes rather than half a megabyte by 2005". Those countries are seeing the need to go there and putting in place top level policy, drawing in these new networks rather than being built from the bottom up. The work that we done so far is fine, let us applaud it, it is great, for the take-up of broadband we are now at three million, it was only one million in November 2002 and it is going to rise during the course of this year. We need to make sure we do not sit on our laurels and the policies are put in place to draw the next generation, which involves civil infrastructure projects.

Q70 Mr Djanogly: What more needs to be done to give consumers more confidence in the security of e-commerce?

Dr Hargrave: The technologies are there. I think that confidence is going to come with more and more use. People are concerned about the unknown. There are technologies, my company makes things that are secure that cannot be spoofed, and such like. The trouble is you hear horror stories and always in the roll-out of new technology you are going to have that problem of those stories. The technologies are there and I am sure the confidence will grow with time.

Q71 Mr Djanogly: Do you think things like spam and concerns for child safety are actually having a negative impact on the growth of ICT at the moment?

Dr Hargrave: They are concerns, they worry me. I look at the amount of spam that comes to my private e-mail accounts and fortunately my ISP blocks it. I look at the inappropriate material that comes in some of that spam and I do not like it. As with all technologies that have major, major capability of changing the world they can be exploited for the good and the bad. It is therefore important that things are done to minimise unsolicited things, to close it down. It is a very challenging problem given that the whole point of this network is that it communicates globally, anywhere in the world can make connections to it and connect to anywhere else in the world. It is the capability of the network and its availability for good, e-commerce that is good, however it has this dark side as well and we are doing all that we can to stop it.

Mr Woodget: The fact is that growth continues. Your question was, is it holding things back? The answer is no.

Q72 Mr Clapham: Mr Higgins, some studies that have been done making a comparison between the United Kingdom and the United States suggest that the United Kingdom has the second best environment for e-commerce. Bearing that in mind and also what we heard from the people that were here before you about the difference in structures there is a suggestion that the infrastructure environment is really driving the gap between the two countries. Is it possible to say what is being done to actually narrow that gap and whether it is making any difference?

Mr Higgins: I begin by totally supporting what Sir John Chisholm was saying and his colleague Dr Mears about the top pool of the Federal Government having clear directions for the US economy of how they want to deploy information and communication technologies in pursuit of their own public agendas like health and defence. I think that is a huge driver. I think that combined with these small local economies, as in California or Virginia or many other parts of the United States, is a powerful combination. It has been said many times that the cultural risk, adverse nature of European cultures as opposed to US is clearly a factor, and that has been said many, many times. I begin by supporting what my colleagues from QinetiQ were saying. It might be interesting to get a particular perspective, both Philip and John are from North American based companies and we thought it might be helpful for you to have a view of what it is like on the ground in those companies and what the attitudes are.

Dr Hargrave: We talk about having the infrastructure in place, the second thing is that you have to use it effectively. You have to embrace it. I know in my company for example with a North American culture one embraces technology. It was rapidly deployed when it first became available in order to ensure that it was used for business benefit. I think more needs to be done to help, shall we say, those areas of society where the embracing culture is not quite there. We see metrics on government services being available on-line

rather than the take-up and use of those services by the end citizen. I come from a culture where it is embraced, maybe that culture embraces more straightforwardly and therefore to help to move from available to embrace you need some sort of initiative in the United Kingdom to benefit from that North American culture.

Mr Woodget: Intel has pioneered e-commerce and e-business, 100% of our customers place their business with us over the internet, 90% of our business is placed with our suppliers over the internet, in fact we are the world's largest transactor across the internet, larger than Amazon.com, larger than IBM, and many people do not know that. This is something that has taken us eight years of hard work to achieve and it comes from a culture of our belief that the technology does bring efficiency and we have experienced that and we have been able to grow over the last eight years with a relatively flat head count, and so on. We come from a position of believing this. Looking at the uptake of e-commerce globally we have been looking for measures. You mentioned that the United Kingdom is number two, if you look at work done by INSEAD with the World Economic Forum they do a global information technology report and as part of that they produce a technology readiness index and it is interesting to see how the countries change year by year on this. We are just about to get some new data in fact so it will be interesting to see. The United Kingdom was at number ten in 2001/2002 and number seven in 2002/2003. I suspect the United Kingdom has probably slipped back behind countries like Korea that are making some significant investments and that technology readiness is looking at economic factors as well as technology deployments, internet usage, household penetration, broadband deployment, et cetera. Getting back to the sense of your question, how is the United Kingdom doing? I think it is a moving target, that is the point, there is no room for complacency or pausing. We have to look at the various elements that push us forward. The other part of the question is, what is the difference between the USA and the United Kingdom? I think John mentioned the top of the mind attitude in the political environment, I think that sort of approach in political thinking is essential to create an environment in a number of areas.

Q73 Mr Clapham: Thank you. We see there is a cultural problem, the need to embrace, are our competitors embracing the culture better than we are, for example Korea?

Mr Woodget: In some ways, yes. In some ways it is easier for the smaller countries to be able to make policy decisions and execute them. The extent to which progress has been made in the last five years in the United Kingdom has shown it is possible for us to do more of the right thing. The question is, what are the key areas for us to do better in? I think we are doing many of the right things, it is doing more of the right thing that is the challenge here.

Mr Clapham: Thank you.

Q74 Chairman: Mr Woodget, before we leave this area, do you think you could as an organisation give us your view on the INSEAD information when it becomes available. You have alluded to the next report coming out, perhaps Intellect could give us its comment on the information when it comes out because it is obviously the kind of question that had we had it we would have asked you.

Q75 Mr Woodget: I was talking from an Intel point of view, looking as a global company and as an American company.

Q76 Chairman: What I was really getting at was the INSEAD report is not insignificant, obviously, because we were talking earlier about one of the listings and how competitive Britain was.

Mr Woodget: We could do that.

Q77 Chairman: You might argue that there is such a flurry of information of that kind that it is difficult to distinguish.

Mr Woodget: It is very interesting.

Q78 Chairman: If you have a series it would be useful to get your view, either your organisation or your company, whichever take on it.

Mr Woodget: I would be pleased to do that. You would be interested to know that I think INSEAD nicked some of the information, age partnership, dashboard, metrics, much of their structure maps very nicely on to the United Kingdom's initiative for the Information Age Partnership, I think it will be very interesting to do that.

Q79 Richard Burden: Can we go just back to the emphasis you put on the need to create a more effective national communications infrastructure. You have talked about the role of broadband within that and the need to move horizons beyond where they are at the moment. I have just struck in your evidence 478, where you said "the United Kingdom is to reach 100% broadband availability to all communities by the end of 2005. Decisions will need to be made as to which model of public sector intervention is most suitable to do that". You then say, "Intellect recommends that the Government continue to work with industry to ensure we have the right regulatory framework and incentives to invest in such networks". What is the model of public sector intervention that you would like to see?

Dr Hargrave: I think the key thing is there should be some form of public sector intervention. Obviously we are working in an environment where it is often said that the market should decide and if there is an economic value or value to business and commerce these things will happen. If you look at many of the components of the knowledge economy for electronic devices it might not matter ultimately whether they are developed or researched and made in the UK, they can be imported. There is a fundamental thing which is the actual communication infrastructure linking together. It is like the roads in the twentieth century and the railways in the century before and the canals before that, individuals cannot put it in place if they need it. If you are going to be a knowledge worker of the new economy and you want to sell your skills to an international company who does not happen to have a site that you can go to work they might in the future quite reasonably expect you to work from home. If there is no communication infrastructure in place to enable you so to do you cannot be employed. You would not have built a factory in the last century if there were not roads in and out to get the raw materials. Because it is so important and so central it cannot just be left to be created bottom-up by market forces. We are talking about the next generation of broadband, a lot is being done and most of the numbers here relate to the roll-out of the first generation, that was even more straightforward. This next generation requires digging the roads, getting fibre closer to the user, the use of fibre and radio alongside these. Unless that is pulled through it will not be there. It is like if there are no roads in the country and expecting the market to build the right road network. It seems so fundamental to the economy that that must be pulled. There needs to be a vision in the United Kingdom as to what that should be and as it says elsewhere in this document someone needs to be empowered within Government in order to make sure that vision takes forward. The particular nature of interventions I think are open to debate but it has to be pulled rather than pushed. It is so central to the economy that it is argued that the person who actually monitors that and looks at it should be in the Treasury within the United Kingdom administration. That is the sort of concept behind those comments.

Q80 Mr Clapham: Coming on the back of that question, if we were to examine the current situation with a view to identifying where major errors had been made in terms of the policies that are required to support the United Kingdom's information technology industry what would you say they were? I heard Dr Hargrave's say there is a need for more support, you referred to the Treasury, is there anything else that is required to be done that we have missed?

Mr Higgins: As we all know, and you are discovering as you go through this process, it is enormously complex and a very initiative-rich area. There are lots of lots of things. I am not sure we could pick out any specific things that have been wrong or particularly driven better than others. One thing that does seem to me to beginning to be a weakness is a bit of a tendency to take our foot off the gas. I have said to Stephen Timms that it worries me greatly that his job title includes "Energy and Postal Services" that does not give me great confidence that the Government regards the whole "e" agenda with such enthusiasm as it once did. I think there is a great danger in that, and I have said that to him on a number of occasions. Stephen is a great minister and he supports this sector enormously and our industry but we would like a bit more of him. To have him spread round "Energy and Postal Services" is not terribly helpful.

Q81 Mr Clapham: A bit more of him and perhaps more cross-government support.

Mr Higgins: I think the cross-government support is actually fundamental. If I come back to my car metaphor, if you like, and also why do we care, I think in the car metaphor if you think of the knowledge powered economy as a car, it might be a knowledge powered economy but it is still an economy. It seems to me that the people who are traditionally at the driving seat of an economy are people in the Treasury. Organisations like ourselves representing the ICT industry we might see ourselves as, if you like, the tools supplier, the power tool suppliers. We, of course, want to see that our power tool industry is developed but also that our power tools are used to make the cars as efficient and effective as possible. If I can extend that

metaphor, we see the DTI having a very important role as the engineers and mechanics, supporting our power tool industry but also ensuring that these are deployed well. If a knowledge powered economy is only a different sort of economy, a more efficient economy in the field sector of the economy it seems absolutely logical to us that the people who understand how to drive economies should be driving the knowledge economy. That is the danger, the fundamental one of taking your foot off the gas and maybe having the wrong people in the driving seat as well.

Q82 Chairman: I am just thinking about the metaphor, I will do it a wee bit, if I can, I kind of worry that the risk adverse character of the Treasury would be such that this vehicle which would be driven not only would the foot be taken off the gas but they might be frightened to go on the motorway, despite the fact it is safer to drive on a motorway than on most of our roads. I make the point but again as time goes on we will test out your suggestion about Treasury and an individual within the Treasury responsible for it. What I would be interested in is actually to get your view on the diminution of the status of the e-enjoy or the disappearance thereof, how do you feel about that? In passing you said that part of the impetus behind much of what has been successful in the Government's achievement could be attributed to the e-envoy, which we have not got.

Mr Higgins: To the creation of that role as opposed to the individual. The original model we all had in mind was President Clinton's special representative, Ira Magaziner, whose job was to ensure that the "e" agenda stayed near the top of each department's agenda. That is what we all more or less had in mind when we were making recommendations about the creation of a similar post here in the United Kingdom. My own interpretation of what happened is that modernising government and the application of information and communication technology into this huge modernising government programme quickly became a key priority with the e-envoy and that is how the role has transitioned now with the appointment of somebody responsible for e-government. That in itself is a big job to do but I do think it has and will continue to take focus of this knowledge powered economy. I think we do have to find a solution to that. Putting whatever follows the e-envoy focusing on application of technologies to modernise government, given it is a projected spend of 40 billion over the next three years in health, defence, central and civil government, criminal justice huge, huge challenges, you are absolutely right to have a key focus on it but we also have this knowledge powered economy issue to deal with as well.

Chairman: We have just about covered all of areas that we wanted to. Having said that if you have any second or third thoughts we would be happy to receive them. If we can get your observations on the INSEAD World Economic Forum update, that would be helpful to. Once again thank you very much, gentlemen, it has been very good.