HOUSE OF COMMONS

Business, Innovation and Skills Committee

Oral evidence: Business-University collaboration

HC 249-iv

Tuesday 1 July 2014

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Witnesses and written evidence where submitted:

At 3.15pm

- Professor Nigel Thrift, Vice-Chancellor, University of Warwick
- Professor Kevin Warwick, Deputy Vice-Chancellor (Research), Coventry University
- John Latham, Vice Chancellor, Coventry University

At 4.15pm

- Will Searle, Managing Director, Axillium
- Dr Richard Hutchins, Board Member, Coventry and Warwickshire Local Enterprise Partnership
- Dr Carl Perrin, Director, The Institute for Advanced Manufacturing and Engineering
- Tony Harper, Head of Research, Jaguar Land Rover

Members present Mr Adrian Bailey (Chair), Mr William Bain, Mike Crockart, Ann McKechin, Mr Robin Walker

Questions 172 - 225

Witnesses: **Professor Nigel Thrift**, Vice-Chancellor, University of Warwick, **Professor Kevin Warwick**, Deputy Vice-Chancellor (Research), Coventry University, and **John Latham**, Vice-Chancellor, Coventry University, gave evidence.

Q172 Chair: May I start by thanking representatives of both Coventry and Warwick for their hospitality today? Thank you, as individuals, for agreeing to assist us with our inquiry.

Before we start, there are one or two little things. I understand that for the audio system you press the button at the bottom to start and press it again when you conclude. I

understand that our audio operator at the back can switch anybody off, so if you see me frantically signalling to him, you will know I have got fed up with everything you are saying and just want to shut you up, but I am sure it will not happen.

Some of our questions will be person-specific; that has caused us a little bit of a problem, given the fact that we have some for Lord Bhattacharyya and, of course, he is not here. However, we have made suitable adjustments to the questions so that you can hopefully adequately stand in for him, if indeed anybody can adequately stand in for Lord Bhattacharyya. Do not feel that you all have to answer every question if you don't feel you have anything to add to or subtract from what a previous speaker has said. Before we start, can I test the system by inviting you to introduce yourselves?

Professor Thrift: Nigel Thrift, Vice-Chancellor of the University of Warwick.
Professor Warwick: Kevin Warwick, Deputy Vice-Chancellor, Research, at Coventry University.
John Latham: John Latham, Vice-Chancellor at Coventry University.

Q173 Chair: I start with a slightly amended question. In the light of the experience of the panel members of working with Warwick Manufacturing Group, what do you think are the key features of WMG's design that encourage greater collaboration between business and the universities? Who would like to lead on that?
Professor Thrift: It might be appropriate if I do. Of course, there are a number of features. In particular, WMG does a lot of research, and that is important to note. Secondly, a lot of that research is close to implementation. It does not stop with producing a new idea or product. It works all the way through and helps companies to implement as they go on. Thirdly, I honestly think it is about depth of experience. WMG has been around a long time now, and they know whereof they speak, therefore, and they have seen a lot of different things. They have been able to hone a model that really works, and we can see that it really works; the results speak for themselves.
Chair: Does anybody wish to add to that?

John Latham: I will add to that, because there are some key points from Nigel's statement. Number one is around longevity and the experience and recognition that longevity brings. Certainly, in my experience of working in the UK and internationally, in Germany, Finland and France, longevity is a key issue. Recognition of the expertise and the capability is paramount. Also, it is closeness to market: the ability to interact with business in a way in which business needs to be interacted with and that supports what they are trying to achieve and the way in which they can try to achieve it. WMG is an example of that, and there are other elements, both within our university and others, that do that.

Q174 Chair: Can I just move on now, broadly, on the skills and talent issue? I will start by quoting Coventry University's written evidence, which says that "the Innovation and Skills Agendas should be considered more holistically in the UK to increase the amount of collaboration between business and industry". It highlighted Finland as a leader in this respect, and indeed I think that was mentioned this morning. What are the key differences between the Finnish and UK approaches? Would you like to start on this, Kevin? You are pointing at each other.
Professor Warwick: For me the key point is, in terms of research students or postgraduate students per se, rather than having a "them and us" philosophy, it is much more integrated

and students can move into the academic life and move out again. Within the industrial sector, they can carry out their studies there, whether it is for postgraduate, PhD or Master's. It is much more integrated. It is not that you do this time in academia and then you go and work. It is a holistic thing: you can be working but studying for a PhD or Master's at the same time.

Q175 Chair: If I can just follow that up, in effect in Finland it is much easier to move, during the course of your studies, from the university to business.

Professor Warwick: And back again.

Chair: And back—yes, obviously. Is this a result of the structure of the course, the funding regime, or what? What is it about the delivery of university courses that makes that process easier?

John Latham: There are two things. One of the things that you come across when you enter Scandinavian systems—Finland being a particularly good example of this—is a recognised structure, both an innovation path and a support path, for individuals, whether working in a university, research centre, business or business support agency. Very crudely, if you go to any of those organisations within Finland and they present how they fit within the innovation and support structure, they will all use the same slides. It might have a different logo and a different colour, but everybody understands what their part in the innovation and R and D process is.

That enables people, whether in business or academia, to design courses that are very close to the needs of business—because there is a close interaction and understanding of what the needs of business are—and there is a true recognition that spending some of your career in academia or research and some of your career within business is a norm. It is the type of thing that people are encouraged to do. It significantly increases the levels of postgraduate attainment within Finland. Particularly in some areas of Finland, it is up at 75%, and that is a huge difference from the level of attainment in postgraduate education that you have in the UK.

However, fundamentally what you have is a holistic model. Everybody understands where they fit within that model, where it is delivered, and how you move from one part of the model to another. In the UK, it is very disjointed. Fundamentally, you find you do one thing; then you might go and do something else; then you might go and do something else; but the recognition is not as coherent or integrated.

Q176 Chair: Assuming that you think we should introduce elements of the Finnish model, what changes need to take place in our delivery of British university education, if you like, that would actually enable that to take place?

Professor Thrift: I would make the following comments. First, and echoing John's point, I think it would be unlikely, a lot of the time, that difference actors in the system we have at the moment would put the same slide up, and one of the reasons, at least, for that is that the system is so complex. If you look at skills education, there are very large numbers of different kinds of things going on, so it is extremely difficult to navigate, I think.

Going on from that, I think that nowadays academics are much more attuned to the idea that they would spend time in industry, but it is still quite difficult to do that. We certainly have not got round the barriers to doing that or indeed the other way, and that certainly is something to be emphasised.

Q177 Chair: What are the barriers?

Professor Thrift: They are extraordinarily practical barriers. If you want to move from one place to another, what do you do about your pension? Things like that are often the most difficult things to work through. We have to find a way of making a whole series of things portable in a way that they are not at the moment.

Going on from that, I did want to mention one thing that I feel very strongly about, and that is undergraduates. They could have a much greater role to play in the system than they have at the moment. I have just been in Canada at Waterloo University, and they have the most extraordinary undergraduate start-up programme there. There really is not anything quite like it at the moment in the UK, but I think there could be. They argue that undergraduates are the most appropriate people to start with, because they really are interested in setting up businesses, and at the same time they have often come from more frugal environments, which means that they do not have to make a lot of sacrifices.

Lastly, one thing that is difficult is that countries like Finland are important exemplars but there is a real issue around scalability. They are much smaller countries. People mention Finland, Singapore, etc, but in what is effectively the size of a large city, it is not too difficult to do some of these things. When you start having to do them in much larger countries, it becomes quite problematic to get anything like equality of outcome across the whole system.

Professor Warwick: From an academic perspective, one of the key drivers, particularly on the research side, is the production of academic peer-reviewed papers in top-quality journals. I am very happy that I have got a lot of those; I have spent my career in academia. I graduated with another guy who is now working two minutes from here with Jaguar Land Rover. He has not published any papers at all. He is very successful in Jaguar Land Rover. The drivers and the goals are completely different. I would like to think we have both been very successful, but the goals that I have had to achieve in the academic world, particularly papers as one example, have nothing to do with his goals. I am sure he could produce papers, but that is not what he is about.

John Latham: Just to add to Nigel's remark, there is something about the scale of Scandinavia. There is something about a population of 5 million people. It is the driver that seems to make a big difference in terms of what you can mobilise, move and make a difference in. However, I do think there are elements of best practice you can bring from Canada, Finland or other parts of the world that we really do miss out on.

Q178 Mr Walker: Just while we are talking about other parts of the world, clearly we have a concentration in this very small area, with both Coventry and Warwick, of very close collaboration between industry and universities. Looking further afield than just Scandinavia, where are the other international comparators that you would measure yourself against, or are there any? Is this a space in which we are standing out?

Professor Thrift: I will start. I had not thought very much about that, except in the sense that, if you think about the main comparators at the moment, they would probably be parts of Germany, without a doubt. Going on from that, it would be parts of the Netherlands. Then if we go wider afield, there are obvious examples in the United States. Those are the comparators at the moment. However, there are some very interesting things going on in other countries that tend to get neglected.

John Latham: I would like to echo what Nigel said. We, as a university, have already borrowed examples from the Netherlands and Germany in terms of models, and most certainly universities like Aachen in Germany, for example, where there are really good relationships between industry and the institutions. There are also quite good models starting

to be developed in parts of Asia. There are certainly models being developed in Australia, for example. If you look at some of the Australian technical universities and their interaction with their industry, again they have had the advantage of not having the legacy, so they have managed to bring in some new models of interaction. However, the UK does have significant scale in this area already and a lot of expertise, but perhaps some of it is clouded by that legacy and some of it needs to look at new models that we could put in place.

Q179 Mike Crockart: I just want to come back to the Chair's question, which was: what, in concrete terms, can we do differently to make things work better in this country? There was lots of general talk, but the only definite thing I took from what you said was making pensions portable but, to be frank, if you start out in the business world and you move around in the business world, then you deal with your pension yourself and end up with lots of pots in lots of different places. I am not entirely sure what the argument is there. The only other one was the need to produce papers or not, but equally you answered that by saying, "I am sure he could produce papers if he needed to". I do not see either of those as being the thing that will crack the difficulty of moving between the two. I ask you again: what is the thing that we can do differently that will make it easier to move between business and academia, and back?

John Latham: There are two or three things, and we have almost seen a reduction over the last 30 years. If I take my own career, 30 years ago I was a sponsored undergraduate student. I worked for what was then called Plessey Telecoms. I did what was known as a sandwich degree at that point, so I started my career being sponsored to go to Coventry to do my first degree. I then left and came back early in my career, about six months after I left, to be an academic member of staff.

I spent nine of my first 15 years of being employed in Coventry either working in industry or working overseas. Part of it is around early-career academics, because you have some of the flexibility and freedom that Nigel was talking about. You are not necessarily so committed in terms of your long-term career. There is some flexibility. There were options for secondment, as it was called in my time, and I had the opportunity through European-funded schemes to go and spend time abroad; I spent a year in Germany, a year in France, a year in Portugal, and some time in Spain. I was very fortunate. I was willing to do that; it allowed me to spend time both in academia overseas but also working in industry. I was a BT research fellow for a period of time.

Slightly later in my career, it became slightly more difficult to do that moving around. However, there was the opportunity and the ability to put in the university systems career development processes that allow and encourage individuals to spend time out of the institution. In fact, when I joined Coventry, my contract said I would spend one year in five out of the institution. It was a contractual obligation at that point in time, which was removed later.

However, it is also the same around accepting individuals into the university from industry on sabbaticals. It used to be more common. Again, when I was at Plessey Telecoms, individuals from that organisation used to come in and spend a year in industry as part of a sabbatical out from their organisation. At that point in time, Plessey itself used to have some tax breaks on that part of the model. There was a whole tax-break system that had been put in place that supported both them supporting me as a student, as an undergraduate, and some interaction between their organisation and the university. Two or three years after I graduated, that was all taken away in a process, but at that point in time it seemed much easier because there was a promotion, if you like. Part of it is that promotion: the university

has an onus and a responsibility, but there also needs to be a recognition from industry, in some ways, that we want to move staff in between the two organisations.

Chair: Nigel, did you wish to add to that? We are running slightly behind time.

Professor Thrift: I was going to add only a couple of things. It is also worth remembering that there are generally fewer labs and research facilities in business than there used to be that you could move people between, and that is something that we need to think about. Going on from that, universities now are routinely appointing people from industry into the ranks of the academics, so I do not think there is an issue of quite the same scale there would have been even 10 years ago.

Q180 Ann McKechin: Recent analysis by BIS showed that the UK had low scores on management skills, which would limit our ability to capture the economic value of the innovation and research carried out here in the UK. Should the development of management skills be a priority for our students, and how do we go about it?

John Latham: The simple answer is "yes". I think there are definitely areas of enterprise development, management skills and recognition of innovation and R and D skills that could be given to individuals both in work or those who are moving through the education system at the moment—undergraduate and postgraduate—in terms of moving it through. I think there is a role for universities. Over the last few years, they have certainly been very good at instilling enterprise and entrepreneurship skills within individuals as they go through.

There is a need, perhaps, to recognise in non-business and management areas that it could be one of those core skills that you almost expose every student to, and you would expect them to undertake those key skills as they move through the system. However, I think you are absolutely right that, particularly in the medium-sized companies—not necessarily the small companies, which are a bit more enterprising and entrepreneurial—there needs to be a focus on generating opportunities for their management and leadership teams to gain knowledge and experience of what exploitation of innovation R and D could give them. That would be quite a positive move.

Ann McKechin: Nigel, did you want to add to that?

Professor Thrift: Yes. First, another five years or so and most universities will be teaching entrepreneurship skills to their undergraduates as a matter of course. They will have to be doing this. It is a national priority; in a sense, where are the jobs going to come from? In a lot of cases, people are going to have to create them themselves, if I can put it that way.

Secondly, you can then go on, of course, to postgraduates more generally and so on through the system. Thirdly, universities like this in Coventry also have science parks and such like, and they are trying to inculcate skills by mentoring people within science parks as well—specifically management skills.

Q181 Ann McKechin: We hear this a lot from universities: how they are doing more in terms of entrepreneurship. Actually, when you look at the statistics, only 7.2% of full-time undergraduates had a placement year with industry in 2009, which was 2% lower than in 1999. The figures are actually going backwards, so can you actually be expected to produce graduates with business-orientated management skills in the absence of their having any practical experience in a working environment outside academia?

Professor Warwick: I will add a little, and perhaps be a bit awkward in my answer. I agree it is very difficult without the practical experience in any sense, but to swing it slightly, what students get, particularly in the more applied sciences, depends on what you call

management. In terms of project management, they do get a good grounding. Often they are given projects they are expected to manage, with time delivery and so on, and that relates, as Nigel was saying, to when some of the larger UK companies had big research institutes and so on. A lot of the bigger companies had those. They do not now. It related very closely to those things, and the students could spend time working in those environments, without too much of a transition between the two, and pick up those management skills. However, now that those sorts of areas have gone within the companies, it is a much bigger step for students to take.

Q182 Ann McKechin: Is the problem occurring more at the business side, where businesses are more reluctant to take people on at, say, an undergraduate level as part of their course?

Professor Warwick: It is easy for me to say so, but I would say "yes". I have not been at Coventry for that long. I was at Reading before, which I know is similar to Coventry, so I can speak for the two universities. Both have people working within the university to try to make the links for students, but it is very difficult for the companies to give placements over a period of time. They are obviously very choosy—perhaps a lot more choosy than they were. So, yes, I point the finger and blame companies, but I think there has been, as Nigel was talking about, a movement; the ground in the middle has disappeared.

John Latham: There are many elements here as well, and one of the things we have to be very careful with is that every undergraduate at Coventry, as part of their course, does enterprise and entrepreneurship modules now. That is true. We try to give every student at Coventry an international experience. We have 1,000 undergraduates going overseas this year doing something: physically travelling, going to a company, doing something as part of the experience. We still have at Coventry quite a large number of individuals who take a sandwich year or a placement period during their time in industry, for which they will get some leadership and management skills. There are a number of things as a global citizen these days graduates need to have, as well as studying their core subject area. Management and leadership is quite a strong element for me; so is enterprise and entrepreneurship, and so is that global and international dimension. If you are a fortunate graduate and you come out with all of those, that is very good.

However, there is also an element of what we need, and we do need a mix, and we have a good strong mix in the UK. If you look at graduates coming out of most of the universities you find in the UK, we should be very proud of what they have and what they have done, and most of the universities are doing a pretty good job in terms of the overall levels of employability, given the market and everything else that we have. Some are slightly better, some are slightly worse, but I do think that leadership and management is one of a bag of areas required for the UK.

Professor Thrift: Could I just add one thing to that, only because I think it is important? I do not really recognise that the number of placements is going down. I looked at the HESA statistics and I find them not very understandable. Most universities are increasing their placement numbers quite substantially, as indeed is this university. If you really wanted to make a step change, the problem you have is you have to have an enormous pool of companies to do that. If I look at Waterloo, the university I talked about before, they have one in two of their undergraduates on placements—paid work, at least, of one kind or another. They have to have a constant pool of 5,500 firms to do that. That is a struggle.

Q183 Mr Bain: If I could turn to the issue of what Axillium Research said in their evidence to the Committee, they have said that "the call we hear is for money to be allocated to the areas where it will have greatest impact, which is often support and knowledge transfer, not buildings, equipment and infrastructure". Would you say, Nigel, that the balance of public funding between capital, operations and revenue is right?

Professor Thrift: I think it could do with a bit of adjustment, let me put it like that. As a vice-chancellor, of course, my job is always to argue that there is not enough funding to go round, and you would expect no less, I am sure. In particular, in the last couple of years we have struggled over capital, I have to say, and we have been getting it from a lot of different kinds of sources. However, anyone would say that you can build a building, but the most important thing is to find the money to run it subsequently. I would therefore say that a lot of the time it is the revenue side that is the most important thing. WMG, though they build buildings, always make sure that they have a revenue model so that they have filled it.

Q184 Mr Bain: One of the other issues mentioned in this regard is that funding from the Technology Strategy Board comes with very stringent business metrics and very strong criteria attached to it, which is not the case with HEFCE funding. Would there be an argument for reforming the system in your view?

Professor Thrift: First, I am very much an admirer of the Technology Strategy Board, and when you are dealing with the kinds of things they are dealing with, which is mainly technology readiness level 4 plus, you would expect the funding to come with particular kinds of metrics, and that is only right and proper. You then have to decide if you are going to rob Peter to pay Paul, effectively, by taking money from, say, the Research Councils and suchlike in greater amounts. I would say that that would be unwise. At the same time, I would also say that the Technology Strategy Board is very good thing.

Professor Warwick: HEFCE and TSB are looking at two different things. In a way, TSB is looking at the metrics to set, "This is what you must achieve", and HEFCE is doing the retrospective, "This is what you have achieved, so we will give you this much money". Importantly, the impact area within HEFCE is part of that, having just been brought in. I think it will probably be covered later on. Clearly that is very important, so in a way there are similarities there between the two, but one is a sort of pre-award and one is a post-award thing.

John Latham: I should make the statement that, as a vice-chancellor, I do not think there is enough, but I will park that one. Ultimately, one of the biggest issues we have is that, with most of the schemes that you tend to apply to for funding these days, you are either applying for capital or you are applying for revenue. Very rarely can you apply for capital and revenue together. Luckily, most universities are skilled in the art—and it is an art—of being able to secure capital funding for an initiative and then, alongside that, some revenue funding. Hopefully, as Nigel says, most people these days know you need a sustainable business case, otherwise you do not want the capital asset in the first place, because it is not going to be sustainable. There is an issue around the responsibility of Government, as much as of major funders, to recognise that with capital there does need to be some revenue—at least some start-up revenue—to enable you to start the initiatives that go with the capital asset generation.

I also think it is a fine balance between the work of the Technology Strategy Board, the Research Councils and HEFCE as a funding agency. It changes almost yearly in terms of the requirement at any point in time, because you are responding to either a government initiative

or a change in administration. One of the biggest issues for me is the longevity of the planning cycle and the ability to react to that.
Going back to my experience of working in Germany and overseas, I took a group of individuals from what was then the DTI on a study tour of Europe. We found that the UK was doing most of the initiatives, most of the activities, in one way or another. What was not there was the longevity, flexibility and stability of the support systems that came with that. Most of the companies in most of the countries understood what the support system was because it was there, and when it needed to change, it migrated. It did not stop, only for somebody to come up with a new initiative and start it again six months later. It was more around being flexible but supporting that long-term agenda, particularly if you are looking at significant research infrastructure or research capabilities that you were seeing within government initiatives. That is a serious issue.

Q185 Mr Bain: One of the other differences is the scale of the investment in Germany as well. You have pointed out that the TSB has about £450 million a year in this country. The Fraunhofer investment in their institutes is around €2 billion a year. There is a dramatic difference in scale. If we turn to that composition of the TSB's funding in comparison with what the Research Councils get, it is roughly one-eleventh of what is awarded to the Research Councils. The evidence that this Committee has received has demonstrated a consensus so far that opportunities for business and university collaboration ought to be improved. Is there not a strong case, therefore, for reviewing what some have called a substantial under-gearing of public funding for innovation?
Professor Thrift: Straightforwardly, yes, but not at the expense of the Research Councils.
John Latham: The simple answer from me is also "yes". There are aspects of other funding mechanisms. You could have a much more integrated holistic approach to the funding cycle and, I would argue, a framework that people understood. At the moment, if you look at the work that is going on within our own Coventry and Warwickshire LEP area, we are looking at the development, through the LEP, of innovation assets; in other words, capital infrastructure to support some of the activities we would want to lead because they are important to us as a region—I will call it a region now; it is not a sub-region anymore—of Coventry and Warwickshire. There is then an opportunity, if their funds can be aligned, if the European Structural Funds, which they partly have some control over, can be aligned, and if the TSB and the Research Councils and others accepted the opportunity to maybe access some European funding and bring it in and align it. That was one of the other key differences that I found, particularly when I was working in Germany and Finland. National funding and the European funding were much more aligned, almost to the extent—and this is being slightly flippant—that if you got a euro, you got a Finn mark at the same time, because it was about growing the capacity and growing the pot.
In interactions that I have had with the TSB previously, and certainly talking with some of the other research bodies, one of which I sit on, round the National Measurement Board, it is not about cutting; it is not about reforming; it is about how you add value to or extend their current funding portfolio to do more of what they do. I think the TSB is fabulous in terms of what is has done: the impact it has had and the opportunity it gives for business interaction. It is massively underfunded, in my view, because it could do a lot more and it could get that funding, but that would mean it would have to go and get some funding from somewhere else to be added to its own pot, and at the moment that is not done.

Q186 Mr Bain: To summarise what the two of you have said, we need to grow the pie in this country for public and private funding for research and development and innovation.

John Latham: Absolutely.

Professor Thrift: Absolutely. To add one thing to it, the other thing to remember on the capital side is that buildings grow old. We will have a real replacement problem in times to come.

Q187 Chair: Before I bring in Robin, could I follow up that issue of the Research Council funding? You say that in the other parts of Europe, their equivalent, if you like, research councils can access European funding as well. What are the obstacles to this happening in this country?

John Latham: There are two things. Historically, and this is a personal observation—I will make that statement at this point—the UK approach to certain European funding systems is that, if you are able to attract European funding, then you do not need national funding, "That is a saving; thank you very much," as opposed to adding value to potential national funding. There is some resistance within government agencies to align their future delivery against the opportunities that come from Europe. Previously, if you look at some of the programmes under, for example, Framework 6 and Framework 7—the precursor to Horizon 2020—there were obviously UK national science government programmes running that were almost identical to the equivalent programmes from Europe. It was very difficult to match those two programmes together to get a bigger bang for your buck and, if at all possible, was down to the people who make the application. The pre-matched, pre-focussed agenda, where the alignment was stronger and you would get more opportunity to apply, was not taken by many of the UK agencies. It was almost as if, "That is what you do not do", as opposed to, "That is what you do do", and that is a fundamental difference in mindset.

Chair: Thank you. I do not want to dwell any further on that, although it is a very interesting angle that we may ask you to submit some written evidence on in the very near future.

Q188 Mr Walker: We have heard some impressive figures as we have gone round this morning about the number of SMEs that you interact with, but we have also heard evidence that the whole independent SME sector in the UK accounts for only about 4% of R and D. Do you think there is any argument that the public funding or public support for R and D through tax breaks should be targeted further towards the SME sector, or is there a form of trickle-down effect, whereby big firms working with universities benefit SME supply chains?

John Latham: There are two or three things to look at. One is that the overall spend of SMEs on R and D is going to be related to the size of the company and the fact that, when you do start to look at SMEs in terms of the total number of SMEs, a large percentage of those companies are not going to be part of the R and D agenda. The other problem with SMEs is "small and medium" is a very, very big scale, and in certain sectors a medium company is about as big as you are going to get, and it is not going to get much bigger. There is some hidden information that needs to be unpicked there in terms of the SMEs that could and would and should benefit from undertaking R and D probably being a reasonable proportion of our total SME population, and ultimately SMEs hopefully become Ms, and Ms

hopefully become large companies. We have to recognise there is a pull through in the supply chain there, and I think universities support those very well.
There is a targeted area, as I have always thought, around the Ms: those people who have got a good balance sheet and track record, and who can show that they have a good solid business that could grow either through exporting or being acquired, which is not necessarily a bad thing, or by growing their activities into either adjacent sectors or to developing new products. There is definitely an opportunity to focus and differentiate between Ss and Ms in the SME community, and I know UKTI are launching some schemes with that particular focus, and I know there are some areas of particular interest both within the EU and other parts of the UK government on the Ms, and I certainly would not be against a focussed approach, saying, "We think there is something here we could make a difference with; let's have a look at the M market and see." It is much more of a step change if one of those is successful than if an S is successful.
Professor Thrift: Briefly, the bald figures I think underestimate the kind of help that is going into a lot small firms, especially, as John's precisely said, because of the supply chains that they work in. Secondly, yes, there is the medium-sized, and universities can help in all kinds of ways there: management skills, new products, etc. I suspect that a lot of the time they can be very effective. We just need to do more of it.

Q189 Mr Walker: You have talked about relatively low investment in the UK in R and D compared with other countries and the fact that, during the 30 years for which the Warwick Manufacturing Group has been around, that level has fallen, certainly relatively to other countries as well. What has been the impact of that on your respective institutions and the approach to business, and is there any extent to which comparatively low public-sector investment has driven collaboration between the university sector and businesses?
Professor Thrift: You are arguing it has made us leaner and more appropriate to the task. I actually think that one of WMG's great skills is being able to find funding from a lot of sources in order to make sure they can do the job it was set up by Lord Bhattacharya to do. In a way, there is always going to be this constant shifting balance. If you go the other way, though, it is patently obviously that more money needs to go into R and D in the British economy. It is pretty hard to find anyone who says the opposite. There has just been a BIS working paper, for goodness' sake, saying precisely that.
John Latham: I can give you a couple of figures, if you like, that echo what Nigel was saying. We recently started on a journey of growing our applied research income, and six years ago we had funding from 194 sources. This year we have funding from 621, because to maintain our level of activity we have had to diversify where we get our funding from. Maybe we are fortunate enough to do that, and I am sure Warwick and WMG have been doing exactly the same activity, but that just means we are going wider into a pool to try to effectively overcome the cuts we are finding from our previous sources of funding.
I will give an example of a task that we have at the moment. Certainly under the current European Structural Funds programme that has been running in the West Midlands, Coventry University itself has been involved in a total funding—not just the structural funds—of 53 million. Under the new programme, there is 20 million for the whole of the Coventry and Warwickshire area. We are going to have to get that money from somewhere else, and part of it—and I think this was part of your question—is around interaction with industry. There is a kind of positive knock-on that some of the reactions and interactions we are having with industry are as result of the fact that maybe industry are willing to contribute, if I put it that way, to some of the activities they used to get for free, and there is a view that in the UK we

give too many things for free to too many businesses. However, there is a scale at which you have to offer. For start-ups, pre-incubation, the subsidy level from Government needs to be higher than it does perhaps a little bit further up the scale, and again there needs to be some recognition about what that level of subsidy is, depending on the organisation, because at the moment this SME definition is just too broad.

Q190 Mr Walker: Funnily enough, what you were just saying about greater subsidy to start-ups and so on is an argument I have had many times with UKTI. I was quite struck by what you were saying a minute ago about the UKTI export agenda and what we saw earlier in terms of your involvement as a university. I am guessing it is relatively unusual for a university to be actively promoting that in that way.

John Latham: Yes.

Mr Walker: Have you found any link between companies' involvement in export and their willingness to invest in R and D?

John Latham: Yes. I think there is a direct correlation. One leads to the other, both ways round. You can target a company that wants to go global very quickly. One of the programmes we operated on behalf of UKTI a few years ago was called Soft Landing Zone. We opened 20 offices around the world for UKTI. The idea was that, if you had a company that was starting up in the UK, quite often the product they are developing is not for the UK market. Unless you can get them into an overseas market very quickly, they are not going anywhere. Now, that created a lot of R and D and innovation with our university, because developing global products is very different from generating a product in the home market. What is also true is that quite often, if you get a company that has new and innovative products and they are not exporting, if you can introduce them to exporting, you can grow those companies much more quickly. There is some correlation between the type of company that is willing to take the risk of R and D and innovation as well as the risk of exporting. Sometimes it is related to their appetite for risk.

Chair: We have nearly half our questions yet to be posed and only a quarter of the time available to answer them. Could I just ask for brevity in responses and emphasise that, if you feel you would like to supplement any of your verbal answers today with written evidence afterwards, we would be very happy to receive it?

Q191 Ann McKechin: The University of Bath in their evidence to the Committee said that "as strongly business-led enterprises, there is a risk that Catapults will develop strong business-business activity with limited academic engagement". Now, I would be interested to know very quickly this afternoon whether you agree with that contention, or whether you think that is a risk, or whether that actually might be a benefit. I find it personally rather a strange way to present the whole issue about Catapults, but I would also be interested to know your own experience as universities about your contact and link with the High Value Manufacturing Catapults.

Professor Thrift: All I can talk about is obviously the High Value Manufacturing Catapult. In terms of that, I do not think that risk has happened at all, just factually. Universities and business have worked together very well in terms of making sure that the goals are reached. Remembering that Catapults are meant to be national centres with international reach, then both business and universities provide both parts of that. At the same time, of course, they then produce big dividends locally. They are not one thing or the other.

John Latham: Very quickly, we are involved in three Catapults. First, there is the High Value Manufacturing Catapult. The other node, which is very close in Coventry, we work

closely with, and we have a lot of interactions between the university and their SME community. We work with the Connected Digital Economy Catapult, and I think they issued a call last week to work with LEPs to support business, and part of that involves interactions with university, which I think is a very positive move. Finally, there is the transport Catapult, where we have been recognised as a formal university partner, which they opened up through a formal call, which I thought was good recognition of the importance of universities around the development of transport. I do not think that is necessarily a big issue.

Chair: The next question is actually to the Coventry University representatives.

Q192 Mike Crockart: This particularly relates to the written evidence that you submitted to us. You stated that "there is a role for both universities and Catapult Centres to be the overlap between the research space occupied by the Research Councils and the Technology Strategy Board's industrial focus". That leaves me feeling that perhaps there is a bit of a congested space there, because we have the Research Councils, TSB, Catapult Centres, business, universities—are all these things complementary or are they competitive?

John Latham: There are two things. Look at the work of the Research Councils. As Nigel quite rightly mentioned, if you look at their TRL levels, in terms of going from one up to four, and then look at the TSB taking on from four all the way up to seven, where the biggest concentration of need and support takes place is in the overlap and the interaction between those two spaces. The Catapults and a lot of the universities—particularly our university, an applied research university—operate really between TRL levels four, five, six and seven. Catapults are looking at operating within that space. That is the area of greatest need, I believe, from industry—taking the pure research to market and looking at the impact. If that is where your greatest volume of need is, having organisations that complement each other, and I actually think all of those do, to deliver in that market space, where you have local, national and sector-focussed delivery, is a strength for the UK.

Q193 Mike Crockart: You were not talking specifically about this earlier on, but you were comparing the situation here and in Finland, and you said, "Everyone understands what their role is in the innovation process". Do you think everyone does understand what their role is in this complementary structure?

John Latham: I do not think that everybody fully understands. I think it is there because it is there. There is a model that could be both explained and promoted better. I think the model is missing for the UK. You do not know where you are; there is no diagram that explains where you are. I think that people could get more benefit from seeing that model: that overlap, that strength. Universities tend to have a sector focus, a location focus and a capability focus in terms of what they do. Catapults are very much sector-focussed to a certain extent in terms of what they are delivering, but the sector they are looking at is a particular competency, like manufacturing or digital communications, and I think those strengths for the UK need the extra top-up that the Catapults are giving them. I think the universities are adding to that capability, and the funding from the TSB and the Research Councils together actually gives the basis on which the other two operate.

Q194 Mike Crockart: Are you saying it is just the diagram that is missing to explain it?

John Latham: It is the way in which they integrate. I also think you need to give the Catapults a period of time to settle in and bed in, because they are very different and the

technologies they are operating in are different, and if you look at the industrial sectors they are supporting, they are very different. There is a danger that, if you measure them too early, you will do a typical British thing, which is give them three years, cut them dead, and try to think of something else to do, whereas if you can give them some space to operate, I think they can make a bigger difference than they are making at the moment. Most of them are very new, after all.

Q195 Chair: Can I just talk about the High Value Manufacturing Catapult? It has now got seven centres across the UK. This would seem in some respects incompatible with the principle that you have a local university research facility engaging with local business. Basically, how do you see this and do you think it does dilute the principle of the Catapult Centre?

Professor Thrift: The Catapult Centres were always meant to be national centres with a local presence. It is less problematic than you might think. The other thing to say is that the High Value Manufacturing Catapults have become quite good at acting as first point of access but passing on firms to other Catapults when it is appropriate. They are building that capacity, I think. They are building a national network that will also be local. I am less concerned than you might be about that.

John Latham: I would agree. We work very closely with the High Value Manufacturing Catapult. We have some capabilities they take from the university and we help to support them with those, and they also give access and are quite good at signposting those organisations into the university, not just locally but from wherever they are within the nodes and the networks of the seven centres they currently have. I think it is working quite well.

Q196 Mike Crockart: To a certain extent I am coming back to the same subject I was talking about a second ago but perhaps from the business perspective. Looking at the role of universities in supporting collaboration, we had written evidence from Siemens—not a small company but a fairly major one. Their written evidence was that "universities can do better at 1) understanding what funding is accessible for industry and 2) helping industry understand how to access it", which seems to be saying that they are struggling with the structure. Perhaps they just need the diagram to know where to go to, but they are struggling with the structure of how to access the help and actually set up the collaboration. Do you think that your respective institutions—and you are both working well with businesses—see yourselves as responsible for support functions like that, or is that just cut-price consultancy services?

Professor Warwick: Particularly where it is Government schemes, where they have rules and regulations, then the university can swot up on it and have particular centres based on this scheme, that scheme, whatever, and can pass the information on. It is interesting to hear that a big company such as Siemens has issues in that area. Where it is particularly relevant is back to the SMEs; it is very difficult for them, unless they know some sort of personal contact, to find out what funding can actually help them, and that is where the universities have a particular role to play. In terms of facilitating, at the same time, where there are funding opportunities for liaisons—linked, joint projects between the company and the university—I think Coventry does that very well.

Professor Warwick: I would echo that. Access to funding is usually joint between universities and industry. Therefore, that knowledge is shared, in a way, though universities probably know more about it. I would not like the intimation that universities act as, if you like, agents for business to get funding. I think it is a much more joint process than that.

Q197 Mike Crockart: The opposite view was taken in evidence we got from Imperial College London and University of Bath, who said there should be no assumption that universities provide—I put it as "cut-price"—consultancy services for below market rates. Is that not what you have been asked to do?

John Latham: I do not think we should; I do not think we do. Siemens, of course, have got a £28 million joint research institute with the University of Lincoln, which they have worked on quite considerably. That gained quite a large amount of research funding. Sometimes I wonder, with some particularly large organisations, whether one part of the organisation does not necessarily talk too much to the other part of the organisation. I would not say that is like universities, but that is potentially what we might have.

However, fundamentally I think this is a partnership activity; if you are engaging in it properly, you are doing it in partnership. You should work in partnership; you should bid for funding in partnership. There might be more expertise within the universities because they tend to do it more, by the very nature of the activity that they engage with, but certainly companies and universities working together, through a partnership office or a knowledge transfer office, or wherever it happens to be, should be able to put bids together or opportunities for which funding may or may not be required, because you do not always need funding; it is just about the way in which partnership comes together to drive it forward. Universities should not be looked upon as doing that on the cheap—certainly not by the partner, because if that is true, then the partner is not really truly valuing the interaction with the university and the benefits that can come from working with it, as opposed to working with somebody else.

Q198 Mike Crockart: That was going to be my next question, because we have been talking mainly about how to access schemes to access funding, but what needs to come first is an appreciation of the value of research. Do you feel that there is enough appreciation within the business community in the UK of the value of that research that they want to become part of the collaborative process?

Professor Warwick: There are different people within the companies particularly, and most university academics are aware of different schemes being available; they can pick up the phone within the university and say what the particular requirements are for this or that. Within particularly larger companies, often the people who you are actually working with and dealing with at a practical level are not aware of the same sorts of opportunities. An example would be CASE award schemes to deal with Research Councils. In the universities, you are well aware of them. There is the research opportunity that you can build up with the person in the company, but nowadays the companies have a handle on the CASE but the people on the ground have no idea who deals with it. They do not even know it is possible, and you have to try to assist from a good research project basis in order to extract the funding—more from within the company than anything else.

John Latham: To add to that, the other thing that is very important and should not be lost here is that we have 50—and we cap it at 50—corporate relationships with organisations. They are our key clients. If you were a business, they would be your key accounts. The vast majority of the work we do with them has no grant funding—at all. It is paid for by them or we work together to develop a product, which we then exploit or do something. The grant funding element is an important element of what universities interact with, but there is also quite a lot of work that goes on between universities and industry that actually is not necessarily supported by grant funding, in terms of the activity we do.

Q199 Mike Crockart: My final question is: as two universities working in Coventry, you are both obviously working very well with business, from what we have already seen today. Are you working together to ensure a co-ordinated approach to increasing and improving collaboration with business?
Professor Thrift: Yes.
John Latham: I think the answer is yes.
Mike Crockart: Make sure both sides are the same.

John Latham: We have the joint activity going through the LEP, which is to create the shop front, if you like, for businesses within the area. Both universities are involved in the delivery of that service. There are quite a number of research programmes where both universities are actually involved as a partner, bringing in their particular area of expertise. I am sure you will hear from JLR later, as an example of a company where both universities work together and complement each other. We quite often make bids together and, certainly, the formulation of the LEP strategy and also the delivery of that strategy is undertaken by both universities quite regularly. I actually think the partnership works very well.

Q200 Mike Crockart: You have done well; I think that is the first time you have mentioned Jaguar Land Rover in the answers, but are there other joint initiatives that you are involved with?
John Latham: Yes, there are things if you look at the projects we did, for example the Niche Vehicle Network, which again is still in the automotive sector, but was a programme that we put together that both universities worked on. We both brought our competence to small-volume manufacturers of automotive vehicles, such as Morgan cars or that kind of company. We worked together on a whole series of projects, where we came together to deliver in that space. Also, if you look at the joint work that is going on in health in terms of supporting the health industry, we have a medical school here at Warwick; we have allied health support coming out of the Coventry University. There are many areas of joint work that go on between those two institutions.

Chair: Okay, I think you have made your point. Could you submit any further evidence in written form? I am conscious of the fact that we have to have a very quick turnover of panellists. We have a lot of questions to ask the next panel and we have a train to catch afterwards. Can I thank you very much for your contribution? I do emphasise: please submit any further evidence to us in written form. We would be very pleased to receive it. Thank you very much.

Examination of Witnesses

Witnesses: **Will Searle**, Managing Director, Axillium Research, **Dr Richard Hutchins**, Board Member, Coventry and Warwickshire Local Enterprise Partnership, **Dr Carl Perrin**, Director, Institute for Advanced Manufacturing and Engineering, and **Antony Harper**, Head of Research, Jaguar Land Rover, gave evidence.

Q201 Chair: May I thank you for agreeing to help the Committee with its inquiry? First of all, if you were not here at the beginning, to activate your mics just press the bottom button, and then to de-activate them press it again on conclusion of your remarks. Could I also emphasise: please do not feel that you all have to answer every question, only if you feel that there is something that you wish to add or subtract to anything else that has been said. Could I just ask you to introduce yourselves for voice transcription purposes, starting with you, Will?

Will Searle: Will Searle, Axillium Research.

Dr Hutchins: Richard Hutchins; I am a Director of the Coventry and Warwickshire Local Enterprise Partnership.

Dr Perrin: Carl Perrin; I am Director of the Institute for Advanced Manufacturing and Engineering.

Antony Harper: Tony Harper; I am Head of Research for Jaguar Land Rover.

Q202 Chair: Thanks very much. The first question is really about ease of access to universities from industry, because we have heard conflicting evidence on this. Nigel Foster of Leeds University and Professor Richard Jones of Sheffield University said that Andrew Witty's recommendation for a single point of contact at each university for SMEs is "a difficult area", and that intermediaries, such as Catapults and individual academics, are preferable alternatives. From a business perspective, why do you think it is important to have a single point of contact?

Dr Hutchins: One of the things that businesses crave, and we heard it from the last set of witnesses, is continuity and a set of brands and trusted relationships that businesses can work with. The landscape over the last five to 10 years has changed considerably. Some of the intermediaries have disappeared from the scene, Business Link being one example; some have remained. The Manufacturing Advisory Service is a good example of that. Where they have remained and have, by and large, done a good job and are a brand that is recognised, there are effective relationships with those brokerages and they can then broker into the likes of universities to provide services, such as those that are provided by the two universities that you have visited today.

One thing that is beginning to emerge and could be very helpful through the Local Enterprise Partnerships is the emergence of new growth hubs. These effectively are new brokerage services. De facto, with 39 LEPs, there are likely to be a large number of growth hubs operating at a very, very local level. In that regard, they could be problematic in that businesses do not really recognise local areas. Businesses operate where businesses need to operate—locally, regionally, nationally and internationally. They may need to work with a multitude of growth hubs to access the services that they require from universities and the like, so it is a complicated landscape, but at least there is some form of brokerage service around for businesses where they so desire it.

Q203 Chair: Could I just go on and look at it from the point of view of delivery from the universities' angle? GlaxoSmithKline said in their evidence to the Committee that universities' technology transfer offices tend "to treat all sectors the same when negotiating, despite development times and the size of potential returns being hugely different". In your experience, just how well equipped do you think university staff are in their understanding of industry to understand exactly the sort of business drivers and mindsets that lie behind the relationship?

Dr Perrin: I have only been in my role now for a couple of months and, prior to that, I have worked for 20 years in manufacturing and just come from Rolls-Royce. There is a great deal of work that Rolls-Royce does with universities in terms of developing new technologies and with its supply chain. One of the gaps is not just in terms of the university technology transfer of the technology and the product knowledge itself, but it is actually in terms of turning it into a manufacturable product. We have talked a lot about TRL and levels of TRL, but MCRL, the manufacturing capability readiness, in terms of taking that product and being able to manufacture it to the intended design, at scale, at the right quality and the right cost, is very important.

It is important to understand what the expectations of the university actually are in terms of what it is transferring into industry and then what industry picks up, and how we avoid that valley of throwing the technology over the wall and some gaps in between the two. One of the things that I think can work well is transfer of people between the two, and those organisations getting closer together, understanding each other and each other's organisations a lot better to try to bridge that gap.

Q204 Chair: What you have said seems to be consistent with some of the remarks made by the previous panel about the inter-exchange between the university and business. What would you analyse as being the key qualities that a university employee has trying to promote that in supporting collaboration?

Dr Perrin: Where I have seen it work well is where the university researchers who I have worked with understand the industry's needs. There is as much push from the university into the business in terms of answering technology needs, rather than trying to pull through from industry from the university. The skills they need are an understanding of what makes a sellable product, in terms of cost and capability, if it is in manufacturing. That is just one example.

Q205 Ann McKechin: Axillium's written evidence described the cultural conflict between industry on the one hand, and academia on the other, relating to industry having a terms-of-business approach and academic institutions being focused on research grant terms. I just wonder what the key aspects are to you of each side's position that tend to be unacceptable to the other. What are the practical solutions—I am sure you are all practical people—about how we could actually alleviate these problems?

Antony Harper: First of all, there is a cultural difference, and it does lead to issues. To paraphrase it, large companies are used to transacting with other large companies with large sums of money, and the sorts of terms and conditions that come with those kinds of transactions. Universities are used more to a smaller scale; it is more collaborative and so on. The key issues we tend to find are mostly around liability for breach of confidentiality, so the amount of punitive damages that a company might go after a university for, for wilful breach of confidentiality, which could result in substantial losses to the company. In the case of a company like Jaguar Land Rover, it could be losses of sales due to somebody talking about new product introductions and then the inability of the university to insure themselves against that kind of liability, because essentially they are small charities.

Ann McKechin: That is a very particular issue about the insurance sector.

Antony Harper: If you are asking us which is the one issue that it normally boils down to, it is that one.

Ann McKechin: Thank you very much for that. Will, did you have any additional points?

Will Searle: I would add to Tony's comment that, from a university industry perspective and our experience, where we are often in the middle of this, it is the mindset. We are very aware of the differences. It relates to the earlier question of point of entry into a university. An academic is driven by the right of publishing and research, and a growing level of impact. An industrial is looking for an engagement and a service. We very quickly end up at contractual terms that are very different, and the way we have overcome that is by working on a common framework, with common language and common expectation. If you set the expectation clearly, at the right level in the business world of universities, then you do get clear engagement. That is, from our experience both working on behalf of and with industry, and on behalf of and working with Catapult and universities, it is about addressing a coming-together of enterprises that have common purpose. Therefore, you need a common language. That is where, when we walk around the university sector, there are so many different voices, but we need commonality. That is our experience.

Dr Hutchins: Just to add very briefly, we have to ask ourselves the question of why we have universities in the first place. The WMG model is very clear that we see ourselves as being here to help promote growth and job creation in companies, within a university context. I am not sure all universities would see themselves in that way.

Q206 Ann McKechin: You obviously may have heard this afternoon that we have been talking about the structure of academic careers and the problem, perhaps, of moving between the academic sector and the business sector, and vice versa. One witness to our inquiry told us that "where we have had the self-confidence to appoint people from an industrial background, it had been enormously successful". I am just wondering, from a business perspective, is the academic emphasis on publication, which you have mentioned, Will, disproportionate in terms of recruiting people.

Will Searle: It is quite an interesting endeavour for us, in that we have a number of engagement models, one of which is that we work with universities to take engineering doctorates through the entire lifecycle of the three years. I was listening very carefully earlier. For me, as an employer of a bright young engineering doctorate, he has spent the last six months working solely on his publication process. For me, that is vitally important for him because, in my business as an industrial, I have to have credibility for the individual. I think the right balance is there for me, but I am an SME with a small team. The dependency on publication does limit the academic environment. Engagement is just as important as the publication.

Dr Hutchins: Just very briefly, it goes without saying that not everybody who works in a university is an academic with academic targets. There are people who work in a university who are very business-facing and have business-facing targets. You need a combination of the two, and that is how you can bridge the gap.

Antony Harper: We heard earlier about the cultural differences and that the career paths are rather separate. What we tend to do, particularly in our activities with WMG, is to create environments in which that matters a lot less. For example, we have 250 people over in that building working with the university, and what you can do is you can create programmes and structures of work that allow us to collaborate but, at the same time, academics still publish. They are still doing academic work; they can publish and do everything they need to do, but

the knowledge that they are generating through doing that is within a collaborative programme. Actually, that works quite well.

Q207 Mr Walker: Another point that came out of Axillium's evidence, which Will was also touching on earlier, was talking about the different metrics to measure impact for the company funding, from Technology Strategy Boards compared to Research Councils and HEFCE. How do they compare and how do the different organisations see the challenges of those different streams of funding?

Antony Harper: First of all, for the Technology Strategy Board, from our perspective actually the mechanisms for evaluating the value of a particular proposal are pretty natural and pretty intuitive. They are the same sorts of things that we would take to our board to make a case, so they are around impact, around route to market, additional investment, etc. Also, the calls for the TSB tend to be strategically aligned to some challenge that is relevant to both business and society, so you have some very good ingredients there. You have a good agreement on the challenge, calls and funding around projects, and then a business case for each of those projects. That makes a lot of sense from a business point of view.

The EPSRC to us is less of that nature. It tends to concentrate purely on academic excellence, which from our perspective is necessary but not sufficient. That is the key message we want to get across: it is absolutely necessary to do that, but we do see that additional criteria ought to be applied to the EPSRC funding to make sure it is strategically aligned to other investments and to the challenges that are laid down by industry and Government.

Q208 Mr Walker: That is interesting. Is there a different view from the universities as to the relative merit of the approaches?

Dr Hutchins: I do not think this is within my area of expertise, to be perfectly honest.

Q209 Mr Walker: Fair enough. Does it matter that universities and businesses should actually have the same view of the impact, or is it perfectly possible to have collaborations where actually they can take a different approach?

Antony Harper: A number of people have referred to technology readiness levels and manufacturing readiness levels. If you have some sort of mental model that goes from the early technology readiness levels through to the market, then it is important that industry, academia and the Technology Strategy Board, or whoever is involved in an innovation chain, have a common purpose for that chain and its eventual outcome. The roles that each play in that chain are rather different, so a university might play a role of generating research and intellectual property, but it does need to be strategically aligned to some common purpose.

The interesting thing about this debate is that we tend to be having this "or" debate. Is it in the pursuit of pure science or is it industrial? For us, that is a zero-sum game that we do not recognise. It is perfectly possible—in fact, we are doing it all the time—and it is highly desirable to have all of the players in an innovation chain aligned to a common purpose, but playing a different role within that purpose.

Mr Walker: And achieving different objectives from their own perspective.

Antony Harper: And still achieving what they need to do along that chain, yes.

Q210 Mr Walker: Just looking at some of the analysis from BIS, there are quite worrying signs, which again we were discussing with the first panel, about the weakness of

the UK skills base, basic numeracy and literacy, but also management skills. We are looking, in a separate inquiry, at some of the issues around adult literacy and numeracy. What is Jaguar Land Rover's experience of the quality of the UK skills base?

Antony Harper: I can only speak from my own perspective as Head of Research. One thing to say is that that is a fairly rarefied perspective, because as Jaguar Land Rover we tend to attract a very high standard—we are at the top of the food chain. As Jaguar Land Rover Research, we are at the top of the top of the food chain, if you see what I mean, so it is a somewhat rarefied perspective. We tend to recruit from the undergraduate and postgraduate population on business behaviours, as much as we do on technical capability. Coming out of an Imperial, a Cambridge or a Warwick, to a certain extent you take the technical part of it as read and then we select on business behaviour, so we do reasonably well.

The point I would make around this, which comes back to a number of points that have been discussed, is that when you create collaborative environments such as the environment we have over the road in the Catapult, or when we create a collaborative environment in a large TSB project, then at the same time you tend to mature the business skills of the technical postgraduates that you bring into those collaborations. If we work with a university partner in a large TSB project, for example, and they bring in doctoral students or postgraduates, they cannot help but have their business skills increased through their participation in that project, because they are working with business people. We find that to be a very useful mechanism.

Will Searle: Just to add to that, at the lower end of the food chain where I sit, I am actively recruiting all the time and it is necessary to bottom-fill my business. I heard the evidence earlier on and the thing I would like to add to it is that I do not think we can teach our graduate community necessarily all the skills in a university period, because I cannot remember very much of my manufacturing and engineering degree. To Tony's point, what really rings true for me is that, actually, in the collaborative programmes and the cooperative programmes, where you are bringing industry, university and Catapult together, the transfer of real-life vocational skill is the fundamental glue. That is what empowers us. We see graduates accelerate through R and D programmes not because they are dynamic scientists, but because they have good, clear communication skills or good, sound technical knowledge. That is fundamental to the growth.

Dr Hutchins: Could I go even further back down the food chain back to schools and just mention the fantastic example of business-university collaboration, which is the University Technical College programme, which I am sure you are familiar with? We are opening a UTC here in WMG in September. When we set out on that journey four years ago, and asked businesses, including JLR, "What do you want from these young people?" the very first thing they said was teamwork skills, communication skills, problem-solving skills and resilience. The maths, the physics, and the English is taken for granted. Yes, you need that at an entry level, but those are the things that they really wanted to come out of a UTC and so, with companies like JLR, they are embedded into the curriculum. It is really important to get them at 14, way before they get to university and a long time before they get into Tony's team.

Will Searle: I would echo that as a governor of a UTC, a sponsor and a parent, for the record.

Mr Walker: We have a big UTC fan club here.

Will Searle: Absolutely. It is fundamental to what we do.

Q211 Mr Walker: I do not know, from any of your perspectives, if there is any difference in this space in terms of the motivation or the skills that graduates have, between UK graduates and graduates that you see from elsewhere in the world.

Antony Harper: It is quite diverse, the global view. Some will talk of Germany or Finland, where undergrads get more of the business acumen through the sorts of mechanisms that we heard about earlier. Others will talk about the Far East and India, where the amount of technical graduates that are being produced is quite high but, anecdotally, the business acumen is very low. It is a mixed picture; we should not assume that everyone else is better than us in this space. It is a mixed picture and we should concentrate on what we know we can do better in the UK, and we have heard a few ideas around that previously.

Q212 Mike Crockart: I would like to turn to the particular area of looking at how to design institutions to make sure that they do maximise collaboration. I would like to put Carl on the spot, as the leader of one of the most recent additions to those sorts of institutions. The Institute for Advanced Manufacturing and Engineering is a collaboration between Coventry University and Unipart. How will that institute encourage and maximise the business-university collaboration?

Dr Perrin: One of the things that is really different about the institute, which is being built now and opens later this year, is that the education platform is actually being built and located on one of the Unipart manufacturing sites. The institute is really going to deliver on three fronts: it is going to deliver graduates, so they will get their degree, but the way in which they are taught and the way in which they will learn is partly in the classroom but partly on the shop floor as well, and working in that real environment. We looked at management skills earlier and, in part, it can be taught in the classroom, but I think and believe that management skills are very much on-the-job learning. A lot of it is about how to communicate and deal with people, and so they will get that.

There is also the research element to it and there is product development, which interfaces in with Unipart, where we will have professors and researchers working in the institute as well. Not only do we have university people working in this institute and learning in the institute, on the manufacturing side, but we have Unipart employees who will be seconded in there.

One of the things that I am trying to do through that collaboration, with that bringing together of the two organisations and people from the two organisations, certainly from the product side of things and manufacturing capability, is bridge that gap I was talking about earlier, where the technology and the research can be developed at a low TRL in the institute, and then that team can effectively evolve and pull the technology through, mature it in the institute and then transfer it out into a capable process onto the shop floor into production. It is the model in terms of how we teach and how we co-locate people to work together that is really different.

Q213 Mike Crockart: That was going to be my next question. Is it the co-location that is the unique extra that is in there, which makes it easier to deliver everything else?

Dr Perrin: It removes a barrier that might otherwise be there—a geographic barrier. It will ease that and there will be no excuses for people working together closely. From an education front, it actually puts the students on the shop floor. So there are two sides. The geographical side of it does help and co-location, which would be very difficult otherwise. It would be difficult to take students from a university environment and put them into a manufacturing site if we did not have the infrastructure geared up to deal with it there.

Q214 Mike Crockart: Can I ask Tony whether that is the case for Jaguar Land Rover?

Antony Harper: From our perspective, if we think about the High Value Manufacturing Catapult activity we have, they are the same ingredients with maybe a slightly different recipe. The activity we have here is around energy storage, particularly batteries for future electrified vehicles. What we have done, together with WMG, but this extends to the universities of Imperial and Oxford as well, is to create a programme of work and research, which goes all the way from the fundamental chemistry of batteries through to how you formulate the powder into pouches, the pouches into modules, the modules into batteries and the batteries into electrified vehicles. That programme of work is very co-ordinated across the TRLs. The ingredients are a programme of work towards a common goal, which is highly linked all the way from lab through to market, if you like; the physical co-working in a space; and also putting skills development alongside that programme. Those are fundamentally the ingredients.

Coming back to the geographical part, one of the things we have found—and it is no comment on WMG or anybody else—is that in order to make it work, we have to roll our sleeves up as a JLR research community and get deeply involved. There is not something that you can just set up as a programme and say, 'Okay then; off you go; hands off.' We have found, at least in the first year of getting it up and running and operational, that we have had to get very deeply involved in ensuring the success of the operation. That, of course, is very difficult to do if you are a long way away. Therefore, the geographical proximity is certainly a success factor, at least in the initial phase.

Q215 Mike Crockart: How much overlap is there between what the Institute is doing and what the High Value Manufacturing Catapult is doing? Is there any at all?

Antony Harper: Sorry, which institute?

Mike Crockart: How much overlap is there between your institute, Carl, and the High Value Manufacturing Catapult?

Antony Harper: It is difficult to say. We have only just met.

Q216 Mike Crockart: Not a lot, then. I think you have answered that one. We will move on. Can we look more generally at Catapults? Because we have had several witnesses to the inquiry who have stated that perhaps dispersal of Catapult Centres across the UK, with several Catapults spawning their own centres of excellence around them, perhaps risks confusing the original aim for these Catapults to be strongly driven by place. Do you think businesses will travel to different Catapults to get the advice, research, and facilities that they need?

Antony Harper: It has been alluded to earlier, and perhaps echoed a little in my previous comments: the Catapult network is pretty nascent in nature at the moment. I have just said that it has taken us some effort to get to where we want to be with this part of the High Value Manufacturing Catapult. I think the answer to your question is that it remains to be seen. As the Catapults are established and as we get past that initial implementation hill, if you like, then that is first base.

All of us have got a wish that these are national capabilities that can be accessed from multiple locations. However, the sheer fact of the matter is that, certainly from a Jaguar Land Rover perspective, our R and D is concentrated in Warwickshire. Therefore, it is easier for us to engage in these kinds of programmes in this location. It becomes more difficult to do so as you get further away. We would hope that the mechanisms mature over time, so that when we have a particular piece of work that would potentially be best done by somewhere in

Sheffield or somewhere in Bristol, the support mechanisms within the Catapult would allow that to happen at a future point in time without us having to send people to Sheffield and Bristol. That is a matter of maturity and we are not there yet from our perspective.

Will Searle: To give you another perspective, I run a 13-partner collaboration with five of the HVM Catapult partners in it. It is industry-led; it has four industrial aerospace partners and it has got five Catapults and three universities. It is also supplied by a supply chain of about 76 smaller businesses and Tier 1s. There is no question of geography at all in that engagement. We rotate, we locate, we co-locate. I think with regards to the geography and the consideration of space and place, the key requirement for a Catapult to be effective in its engagement is that it must be open-access. You must be able to facilitate meeting in location, because that is what we require.

However, there is a recognition that there is a local aspect of what some of the smaller supply-chain companies want. They do not want to take time and money travelling. Yet it is also part of the give and take. For SMEs, if we want to engage with the physical institute that is the Catapult—and I am probably a little bit different as an SME in that I will go anywhere—then you have to go to where the opportunity sits. I think it was said earlier in the panel: you go to where the business is. As long as you understand that going to a Catapult is on the journey towards business, you should go. Strathclyde is a long way away from Daventry, where I am based, but it does not stop me from going to Bristol tomorrow and Strathclyde on Thursday; that is what I have to do. We need to focus on the access to the centres rather than the physical location of them. I am involved in consultation in defence on this topic. Whether the Catapult is bricks and mortar, or virtual, such as CDEC, which is a fantastic location but what they do is not very tangible, as long as we are connecting the institutes together, I do not think we need to worry about the location.

Q217 Mike Crockart: That was going to be my next question, so perhaps I can just pose my next question straight to you. Some of the Catapults do have a very narrow, specific sectoral focus, much more than others. The difficulty was whether that would encourage collaboration with industry, or whether industry potentially wants to have a much more cross-cutting approach with multiple Catapults. You say you are already doing that anyway. Is the structure that is there and the way that Catapults are designed at the moment not a problem?

Will Searle: Transparently—and it is in the public domain, so I will put it on the record—it is a programme we run for GKN Aerospace. It is co-led by Bombardier, Spirit and GE. It is a two-year programme. We have a core presence at Cranfield at the ATI. Through particular projects we have seen the research grow out of the university. We have seen it be matured at the National Composites Centre to a certain level of capability. We have then seen it rotate up to the Manufacturing Technology Centre six months in. It has then been moved up to the Advanced Manufacturing Research Centre at Sheffield 18 months in, and it will be showcased at Farnborough in the physicality and in the virtual sense.

So at no point have we stopped collaboration or co-location. As industry, we have simply moved ourselves to where the best capability is. It is a little different when you are talking about a large enterprise or an OEM. However, I could give you named examples off the record as to SMEs that are travelling with that particular programme. That is a two-year engagement, with £14 million of industry and Government funding. For me, that is the way that the industry is going. It is just getting bigger and bigger. So, in answer, I think geography is less of a barrier.

Physical access and political geography are perhaps challenges. I suspect there is a question here somewhere, but as long as an enterprise of any size and scale can have access to the facility, the relationship, and the programme that are running there, there is less concern.

Mike Crockart: Tony, do you want to come in on that?

Antony Harper: Yes. The funding model of Catapults, which is a third, a third, a third—and a third of that is collaborative R and D, so in effect it is a half and a half, if you see what I mean—means that half of the money has to come from industry. Even doing that is something that industry takes very seriously. Therefore, the programmes of work that are funded from the industry perspective through the Catapults sometimes tend to be quite specific or quite narrow, or from our perspective quite automotive-focused. That is a good thing as long as they create these innovation chains. In response to your question, the way that some of the focus areas of the Catapult are turning out is a function of the industry funding that is going in and the interests of that industry that is providing the funding.

Q218 Mike Crockart: Presumably in your industry you have to deal with multiple Catapults. You will have the transport one that we visited, and the High Value Manufacturing Catapult, and possibly others.

Antony Harper: Yes. They are at different stages of maturity. Our most mature engagement is with the High Value Manufacturing Catapult. We are starting to engage with the Transport Systems Catapult. At the moment, those are the two main ones.

Q219 Mike Crockart: I suppose the point of my question was how well you manage to get cross-cutting collaboration between Catapults.

Antony Harper: At the moment we are not seeing much of it. Again, our endeavour with the HVM is established and is working, and we are really at the very early stages of engagement with the Transport Systems Catapult—very early stages. It may be that at a future point in time there is some kind of convergence, but that is rather difficult to spot from where we are at the moment. Our thinking is that our engagement with the Transport Systems Catapult will mostly be around intelligent mobility and future transportation, clearly. That may or may not have an overlap with the agenda that we have in the HVM Catapult.

Q220 Mr Bain: The Engineering Professors' Council said in its evidence to our Committee that LEPs—Local Economic Partnerships—"do not have the financial resources or knowledge to deliver or support innovation and R and D". In general, Dr Hutchins, are they right or are they wrong? How is the Coventry and Warwickshire LEP going to change their perceptions?

Dr Hutchins: I think they are right, in general. LEPs are very small entities with extremely small executive teams. They rely on the collective resources of the partners to deliver what they deliver. The Vice-Chancellor of Coventry University was quite right when he said that both universities, Coventry and Warwickshire, were working together to help and support LEPs in developing their economic plans, their European Structural and Investment Fund strategies, their skills strategies, and so on and so forth.

It is at that point that we can support LEPs in giving them the appropriate amount of focus on the importance of R and D and innovation to their local areas. That is exactly what we have done, starting with commissioning Centre for Cities to look at the amount and type of R and D activity in Coventry and Warwickshire, benchmarking it, and looking at how we might improve. So, for example, Coventry and Warwickshire has twice the amount of R and D

employment as the whole of Greater Birmingham and Solihull. It has three times the amount of R and D spend than Greater Birmingham and Solihull, and twice the national average. It is an extremely innovative region.
However, most of that innovation and R and D activity is invested in about five companies—one of which is at the end of the table here. The challenge there for the LEP is how we get some of that activity to permeate through the very large SME base in the local area. That is where Coventry and Warwickshire, through the LEP, will put its efforts. It will rely largely upon universities to help it deliver that, through organisations like WMG and the IIPSI building at the end of the lake there, where large numbers of SMEs are supported with innovation activity to help them grow and create jobs.
There is a massive challenge for LEPs in that they have very little disposable income, if I can put it that way. We await the outcome of the Government's view on the single Local Growth Fund. As Professor Latham said earlier on, the amount of European Structural Funds available to support this kind of activity is relatively small, at £20 million per annum for Coventry and Warwickshire alone. As Professor Thrift said, there is not much revenue around to support the activity. So we may be able to support the procurement of a piece of critical equipment that might help battery technology or composite materials development, but how are you going to pay for the people to run it, and how are you going to pay for the people to undertake the R and D activity in collaboration with industry? That is a very long answer to a very important question. I think it is complex, but it is extremely challenging for LEPs to drive this agenda forward.

Q221 Mr Bain: I will return to some of the implications of that answer in a few moments. Obviously Coventry University and the University of Warwick are very different institutions. What is the strategy of your LEP to get the most out of both institutions?
Dr Hutchins: First and foremost, both universities sit on the board of the LEP, through myself and Professor Latham. Both universities sit on various working groups of the LEP. Both universities support the development of the LEP's various strategies. Both universities have considerable expertise, as you have been hearing today, in terms of engaging businesses in bridging the gap between the public and private sectors, if I can put it that way. In terms of accessing funding, for example, the universities, in collaboration with LEPs, can support businesses to access the right type of funding and broker them to the right types of business support. As you heard earlier, we are setting up a growth hub as part of the Coventry and Warwickshire City Deal. Both universities are playing an active part in co-locating full-time and part-time people into that growth hub to broker companies into the support that they require. So there are multiple layers of engagement and participation in the work of the Local Enterprise Partnership by both universities working in partnership.

Q222 Mr Bain: Good. I was very interested in what you said about LEPs in general terms not having that financial firepower to drive innovation, R and D, and the increases in investment that we all want to see. Do we therefore need changes in policy at national level to support this? Do we need to see more tax breaks for investment to encourage firms in the private sector to put more into R and D and into long-term investment? Do we need some changes to the banking system, for example, in order that finance is available in a more consistent, predictable, and long-term basis for companies that want to invest in research? Are these the kinds of changes that might boost what LEPs are able to do on the ground at national level?

Dr Hutchins: Potentially, all of those things can be helpful. If you asked the question five years ago, access to finance would have been the key issue. However, there have been changes to things like R and D tax credits. Certainly my understanding locally is that the uptake of R and D tax credits is improving. Knowledge of SMEs about things like R and D tax credits is improving. That can only be a good thing.

I spoke earlier about trusted brands and trusted advisory services. The Manufacturing Advisory Service is a useful mechanism for supporting SMEs in terms of accessing R and D services. It is really important that we do not change the landscape every five years in this regard, because it just confuses businesses. Then we lose another five years while we reinvent what is essentially going to be something extremely similar but called something different. It is always worthwhile to improve services, and of course money is going to be tight, but do not throw the baby out with the bathwater. That is really important.

Mr Bain: Excellent. Will?

Will Searle: Can I add to Richard's support there? I am an East-Midlands-based business. I thought Brian Binley would perhaps have been on the panel. To give you an example to support what your question is, you have also got to look at the collaboration between the LEPs. I am currently active in Greater Birmingham LEP, Coventry and Warwickshire LEP, Lancashire LEP, the Northampton Enterprise Partnership—the list goes on. This is because, as a local enterprise and a local businessman, I recognise that, while there is no funding to help me do this, we can actively support our home LEP—Northamptonshire Enterprise Partnership—on bringing them the resources and skills they need. We get engaged on their behalf with them. You must not underestimate the energy that is in the LEPs. They do want to do this. I am working actively, and I think you have got to support that. Yes, more funding would assist, but it would assist by giving them a long-term viable business base.

Again, to Richard's request, please do not change the rules. The state aid rules are the state aid rules and they have enabled us to understand the market. Industry understands it now, but if you change the rules we will be going backwards. We need funding flowing through and making LEPs the thing of the future, rather than turning them into the RDAs. The RDAs were a good model but they are the past; we cannot worry about that. What we have got to have is connected entities of enterprises. That is what they are for.

Dr Hutchins: Will just prompted another thought that is important in the context of your question. In terms of revenue funding, there are some "free" resources coming on track, which are the ESIF—European Structural and Investment Funds. These will support skills development and R and D investment, particularly in SMEs. The challenge with that funding is that there will be delays in everybody's understanding about when and how to access it. It is the sooner the better, otherwise we will not have continuity between the old programme and the new programme, which will cause disruption and delay and confuse businesses.

Secondly, it is one thing getting a grant through the European Structural and Investment Funds; it is another thing managing that grant effectively. I think all partners who manage these kinds of funds really do struggle with it. Simplifying that landscape would be enormously helpful for the managing agents as well as the businesses that access the benefits.

Q223 Mr Bain: The Government's innovation strategy is due to be published later this year. What are the top three points you would want to see addressed in that strategy in terms of finance, institutions, and structures that would further and enhance business-university collaboration on research?

Antony Harper: First of all, I would comment that we are fundamentally optimistic about this space in the UK. There are some very good ingredients. The university base and our research base in the UK are very good. The TSB, as we have also heard, is very good. So our whole approach and mindset to this is that there is an opportunity to be had here with the innovation strategy. It is a fundamentally optimistic outlook that we have.

In terms of key things, one of them that has been mentioned before is the Technology Strategy Board. This is very effective, but it is underfunded. We do not see that as a zero-sum game with the Research Councils. We think there is at least a linear, if not better, relationship between further TSB investment and further innovation and growth activity within the UK. We believe there are several bits of data that would back that up, as well as the anecdotal evidence you have heard here.

We also believe, however, that there is a great opportunity to better link the investments that are made by the Research Councils and the investments that are made by the TSB from a strategic point of view. As I said earlier, the investments by the Research Councils are made on research excellence. They tend to be made by peer reviewers within the academic community, and there is little reference to the strategic landscape of the rest of the ecosystem. For us, that is a major missed opportunity. Yes, research excellence is necessary, but it is not sufficient. Also in that vein, we believe that the training and skills agenda also needs to be aligned with that. If we are looking at creating a doctoral research centre in subject X or Y then that should be in the same physical location, and alongside the same R and D programmes, as other investments that are made in X or Y.

I guess the last point we would make is that we need to concentrate on critical mass. The fairy dust that we do have, if you like, cannot be spread over too wide an area. It actually comes back to the earlier questions around signposting and where inward investors go. If we know that institution X or Y is the national centre of expertise for X or Y then it is much easier to signpost it. It also means that we invest in critical mass of research funding, of equipment, and of skills. Our feeling is that at the moment there are wasted opportunities due to trying to please too many people too much of the time. We ought to concentrate our funding on more critical mass and excellence.

Mr Bain: Anyone else? Richard?

Dr Hutchins: I will not repeat the points that have already been made, but I will mention one other issue. We need to develop a new generation of innovators. I would argue that there is an opportunity through the University Technical College programme to achieve that. As I mentioned earlier, lots of universities are collaborating with lots of businesses to develop UTCs. There are around 50 in development. As I said before, we are opening our own WMG academy for Young Engineers here in September. It would be nice to see two departments—the Department for Education and the Department for Business—working collaboratively on this programme. UTCs require lots of equipment. There is not a lot of capital around from the Department for Education to support that. That equipment will need constantly updating and replacing. That might be something that the Department for Business could support the Department for Education on.

Will Searle: I would fully echo Richard's point, by the way, as a person going to a governors' meeting this evening. I would urge cooperation across all three, because the financial aspect gears the institutions' activity, that is then made efficient by the structure that you create. These are three overlapping circles, and they are also represented by the three overlapping circles of RCUK's funding, HEFCE's funding, and TSB's funding. We do not need to repeat the numbers to know that there is an imbalance in there. If we want that

engine of the innovation strategy to gear us and grow us, the single most important bit is cooperation behind the scenes in that engine. So, making sure that HEFCE is doing the right thing for RCUK so that we can pull it through into TSB and make business from it. That is inside the machinery. Outside the machinery, we need to simplify the rules of engagement. It is fundamental that there are too many vehicles to engage with, even on behalf of large enterprises—which is something I do regularly—right down to the smallest enterprise. How do you engage? How do you walk onto a campus and know where the Catapult is? There are no signposts for where the university tranche or office is. Put signs up—and I mean physical signs. I think that would make it simpler to engage with the infrastructure.

Q224 Mr Bain: If we want universities and businesses to collaborate more closely together, you would say that one of the lessons is that government Departments have to collaborate more closely together, think outside of the silos, and be much more cross-cutting with this agenda.
Dr Hutchins: Yes.
Will Searle: Absolutely. The advanced manufacturing sector team leads, the information economy team leads—everyone at the top of those vertical industrial strategy teams who report to Amanda Brooks and that team—need cohesion and co-operation, just as industry needs cohesion and cooperation.

Q225 Chair: That concludes our questions. You have been commendable concise in your answers. Is there anything you would just like to add to anything that you have said before we conclude? I am conscious of the fact that we may not always ask the questions that would enable you to wax most eloquently, or make the most vigorous points. Is there anything there that you feel that we have not covered in terms of our questions, which you feel is relevant to this issue?
Will Searle: I will add some food for thought, really. It came up earlier in the first panel. There is a certain debate that the SME community is perhaps disfranchised. Certainly the numbers that Ann put out were disheartening as well. The question I pose is: how do we encourage enterprises of every size? We have got to gear all enterprises, because today's small—we did not talk about micros—is tomorrow's large. We have dropped the term "SME"; we just talk about enterprises, because the entrepreneurial spirit of enterprising is there. The key enabler of that is business mentoring, coaching, and support, whether it be through a university, a Catapult, or industry-to-industry. For me, I have not heard discussions around how the "B" in BIS helps business engage with the "I" and the "S". As I see it, that is perhaps the function of BIS.

Chair: Thank you; that is very helpful. I would emphasise and reiterate that if, on reflection, you feel there is anything else that you should have said and would like to have said but did not say, please feel free to submit it in further supplementary evidence. We would be most grateful to receive it. Similarly, if, on examination of your comments, we feel there are questions that we should have asked but did not, we would be grateful for your reply if we should submit them to you. Thank you very much. That is very helpful indeed.