



**Cynulliad Cenedlaethol Cymru
The National Assembly for Wales**

**Y Pwyllgor Menter a Dysgu
The Enterprise and Learning Committee**

**Dydd Mercher, 30 Ionawr 2008
Wednesday, 30 January 2008**

Cynnwys
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Cofnodir y trafodion hyn yn yr iaith y llefarwyd hwy ynndi yn y pwyllgor. Yn ogystal, cynhwysir cyfieithiad Saesneg o gyfraniadau yn y Gymraeg.

These proceedings are reported in the language in which they were spoken in the committee.
In addition, an English translation of Welsh speeches is included.

Aelodau'r pwyllgor yn bresennol
Committee members in attendance

Alun Cairns	Ceidwadwyr Cymreig Welsh Conservatives
Christine Chapman	Llafur Labour
Jeff Cuthbert	Llafur Labour
Huw Lewis	Llafur Labour
David Melding	Ceidwadwyr Cymreig Welsh Conservatives
Sandy Mewies	Llafur Labour
Janet Ryder	Plaid Cymru The Party of Wales

Eraill yn bresennol
Others in attendance

Yr Athro / Professor Richard B. Davies Huw Morris	Is-Ganghellor, Prifysgol Abertawe Vice-Chancellor, Swansea University Cofrestrydd Academaidd a Hyrwyddwr Proses Bologna dros Gymru Academic Registrar and Bologna Promoter for Wales
Dr David Rowse	Gwyddonydd Gweithredol, Canolfan Dechnegol Uwch, BAE Systems Executive Scientist, Advanced Technology Centre, BAE Systems
Yr Athro / Professor Nigel Weatherill	Dirprwy Is-Ganghellor, Prifysgol Abertawe Pro Vice-Chancellor, Swansea University

Swyddogion Gwasanaeth Seneddol y Cynulliad yn bresennol
Assembly Parliamentary Service officials in attendance

Dan Collier	Dirprwy Glerc Deputy Clerk
Dr Kathryn Jenkins	Clerc Clerk
Alys Thomas	Gwasanaeth Ymchwil yr Aelodau Members' Research Service

Dechreuodd y cyfarfod am 9.01 a.m.
The meeting began at 9.01 a.m.

Ethol Cadeirydd Dros Dro
Election of Temporary Chair

[1] **Dr Jenkins:** Bore da. Yn unol â **Dr Jenkins:** Good morning. Under Standing
 Rheol Sefydlog Rhif 10.19 ac yn absenoldeb Order No. 10.19 and in the absence of the
 y Cadeirydd, galwaf ar y pwyllgor i ethol Chair, I call on the committee to nominate a
 cadeirydd dros dro. A oes enwebiadau? temporary chair. Are there any nominations?

[2] **Jeff Cuthbert:** I nominate Janet Ryder.

[3] **Dr Jenkins:** Gwelaf nad oes **Dr Jenkins:** I see that there are no gwrthwynebiad ac felly datganaf fod Janet objections, and so I declare that Janet Ryder Ryder wedi'i hethol yn gadeirydd dros dro. has been elected temporary chair.

*Penodwyd Janet Ryder yn gadeirydd dros dro.
Janet Ryder was appointed temporary chair.*

Cyflwyniad, Ymddiheuriadau, Dirprwyon a Datgan Buddiannau Introduction, Apologies, Substitutions and Declarations of Interest

[4] **Janet Ryder:** Diolch i fy nghyd- **Janet Ryder:** I thank my colleagues for Aelodau am fy ethol i'r gadair. electing me to the chair.

[5] Unfortunately, Gareth Jones, who is normally the Chair of the committee, is not available to be with us today. He has a regular hospital appointment that he has not been able to change, and so he sends his apologies. I welcome Members, our witnesses from Swansea University and members of the public to join us for this part of our review. I remind everyone to switch off their mobile phones and any other electronic devices. I also remind Members and witnesses that there is no need to touch the buttons on the microphone. We hope that they will magically light up in front of you when you will speak. A fire alarm system test is not scheduled for this morning, so, if there is an emergency, you should follow the ushers' instructions. The committee's proceedings will be fully bilingual and there are headsets available if you need them. They also help to amplify the sound. There will also be a complete verbatim record of this morning's proceedings.

[6] I have received apologies only from Gareth, and have not been notified of any other apologies. Are there any others? Perhaps they will be latecomers, as we have not been notified of any substitutions.

9.03 a.m.

Tystiolaeth i Ymchwiliad y Pwyllgor i Gyfraniad Economaidd Addysg Uwch Evidence to the Committee Inquiry into the Economic Contribution of Higher Education

[7] **Janet Ryder:** We move straight on to item 3, which will take up the whole of this session. I welcome the witnesses from Swansea this morning, and thank them for their written evidence and for coming here to give evidence. I welcome Professor Richard Davies, who is vice-chancellor of Swansea University, Huw Morris, the academic registrar and Bologna promoter for Wales, Professor Nigel Weatherill who is the pro vice-chancellor of Swansea University, and Dr David Rowse, executive scientist, advanced technology centre, BAE Systems. Welcome here this morning. I invite you to give a short verbal presentation before we proceed to questions.

[8] **Yr Athro Davies:** Diolch yn fawr **Professor Davies:** Thank you for the am y gwahoddiad i ddod yma i siarad â'r opportunity to come here to speak with the pwyllgor. committee.

[9] The university in Swansea—and I make no apologies for this—is aggressively ambitious to achieve some of the very big aims that it has set itself. One of those important

aims is to become a driver for creating a modern knowledge economy across south-west Wales, and more broadly across Wales. We take that extremely seriously. It seems that this is a period in Wales's history in which there is a dramatic opportunity, as well as need, for transformational action to help to develop an economy in Wales based on high-level skills, and on the efforts of people developing new ideas, concepts and products, rather than the traditional heavy industry that we all know from our past. In such a transformation, which is being discussed throughout the western world and beyond, it is absolutely clear that universities have a very heavy responsibility. I want to emphasise to the committee that we take this responsibility very seriously indeed.

[10] As far as universities are concerned, that is particularly important here in Wales, because Wales does so badly on all of the main characteristics of a modern knowledge economy, in terms of research and development in industry. I was looking at the figures—I think that it is worth quoting the key figure, from the latest available information from 2006—that show that research and development in industry in Wales represented only 1.6 per cent of that across the whole of the UK. We also know about the shortage of high-level skills in Wales. So, we are starting from behind, and that is why this is a particularly exciting challenge.

[11] We must admit that we are starting from behind as far as universities and the higher education sector is concerned in Wales. For historic reasons, this sector in Wales has not been as strong as one would have liked in science and technology—in those areas that drive modern knowledge economies. I am not saying that they are the only important things; universities have a much broader role to develop young people so that they can mature and develop into citizens who can make a difference in the world. That applies across all disciplines in universities, and we subscribe to those traditional values. However, when we come to focus specifically on the big challenges of a knowledge economy, undoubtedly, we must look first at science and technology. Unfortunately, we do not have anything like the same levels of top quality science and engineering as Scotland and most of England. We have some very good pockets of strength, but we do not have the quantity that exists elsewhere, and we have made that clear in our submission.

[12] So, we are starting from behind, but, as I say, that makes this even more exciting. In Swansea, we are approaching this challenge in two ways. One is an ambitious development plan that focuses on our strengths, so that we build upon and grow our strong areas. However, incremental growth is too slow, so we are also going for some very major transformational projects at the university that hugely increase our capacity to make a difference in the knowledge economy.

[13] We are really pleased to be able to acknowledge the tremendous support that we have had from the Welsh Assembly Government over recent years on this. The biggest example to date is the Institute of Life Science, a project that has cost more than £50 million in total and was opened last autumn. It involved funding from the Assembly and Europe and considerable support from IBM. Boots has recently set up its global Centre for Innovation. We have the beginning of a real cluster of life science and bioscience companies in south-west Wales, and we will see that grow in future. That is an example. We are looking at incremental growth and really big transformational ideas to take us forward. We present some evidence that you have to be fairly big; very small universities are going to struggle on this. In order to really attract these companies, get the science parks going, get the wealth-creating activities going and the jobs in highly skilled employment, you have got to be fairly big, and our ambitious plans are to grow to the size where we can really deliver that.

[14] The point that I am keen to emphasise today is the importance of working closely with large companies on this. We have looked at research and development in industry across the UK, and 2.5 per cent of that research and development is in small and medium-sized

enterprises; 97.5 per cent of research and development in companies in the UK is not in SMEs.

9.10 a.m.

[15] We will only transform the Welsh economy if we get heavily involved with medium and larger-sized companies. That is why I am delighted that we are joined today by one of our close collaborators, representing BAE Systems. I wonder, as part of the introduction, whether you could invite David to say a few words about his work with the university and the broader implications that might be possible in Wales as a result of this sort of collaboration.

[16] **Janet Ryder:** Thank you. That was very interesting.

[17] **Dr Rowse:** Good morning. I am David Rowse and I work for BAE Systems. We have partnered with Swansea University for, I would say, 20 years. The ethos of partnership and partnering is at the core of our business, and we recognise that we need to partner with the very best, globally, to have an impact. We have a partnership programme that extends worldwide, and we have worked with Swansea University and with organisations across the world; for example, in the recent past, we have worked with the Institute of High Performance Computing in Singapore. We have worked with Swansea University in collaboration with US universities. The strong and trusting relationship that we have with engineering science organisations is very important and does not happen overnight, but there is a critical mass as well. I do not know how to define that, but we have nurtured an expertise and have worked together to our mutual benefit, so that we may share our problems with them and, equally, they share with us things that are problematic that we might be able to assist with. We are a commercial organisation; we are not driven by altruism, so there has to be mutual benefit. However, the embodiment of that may be in capability that you use in some other project. So, you must have that view of where it fits in in a broad sense.

[18] There are relationships in terms of students. We have recruited from Swansea University and we have seconded people into Swansea University. Uniquely, we do it as part of our ethos of partnership. We have sought to move projects, with Professor Weatherill and Professor Mark Clement, where we combine the benefits of the academic capability and the respect that we have with the innovation and entrepreneurial aspects of the technicians, which is impressive.

[19] I want to convey that I am here today because the relationship with Swansea University has been beneficial to us, but I would like to think that it has also been beneficial to the university.

[20] **Janet Ryder:** Thank you. Is there anything else that you would like to add?

[21] **Professor Davies:** No, I think that I will stop there.

[22] **Janet Ryder:** You have raised a number of interesting points and, to be fair, not just about Swansea University, but about issues that will have an impact on the whole of higher education and how we develop it in Wales.

[23] A few Members have indicated that they would like to ask questions. I remind Members that, last week, we had a wide-ranging session of questions. If Members feel that, as a subject is discussed, they want to ask a specific question, it would be better if we could group the questions a little. We will start off with the initial questions, but if you want to come in on any point, please let me know.

[24] **David Melding:** I will begin by telling the witnesses that I thought that the papers

were succinct and relevant, which is a combination that we do not always get. It was a great mercy to read something that was clearly thought out and expressed with great economy. The data and some of the things that you pointed us towards will be very useful for the review, so I congratulate you on that.

[25] I want to follow up on a couple of points. Your analysis was interesting that, if you look at barriers to success in terms of academic research and wealth creation, medicine and engineering are key. I can understand that, on medicine, we have not been great at linking up with pharmaceutical companies and developing drugs, but do you think that the new set-up at Cardiff, where the former medical school is now part of the university, is likely to lead to a better strategy? In terms of co-operating with NHS Wales, you would have thought that there is a lot of potential there for longitudinal studies, and all sorts of high-quality research that you need for the development of medical science. Also, how would somewhere like Swansea University fit in? It is only 40 miles down the M4, and you currently run a conversion course for graduates who want to go into medicine, so how can an area like Swansea be part of that development, if it is a positive thing?

[26] I am curious as to why we do rather poorly in engineering, because we have a great tradition of academic excellence in engineering; Cardiff University currently has one of the best engineering departments in Europe, let alone Britain. I just wonder why we have such difficulty in getting that to impact more upon the economy, though I note from the GVA figures that Swansea is improving at last. I am not sure how directly that relates to some of the developments at the university, but I am sure that they have been part of that improvement.

[27] I would like to probe the paper that you submitted as regards the Bologna process. You quote a European University Association objective:

[28] ‘Strengthening the relationship between governments, higher education institutions and other societal stakeholders is essential to anchor and sustain the goals of the Bologna process. One major priority must be to broaden debate with employers, students, parents and other stakeholders, and thus enhance trust and confidence in the quality and relevance of institutions engagement’.

[29] That is a very urbane criticism, but quite a profound one, it seems to me. Are we way off at the moment, in terms of how these institutions co-operate? The Leitch review says employer engagement, in particular, should be central, as well as resources for students and those improving their skills. One weakness to date has been the top-down approach that has been taken, rather than responding to the needs of people at the community level who are looking to develop their businesses and skills, and moving up in terms of higher-value employment, and so on.

[30] There is a final point that I wanted to make. I was interested in the point—which we have not really covered yet—that we should be looking at the medium and larger business sector as well, if we really want to drive up research and development. I can understand that to some extent, but research and development at that level is a much more finished product, presumably—people do not just wander into research and development with the hope that they might develop something significant. It is further along the development process, whereas research within SMEs is more likely to deal with spin-offs, or things that start as blue-sky research—I am probably not using the current jargon now, because I am terribly dated. Your bright PhD student then moves into a small business and develops an idea; that is also key, is it not? If you look at innovation, and the number of patents that are registered, the figures for Wales are still pitifully low. I must say that your university does not do terribly well, but I am sure that there are reasons for that, and that you are trying to improve it.

[31] However, before we concentrate too much on medium and large enterprises—and, as I said, no-one has raised this with us yet—is the SME sector better suited to the abstract kind of research, which can sometimes lead to a practical application? I am not quite sure if this is a case of either/or, or of emphasising the importance of each kind of research, though they represent different stages of economic development.

[32] **Janet Ryder:** That is an example of how wide-ranging our questions will be—I spotted at least four separate topics within that. You covered general research, medicine in particular, the interaction between Swansea and Cardiff, the Bologna project, and the unique issue that you raised at the end, about where research is likely to come from—SMEs or larger companies.

9.20 a.m.

[33] That is quite an interesting question. Professor Davies, I will leave it up to you to choose who should answer the questions; I spotted at least four points there.

[34] **Professor Davies:** Thank you. I will move around the team, because different people can contribute some real insights here. You focused on some key issues. First, on medicine, it would be difficult for me to comment on developments at another university, but it would be surprising if the merger of the University of Wales College of Medicine and Cardiff University did not lead to growth and development. I think that it is the last-but-one medical school to merge into a university in the whole of the UK. There are natural synergies and you would expect them to operate more effectively when they are in one institution. So, just in terms of what one would expect, I am happy to comment on that.

[35] In Swansea, we have a second medical school in Wales now approved. We are delighted about that. The Institute of Life Sciences, which I mentioned earlier, is the research hub of that. That is already going extremely well. We are benchmarking ourselves in terms of growing research strength against other new medical schools elsewhere in the UK. There have been a significant number in England over the last five years. We are doing extremely well in terms of growth of research income and developing links with companies. I mentioned IBM and I think that it is unique to have a company come in at the early stages of the development of a medical school with so much support. We are delighted to be able to lever in that benefit for Wales with the help and assistance of the Assembly Government.

[36] Last year, the setting-up of the Boots Centre for Innovation was quite a remarkable development. People were asking in London, when it was launched, why Boots was moving out of Nottingham and setting up this global innovation centre in Swansea. I would like to believe—and certainly various people have said this—that it is to do with our innovative way of thinking and how we have got rid of many of the traditional silos of academic disciplines. We are working freely between disciplines, developing new ideas and concepts, and Boots was clearly impressed, and it was also impressed with our close links with IBM. So, things are already moving. Three years ago, Wales had only 1.6 per cent of the total research spend on medicine in the whole of the UK. That is another disappointing figure, but I am sure that that is now growing. When the latest figures come out, I am sure that that will be much better. So, those are positive developments in medicine, which is critical, because it is the biggest area for wealth creation. If you look at research and development in the private sector, pharmaceuticals are the largest single industrial sector for research and development and we do not have enough of that in Wales.

[37] On engineering, I think perhaps that we have been hiding our light under a bushel. You may not realise just how strong and large our engineering school is in Swansea. It has, at the heart, a five-star rated civil and computational engineering group that is world famous. It is variously described as the first or second in the UK. Metallurgy has a long history and is

extremely well known. However, the person to say something about engineering and what is happening with that is Nigel Weatherill, who was, until recently, the head of the engineering school.

[38] **Professor Weatherill:** I will initially comment on engineering at Swansea. Over the last few years, we have tried to change engineering at Swansea and have tried to move away from individual disciplines to an integrated approach to engineering. That has many benefits and there are certainly benefits in terms of acting as a catalyst for the knowledge economy.

[39] Traditionally, we think of engineering as being split into mechanical engineering, civil engineering and materials. They, effectively, are the roots of engineering at Swansea. As the vice chancellor indicated, there is a great deal of industrial engineering history in and around Swansea, and the initial focus of the university was very much engineering based, particularly around metallurgy.

[40] However, things move forward, and one of the benefits of working closely with industry is that we can find out what it requires. To take one example with Dr Rowse, we think of aerospace engineering, but it is actually multi-physics; there is really no such thing as aerospace engineering, because it is made up of a number of disciplines. Working closely with industry, we realised that engineering at Swansea had to change. We had to build upon our significant strengths—as the vice-chancellor said, our civil and materials engineering departments are five-star rated. However, we had to bring things forward to meet the requirements of industry, and industry in the knowledge economy. Therefore, we decided to reorganise.

[41] To give an example of just one of the benefits, traditionally, we did not have aerospace engineering. It is an important sector in Wales, but higher education institutions in Wales did not provide training at an accredited level in aerospace engineering. Therefore, as a nation, we were employing 25,000 people in the aerospace industry, but the higher education sector was not providing skilled accredited graduates for the field. So we use this new integrated structure to provide an aerospace degree; we worked closely with BAE Systems, David and others in the aerospace sector to plan and map out the new degree course, which is now up and running and very successful.

[42] I would like to link that to the knowledge economy. We are now producing graduates who have come through an undergraduate programme that was designed and developed in partnership with our aerospace colleagues, which is producing graduates who can move into the aerospace sector in Wales. That is very important. Again, as the vice-chancellor said, this is one contribution from the university, from the school of engineering, to provide graduates who are equipped with the necessary skills for the knowledge economy. That is just one example of what we are trying to do, moving forward. We have not lost the excellent base in the traditional disciplines. Therefore, if our colleagues from Corus were here, they would tell you that, certainly in materials engineering, it has a tremendous strategic partnership with the university.

[43] We were one of the first universities to capitalise on the engineering doctorate scheme, funded by the Engineering and Physical Sciences Research Council. The scheme was reviewed last year by the research council, and it got a glowing report. Again, this is an example of developing skills, working closely with industry. About 85 per cent of graduates from our engineering doctorate programme are employed by Corus after completing their course. That is a clear indication of what is coming out of the engineering doctorate; we are producing highly skilled individuals who are being snapped up by Corus. Another example, within Corus, is the integrated graduate development scheme. We take graduates and upskill them in areas that are specific to Corus. Recently, we were in discussions with Corus about the possibility of interacting at an undergraduate level. We are moving forward in

engineering; we have tremendous skills, but we are looking to the future.

[44] I wish to pick up a point about medicine and the added capacity that Wales has from having a second medical school in Swansea. If I may bring in engineering again, the links between the school of engineering and the school of medicine in Swansea are adding capacity in this area for Wales. At an undergraduate level, we have started a medical engineering degree at Swansea. That would not have happened without the medical school coming in Swansea. We now have a nanotechnology centre, and the main focus of this, in terms of cutting-edge, leading research, will be nano-health and drug delivery. That would not have happened without the medical school. Equally, the medical school alone would not have put forward an undergraduate degree in medical engineering, and nor would it have become involved in nanotechnology. However, bringing the two together adds capacity to Wales. So there is added value there, over and above what was taking place in Cardiff prior to the second medical school's being set up in Swansea.

9.30 a.m.

[45] **David Melding:** May I intervene? There is a very important—[*Inaudible.*]—and I listened with interest to these examples, which are hugely encouraging. However, if we were looking at this abstractly and someone were to say to a Martian, 'South Wales has a fairly weak knowledge economy, and it doesn't get much research and development investment', and the Martian were then to say, 'Well, that is probably because they don't have much in the way of medical research or engineering departments', you would then say, 'Well, actually, it has one of the greatest records in terms of engineering'. How did that lead to us being such underachievers in terms of developing that as part of economic regeneration? Was it because we were just stuck on a few employers? You say that Corus gets 85 per cent of your PhD students—at one level that is fantastic, but, at another, it raises a possible structural problem. What was significant in terms of the barriers that have prevented this outstanding academic tradition from having a more direct economic impact? If you think that the barriers have been overcome, we do not need to dwell on it, but if some barriers still exist, that is what we would want to address.

[46] I do not want to be too retrospective, so if you tell me that you are really confident now that the processes are in place and that we are going to see significant advances, that is fine, but if you still feel that there are problems—and I note that core funding for research is still falling—I think that we need to know about it.

[47] **Professor Davies:** I will pick up on that. I think that it is important to understand that I was referring to scale when I referred to concerns about engineering and medical research—it is high-quality, but there is not enough of it. So the performance constraint has been the small size of the high-quality activity, but, because it is high-quality, there is something to really grow out of. That is what we are talking about, and I think that we do know how we are going forward. It will not be easy, but we can build on those tremendous strengths. So, there is a mixture—we are telling you about our current strengths and we are telling you about how we are going forward in growing them, and I think that is happening throughout Wales; I do not think that this is just a Swansea phenomenon. So, in some ways, the barrier is beginning to crumble.

[48] **David Melding:** That is a very clear answer, in highlighting that size is also important.

[49] **Janet Ryder:** Before you progress on to some of the other aspects of the original question, Christine wants to come in specifically on engineering.

[50] **Christine Chapman:** It is good to know about the success of the engineering

department, but I am concerned about the links that are made before you get your engineering undergraduates. On widening access, could you say something about the links that you make with schools? There has been an issue with engineering for a number of years, particularly among women. There have been many initiatives over many years, and I used to sit on the Women into Science and Engineering committee for Wales many years ago. Things are changing, but it is a slow process. How are you tackling this issue, particularly in engineering, because of the success that you are having?

[51] **Professor Weatherill:** I would be happy to comment on that. We put a significant amount of effort into recruiting students into engineering and in widening access into engineering. I can give you one practical example: when we reorganised the school, we put together a dedicated team within the school, in addition to the staff that are available across the university, for recruiting students into engineering, for reasons that I am sure that all committee members are aware of. Engineering at Swansea University requires mathematics, which is a problem. There is a problem selling engineering to students at school, because engineering is not per se an A-level subject. So, we realised that in order to attract enough students, and to attract students of the necessary quality to go through and be successful and graduate, we had to put in a lot of effort.

[52] We visit schools on a regular basis—typically, my colleagues visit schools something like twice a week. We organise summer workshops, funded jointly with the Royal Academy of Engineering, and also with the Engineering Education Scheme Wales, or EESW. That takes up several weeks in the summer, and around Christmas time. We bring students in to give them a taste of engineering; it is not always easy to do that, but we try to excite them about engineering, using high-profile, real-world examples. Again, to go back to my earlier point, this is where we benefit enormously from working with our colleagues in industry, because not only are those links challenging academic staff and leading to new research, but they are providing us with information that we can then take to the schools and say, ‘This is what engineering is about’. Just to bring in aerospace, because David is here, most people will marvel as to how the airbus A380, a double-decker, actually gets off the ground, but, working with David and others, we create these examples. We also work on joint promotion with BAE systems, and perhaps David could comment on that.

[53] **Dr Rowse:** It is about excitement—how do you engage with children and make them think that this is something to have a go at? One example—and with respect, I think Swansea University may have undersold this—is the use of technology that you have developed for aerospace products, for example, predicting the take-off of aircraft, and the efficiency of the flight. That same technology was used in the design of the supersonic car. So, the Richard Noble car that broke the land speed record was designed by Professors Assan and Morgan so that it would not take off as it reached high speeds. These examples are very exciting, and are visually impressive in many instances. We have concepts that we are interested in, and which are challenging in an engineering sense, and which I know you have used as illustrations of exciting aspects of engineering. That is something that I think we can provide.

[54] **Janet Ryder:** I know that Sandy would like to come in on this point.

[55] **Sandy Mewies:** I am particularly interested in your links with the university, Dr Rowse, because my constituency is in Flintshire, where Airbus and Corus are major employers, and the links that Airbus in particular has made tend to be with the further education sector. Deeside College does a lot of work with the company, though I know that there is work going on with higher education establishments as well. I was just taking your point that there are clusters of companies that service the aerospace industry, and they have needs as well, so presumably you work with everyone in the cluster. Do you have any north Wales links—I will listen carefully to what you have to say there?

[56] **Professor Davies:** They can both say something about this.

[57] **Sandy Mewies:** I should not be so parochial, bringing in north Wales, but given that we have touched so heavily on Corus, and on the aerospace industry, I would be interested to hear what you have to say.

[58] **Professor Weatherill:** If I could pick up on that point, initially in terms of aerospace and Deeside, there was a development about 18 months ago, again to support aerospace in Wales, where HE and FE partners got together and discussed how we could support aerospace. I keep coming back to this, but 25,000 people could benefit from the developments taking place at St Athan, and we at Swansea University believe that we have a responsibility to provide the necessary skills, whether they are for graduates, postgraduates, or cutting-edge research, to contribute to this important sector. We had discussions about how FE and HE could get together, and they were fruitful. In fact, we are moving forward to put a proposal to the Higher Education Funding Council for Wales for a Wales aerospace research institute, which will bring together all the partners, initially in HE, because that is HEFCW's domain, but we have already identified links with FE, so we will be working in partnership. A positive outcome of these discussions was that, in general, we were not competing, but were complementary, which gave all of us tremendous impetus to push through a partnership in aerospace.

9.40 a.m.

[59] **Sandy Mewies:** It is good to hear that you are not competing but are complementary, because it is a big market and we are a small country.

[60] **Dr Rowse:** I do not know where to start. We have a relationship with Swansea that we have built and sustained and there is mutual respect. In the recent past, we have had dialogue with the universities of Bangor and Aberystwyth and the OptIC technium. On next generation technology, autonomous vehicles, Parc Aberporth and so on—I do not want to go too far down the road—part of that is the ability to get these skills centres to communicate and work together in a complementary fashion. That is fantastically important because by partnering, we bring together the best. Part of that is enabled by your investment in the broadband Wales programme. That is incredibly important. When we worked in Singapore, we did not go to Singapore often, because we used those communication links to aid collaborative working. So, when we talk about spinning out technology and working in partnership with parts of north Wales and SMEs—again, I do not want to go too far down this road—I should mention that we have talked to Aerospace Wales and Paul Lindsay about exploiting the SME chain and its agility wherever it exits—in north Wales or wherever. It is a critical part of a complementary and holistic approach.

[61] **Janet Ryder:** I think that Jeff wants to take up this point.

[62] **Jeff Cuthbert:** As you have raised the issue of SMEs, I may as well ask this part of my question and I will come back on a different issue later. The work that the university is doing is extremely impressive, for example, with BAE Systems. I add my compliments to those of David on the usefulness of your paper and the work with Corus and Rolls Royce, although you work jointly with Birmingham University on the latter.

[63] As regards the contribution of higher education to the Welsh economy, what is noticeable about the Welsh economy is the preponderance of small organisations, namely SMEs. How do those types of organisations manage to engage with you? I know that it is difficult for small firms in terms of resources and manpower, but they are such an important part of the Welsh economy that they need to be developed as much as large organisations. Both in Wales and in the UK, many resources have been ploughed into sector skills councils

to represent their occupational areas. How successfully are the SSCs engaging with higher education? I understand that you will speak for Swansea University in this case. Is there evidence that they are representing the known future needs of their occupational areas in terms of research and development and skills levels?

[64] **Janet Ryder:** Before you answer that, we are diverting to yet another line of questioning by going into the area of SMEs. There are aspects of David's original question that have not yet been answered.

[65] **David Melding:** We could look at the SME point.

[66] **Janet Ryder:** Yes, we could do that and come back to the Bologna point.

[67] **David Melding:** It is about the balance between the larger companies as a driver and the SMEs. Are they different sectors?

[68] **Janet Ryder:** Yes, could you address that point?

[69] **Professor Davies:** I welcome this question because the important point about SMEs is how they work synergistically with each other and with larger companies, particularly through supply chains. There is a question mark as to whether there is enough work in Wales on promoting and supporting supply chain developments, although I am not an expert in this area. However, that is something that one should work hard at in the development of any knowledge economy. From the university side, what I see around other parts of the UK where science parks are developing is that you get synergies between the SMEs based in the science parks working very effectively. If you look at the research, many SMEs that are high-tech companies based in science parks say that they get as much benefit from working with other companies on the science parks as they do with the university across the fence. So, that is the type of hotbed atmosphere that we must create in Wales, and we have not really started to do that yet. Universities have a very important role in this regard, so in bringing in the operations of some of the larger companies into Wales, we must work with smaller high-tech companies, some of which may be spin-outs from universities, and get them into science parks and linked into some of the larger companies. We can do some of that helpful connecting work; we already do that as part of the technium operation, for example, in providing facilities for small companies that allow them to work with larger companies. This involves, for example, providing access to the right software, which may be so expensive that it would not be available otherwise.

[70] So, we are not yet operating on a large enough scale, and when I see science parks in places such as Warwick and York, and around Cambridge in miles of fen land, I realise that we are at a very early stage. However, it is a wonderful example to follow and if others can do it, we can do it in Wales, but we must do it with the public and private sectors working with us to bring it all about.

[71] **Janet Ryder:** Has your point been covered, David?

[72] **David Melding:** Yes.

[73] **Janet Ryder:** Jeff, are you satisfied with that as an answer to your question?

[74] **Jeff Cuthbert:** I know that we might be drifting into something else, but I asked whether or not there is evidence that the sector skills councils are engaging with you, because we need to know whether or not they are doing the work that we hoped that they would?

[75] **Professor Davies:** I think that it is too early to give a clear view on that. Some of the

sector skills councils are working very effectively and others are lagging behind; one would expect that. However, in a research-led university, much of our advice about the market for skills comes directly from the companies, and you have heard about the way in which we work closely with Tata Steel and discuss its needs, just as we do with the aerospace industry. So, it is not about the sector skills councils doing the work alone.

[76] **Janet Ryder:** I know that you have other questions to ask, Jeff, but three other people have indicated that they wish to ask questions on SMEs. I will bring Alun in first because he has not contributed yet.

[77] **Alun Cairns:** Professor Davies, you talked about the technium and the fact that it may be the precursor to the science parks, and there is no doubt that the technium in Swansea is a fantastic success and was the original success in terms of the technium policy. However, when it was rolled out throughout the whole of Wales, it was an expensive disaster in some areas, where some techniums are flash but empty office space. So, why has the technium worked in Swansea in terms of forging links with SMEs, and why has this not been the case elsewhere? In relation to science parks, how do we ensure that where we have a technium, it is meaningful and it works, and does not simply try to replicate what is happening in Warwickshire, York or wherever else the examples may be?

[78] **Professor Davies:** That is a very challenging question, and I do not have enough information about techniums across Wales to give a definitive answer. I can only look at the way in which we interact with the technium. Where the technium is close to us and where we have been involved from the start, we have seen nothing but success.

9.50 a.m.

[79] I am told that the technium on the campus could have been filled three times over, so we have probably lost companies because we have been unable to provide the facilities. There is a micro technium in the Institute of Life Science, and Boots and other companies have moved in. That is no problem. It takes longer when techniums are further away from the university; there is a distance issue when you interact with companies. That is why many science parks are close to universities. People talk about needing travelling time of 10 minutes between the two: can you pop over, have a cup of coffee and a chat about a problem and then get back to work without being missed? That is genuinely how many of these companies want to be able to interact with universities.

[80] In summary, there is a distance effect. If you are very successful, the distance effect does not seem to matter as much. When you are as successful as Cambridge, companies are quite happy to be 20 miles away. However, as we are at an early stage, companies want to be very close to the fount of knowledge. [*Interruption.*]

[81] **Janet Ryder:** We have asked whether we can get the drilling sound stopped, which will be fine if it is coming from our site, but if it is happening on the site next door, it might be a problem. We will do our best. It is a bit like sitting in a dentist's waiting room. Or perhaps it is just me who has bad experiences. [*Laughter.*]

[82] Does that answer your question on small and medium-sized enterprises? Perhaps we need to look at techniums again.

[83] **Alun Cairns:** I have had the answer, but I was trying to suggest that technium centres are often the link between universities and SMEs because of the facilities and connection that they provide.

[84] **Christine Chapman:** I wish to pursue your point about techniums and their success.

It is very good in Swansea, but some parts of Wales do not have them. The Heads of the Valleys area is an example, but there are many SMEs there. You made the point that companies work together, which they do, but an awful lot of companies are quite isolated from each other. You cannot force them to work together, but is there a role for universities to be proactive with those SMEs that are working in isolation? Even if there were not a technium centre, is there a role for universities to work more effectively with SMEs?

[85] **Janet Ryder:** Before you answer that, Professor Davies, I will ask Sandy to ask her question.

[86] **Sandy Mewies:** My question is along similar lines. Going back to what Professor Davies said about the fact that 2.5 per cent of research and development takes place in SMEs and that the rest is done by medium-sized and large businesses. I am not sure whether you said that your role as a university was in working with medium-sized and large businesses or whether that is the situation at the moment. I am not quite clear on that. The first thought that flashed into my mind was the question of who deals with the SMEs. Are you saying that the link should be SME-technium-university, and that that is the way to do it? Chris's point is very important. You will know that, in the supply chains for the aerospace industry, there are many small high-technology companies. We have heard evidence in the committee before from such companies to the effect that they find it hard to recruit graduates and people with PhDs, and that they cannot get people with that level of knowledge. So, do you see this as a developing role for higher education, or should someone elsewhere be doing more about this?

[87] **Professor Davies:** To start with the second question, I certainly did not mean to imply that universities did not wish to work with SMEs; we certainly do want to do that, and we can do a considerable number of things, including on the research side. I was simply quoting the figure that 2.5 per cent of all research and development takes place in SMEs to provide a balance. There is a suspicion sometimes that, in Wales, partly because of the rules from Brussels, we give so much emphasis to SMEs that we miss the importance of larger companies and the interrelationship between the smaller and larger companies. Again, I am talking about supply chains, and so on. They are important to us, but if we focus purely on SMEs, we will not transform the Welsh economy. We have to have some of our focus on SMEs, and we are happy to do that.

[88] **Sandy Mewies:** You are reflecting the situation, which is fine.

[89] **Professor Davies:** SMEs that are not raising their game must be one of the critical issues for a country that is lagging behind in productivity and economic success. My previous university, Lancaster University, had a 5* management school, which trialled a successful programme: it undertook an holistic review of SMEs. A small group of people would go to an SME and look at every aspect of it, and produce detailed advice on how it could raise its game. Usually, it came up with not just one thing, but a series of things. The evaluation of that programme suggested that the companies that went through it had considerably enhanced wealth creation, on average. We are currently hoping to transplant that programme to Wales and to roll out something similar from Swansea, with our business school. Although I have deliberately emphasised the high-tech side, in actual fact, in a knowledge economy, the business leadership side is equally important. High-level leadership and management is another area of deficit in Wales, which has to be addressed as well. I think that I have ticked off all of the points raised, Chair.

[90] **Janet Ryder:** Would anyone else like to come in on the SMEs and the technium side before we move on? Before we move on to the Bologna part, which has not been touched on, I think that Professor Davies was starting to talk about entrepreneurship. We heard a lot about that last week in the evidence from Cardiff University. Would anyone like to comment on that?

[91] **Alun Cairns:** Professor Davies's last points about leadership and management tie in with the theme that was pursued last week about management, though I do not know whether you have had a chance to look at the Record of it yet. What seemed to emerge from that discussion was that enterprise and innovation really need to form part of the core courses, rather than just of management courses and MBAs—and I say that as an MBA graduate. Not so long ago, an article in the *Harvard Business Review* said that, if you invest in management graduates, you end up with management consultants; if you invest in engineering graduates and tie in management and leadership, you will end up with an innovator who can use the core skills acquired. Do you concur with those comments?

[92] **Professor Davies:** In a university, you have both views. We have a strong business school, which is growing and which has recently achieved Association of MBAs accreditation for its course, which is excellent. It is going for the high-quality route, the high-quality product, and it is has accreditation for both the full and part-time courses.

[93] **Alun Cairns:** Do you not just end up with high-quality management consultants?

[94] **Professor Davies:** They would take a slightly different view on that, and there is a lot of evidence that the high-level skills from MBA programmes drives up productivity and provides real strategic leadership in companies, in the private and public sectors. However, as someone who started off as an engineer, I have some sympathy with the point about engineers. I wonder whether Nigel wants to say something about how enterprise and entrepreneurship are embedded in our engineering courses, right through to the EngD doctorate with Corus, which Nigel referred to.

10.00 a.m.

[95] **Professor Weatherill:** I am happy to address those issues. If we choose engineering for example, entrepreneurship, management and innovation are now integrated into our undergraduate programmes, across all disciplines. This is encouraged by our professional institution, the Engineering Council, but it also a core driver within the university. So, students at an undergraduate level are challenged with problems such as how to take an idea to market. What are the barriers, and what are the problems? Here we bring in outside expertise, entrepreneurs and people who have really done it, and they comment on the ideas and solutions that the undergraduates have come up with.

[96] At a postgraduate level, we have special funding from the Engineering and Physical Sciences Research Council to put on activities related to innovation and entrepreneurship. It is targeted at individuals who may consider their career to be based in research, but who want to benefit from any clever ideas they come up with, by taking them through, either to spin-out companies, or simply by protecting their own intellectual property.

[97] However, I would like to raise the multidisciplinary nature of this activity. Take an engineering undergraduate for example. It is appropriate that they take some modules that are taught by the management school or the law school, because that is where the expertise lies. What we are trying to do in Swansea is bring together the important core areas of enterprise, entrepreneurship and innovation to add value to the student experience, whether undergraduate or postgraduate. When we start working with companies, that will be fundamentally important. With David sitting here, I am thinking of aerospace, but it would be the same for Corus. It wants individuals who have an understanding of the key discipline, but who also have a far more rounded education, particularly in innovation and entrepreneurial activities. We are trying to produce graduates and postgraduates who have the skills required by large companies, as well as smaller ones. If we come back to SMEs, it is even more true that you must be able to multitask. You must have a basic understanding of a wider range of

subjects beyond your own particular discipline, and that is what we are trying to create with these new programmes at Swansea.

[98] **David Melding:** On the point of intellectual property, Welsh universities do not do well at registering patents. If you do not think that that is a good indicator please tell me, as perhaps I am just barking up the wrong tree. However, we are about one third off the pace of the UK as a whole as regards patents, but why is that the case? We do not do terribly well on spin-offs, either, or on turning ideas into products that can go to market. Are there particular reasons for that, or have we inherited it and are now getting over? Will we see better results in the near future? What is the nature of the difficulty? It is certainly important that postgraduates are made aware of the potential for becoming entrepreneurs, because it is a key area, particularly at Masters level, we are told, which is interesting. I am interested in the low level of patents registered as an indicator, and I would like your views on how robust that is.

[99] **Professor Davies:** I will be quick, because Nigel may also want to comment. You must compare these figures in Wales with the number of people we have working in world-class science departments. I can provide those figures: there are two and a quarter times as many active academic research staff in world-class science and technology departments in England than there are in Wales. In Scotland, there are three times as many. That is taking population size into account. So, again, it is a scale issue. Our researchers are just as good as those in Scotland and England, but there are proportionally fewer of them, and therefore there will be less activity, fewer patents, and so on. However, historically, there is some truth in what you are saying. We have been rather slow in commercialising many ideas, but it is only part of the record, and I have provided the figures in the briefing that we gave you. The real interaction that we have is at research level. That is where we really interact with companies. The commercialisation in terms of income from IP is low throughout the UK, and is even lower in Wales. So, you have to prioritise the different areas.

[100] Finally, life is changing. More and more companies are talking about open innovation. That is the Boots approach—it calls its centre an open innovation centre. So, instead of developing projects behind closed doors, it does it openly, because it found that, by doing it secretly, it was losing out on what was going on elsewhere in the world. Some of the telecommunications companies tell me that they do not worry about patenting any more, because they go from concept to market in less than a year and they have sold everything before anyone catches up with whether they have infringed any patent from somewhere else in the world—life is moving so fast. So, this new and open innovation environment is slightly reducing the importance of the traditional patenting approach. However, I know that Nigel is heavily involved in these areas.

[101] **Professor Weatherill:** I can only add to that. I have been an academic in Swansea's five-star unit for 20 years. In fact, there has been a successful spin-out company from the computational work, namely Rockfield Software Ltd, which recently won the Queen's Award for Innovation. That is a high-profile example. However, it is a challenging question and, from a personal point of view, I would say—coming back to critical mass—that we were trying to focus on what gave us maximum exposure at a particular time. I am sure that you are all familiar with the research assessment exercise, which is fundamentally important in many respects, over and above just getting a label for one's research—it is all about prestige and raising profile for the university. Certainly, from my point of view, we were very much focused on doing well in that and it was a key driver in universities. In the early stages of the research assessment exercise, patents and spin-outs were not measured—they did not count or add weight.

[102] That was not a full and comprehensive answer to the question, because I do not think that I have a comprehensive answer to the question. However, it is an issue in terms of what drives a university, and what drives a relatively small one like Swansea on which many

demands are placed, be those from research, the knowledge economy or the quality assurance agency, and so on, for teaching. Until you get to this critical mass, there is only a certain amount that you can focus on and in which you expect to excel.

[103] **Janet Ryder:** Huw, I think that you have the next question.

[104] **Huw Lewis:** If it is appropriate, Chair, I want to concentrate on European funding.

[105] **Janet Ryder:** Okay, but we still have not reached part of David's initial question on Bologna. There have also been questions on recruiting students that we might want to explore, as well as Huw's question on European funding.

[106] You just touched on the research review, which, again, was highlighted last week, and its potential impact on HE in Wales outside of Cardiff, let us say. Could we address that research review now, as that has just been highlighted, and then go to Huw's question on European funding? Last week, the research review was raised with us in terms of how it is scored, and you have mentioned that the better the university and the better the five-star departments, the more research funding it gets. Would it be worth reflecting for a minute or two on the impact that that might have on other HE institutions in Wales, in particular, outside those universities that have five-star departments? You talked about collaboration in your earlier answers, so do we need to start looking increasingly at inter-departmental collaboration in Wales, in order to create those five-star departments, rather than forced collaboration between institutions?

10.10 a.m.

[107] **Professor Davies:** There are a number of things here. The research assessment exercise has been important across the UK in helping to drive up standards. The UK has been very good at research in universities, but the research assessment exercise over the past 15 years has undoubtedly focused minds more and more on maintaining world quality. It was all about concentrating resources in areas of strength, and it coincided with hugely expanding the university system, with a large number of new universities coming into it. If all the research money had been spread thinly across everything, the feeling was that this would have damaged the very strong, world-class research base in the UK. So, the logic was appropriate. In Wales, we followed a similar line, and many of us will argue about individual disciplines in individual universities, in terms of whether they were harshly treated or not, but, overall, it is a very fair process. It broadly reflects strengths, but I have one qualification; there was a very strange situation where you could decide how many people to submit. There is a famous example where two members of staff, out of a large number, were submitted in what is a five-star department—it is not Wales. If we had all gone that way—

[108] **David Melding:** They were obviously trophy academics. [*Laughter.*]

[109] **Professor Davies:** Yes. So, there was a certain amount of game playing, which distorts the figures a little bit—you must be a bit careful about that, so that a five-rated department that put everyone in is as good as a five-star department that puts half the staff in. That is just a qualification around the edges, and we would not complain about what has been happening.

[110] However, the crucial issue in Wales is looking at the base that we have, because we start from a weaker base than that in England and Scotland—not just in science, technology engineering and math subjects, but across the board. That needed major strategic action to get us up fast to the average level of the rest of the UK. We have been left to our own devices on that, and the whole higher education sector has reacted, and we are rising to that agenda. In different ways, we are trying to accelerate our institutions up the rankings. However, there is

no question that Wales started from a bit behind. Cardiff is now ahead—we fully acknowledge that—but we think that one or two of us are catching up fast.

[111] I do not have much more to say about that, unless you have any specific concerns. We are not here to whinge about the research assessment exercise.

[112] **Janet Ryder:** Huw, would you like to go on to your question about European funding?

[113] **Huw Lewis:** It was about connecting a few themes that had been running through the paper and the questions and answers that we have listened to, homing in specifically on getting best value out of European funding. There is already a success story in Swansea, as regards the European regional development fund, and so on. As an unreconstructed statist, I was taken with your vision of being large-scale and strategic, which ties in with what the Assembly Government would like to do with this round of convergence funding over the next six or seven years; those terms are used by the Assembly Government in terms of what it would like to see happen as convergence funding takes hold. You mentioned the £50 million Institute of Life Science as the key example in this regard. Where do you see Swansea University going in terms of taking best advantage of convergence funding, and European funding in general, over the next six or seven years, building on the good record that you have had so far?

[114] Tying in with something that Christine mentioned earlier, we do not have convergence funding because of anything that any university did or did not do. We have convergence funding in west Wales and the Valleys because of the state of the economy and the communities in those areas. I am particularly interested in how you would connect with the communities and people in those areas with regard to giving them best value too, because, after all, they are the reason that this cash will flow. So, there are two aspects to that. What is Swansea's big strategic vision for the next round of European funding? What could an underskilled person in Ystradgynlais, for example, expect that Swansea might be able to do for them because of what you would do with European funding?

[115] **Professor Davies:** Our vision, which is one on which we have been working with local authorities across the spatial plan area, is to increase our capacity in a sustainable way for driving the knowledge economy—in other words, creating high-level skills in people, working with companies on wealth-creation and spinning out companies that create highly paid jobs. As part of that, on the ground, there would be an expansion of the campus, leading into science park developments. It is the next stage up from technium centres, rolling out something much more ambitious. That will not be only in Swansea; we are talking closely with Carmarthenshire, Neath Port Talbot and Pembrokeshire about how we can relate to that central development a series of other developments that can spread that wealth.

[116] So, although we have a very clear vision of what a university's role should be—there is nothing magical about this; it is in all the Lisbon documents about a knowledge economy across Europe, and in no end of documents from North America about how universities drive knowledge economy developments across different states—we want to do it better. We are starting a bit later and we want to learn from mistakes made elsewhere and be a bit smarter. Our open innovation campus concept is a bit cleverer than a science park. Sometimes, you do not get first-mover advantage, but last-mover advantage by learning from other people's mistakes as well as their successes. That is where we are on that.

[117] You raise the much more important issue of equity, and particularly spatial equity. We are focusing on driving up wealth, which means higher paid jobs and more money. That will help to suck far more people in to the labour market; that is how knowledge economies work. However, we must look at that from a spatial perspective. My background is in the

Valleys, and therefore I have a personal understanding of the situation there. The head of our medical school is from Ystradgynlais, so we have a great deal of sympathy in this regard. My main answer to that point is that we work closely with agencies, local authorities and the Assembly in planning what we do so that it co-ordinates with broader activities and developments across the region. We are only one player, but we are in touch all the time on developing these big strategies with other players throughout the region. If you look at the spatial plan for our region, you will find that the university is there, but together with other knowledge economy developments that people wish to see put in place.

[118] I see this as complementary to the other thrust, on which the Assembly has been very powerful, of pulling in to the labour market people who are currently economically inactive. However, you need both; you need to create high-level jobs and economic activity—sucking people in—as well as the support to help to push them in.

[119] **Huw Lewis:** Thank you for that comprehensive response. You mentioned big projects and the spatial plan. Is the university connected to the Heads of the Valleys programme in any meaningful way as yet?

10.20 a.m.

[120] **Professor Davies:** Not in a fully strategic way, and that is just because of the way that the spatial plan groups work. Our territory extends quite a long way up the Neath Valley, but not as far as Merthyr. However, that does not mean that we do not undertake activities jointly, and we are currently working on several projects involving the University of Glamorgan, Cardiff University, University of Wales Institute Cardiff, and other universities in Wales. So, we are significant players in the broader activity, but Wales has been split up into planning regions.

[121] **Janet Ryder:** Jeff, Chris and David would like to come in on this point. If you ask your questions together, perhaps you will accept a joint answer.

[122] **Jeff Cuthbert:** Professor Davies has largely answered the points that I was going to raise. There was one that you began to allude to, about collaboration in HE within the convergence areas. Are HE institutions pooling knowledge and understanding now, and working together, or are they doing their own thing? What is your response to that?

[123] **Professor Davies:** I have worked in higher education across the world, and I see more collaboration within Wales than anywhere else that I have worked. So, I think that there are a huge number of positives. You cannot stop academics collaborating with the best, wherever they are. There has been a lot of encouragement, and where there is money, people will put more effort in. I realise that some people would be upset to hear me say this, but we should be giving equal emphasis to collaboration between disciplines within institutions as between institutions; in other words, a lot of the frontiers of development, as Nigel Weatherill was explaining a few minutes ago, are across traditional disciplinary boundaries. We must get the physicists working with the computer scientists, and working with psychologists when it comes to the human interface, and so on. Those are the big research agendas. The old research agendas involved building up traditional disciplines. Some, though not all, of the collaboration between universities is about people within the same discipline talking to friends at other institutions. Some of it is productive and effective, so I am not saying that it is a choice between one or the other, but they are equally important, and I think that collaboration across disciplines within the same institution is currently a little bit lost.

[124] **Jeff Cuthbert:** I am pleased to hear that, and the comprehensive answer that you gave to Huw has largely addressed my other points. On the Lisbon agenda, higher education has a crucial role to play in raising the level of the higher skills in particular. I look forward to

seeing the work on that.

[125] **Janet Ryder:** Chris is next. Perhaps you and David would like to ask your questions together.

[126] **Christine Chapman:** One of the lessons that we have learned from the first phase of European funding was that, although west Wales and the Valleys had to be pretty disadvantaged in order to obtain that funding, there were still areas—Huw mentioned the Heads of the Valleys areas—that were probably even poorer than other parts of the Objective 1 area. My impression in the early days was that some areas were better at collaborating than others. I remember Dylan Jones-Evans making a comment that north Wales had disproportionately benefited, in the early days, from Objective 1 money, because it had a better ethos of collaboration. So, my concern is that that should not happen again in the new phase.

[127] Professor Davies, you have talked about working with local authorities, and I just wondered if you had any thoughts on that—how you will collaborate, and whether it will be better? On the other point that Huw made that some parts of Wales are more difficult than others; in some parts of Wales, there are real barriers. In the Heads of the Valleys area, there are sometimes problems with transport infrastructure and economic inactivity, so you need to do more in those areas than in other parts, because there is a bigger need. Will your university be more proactive, or would you say that you must treat everyone the same, despite the fact that there are areas of greater need?

[128] **Janet Ryder:** David, is your question related to that or would you prefer the witnesses to answer Christine's question and then you can ask your question?

[129] **David Melding:** I do not mind. Swansea is in a challenging situation in that it is a high growth area at the moment; I think that it is only Cardiff and the Vale that have grown more in the last 10 years. The poorest growth has been in Bridgend and Neath Port Talbot; south-west Wales, on your doorstep, is the second poorest growth area. I know that the university is not entirely responsible for economic growth, but it is a key player. How do you balance the need for scale and presence in Swansea, which has an effect, with the demands of much poorer areas that are only four or five miles down the road in some cases?

[130] **Janet Ryder:** Would you like to take the questions together?

[131] **Professor Davies:** There are issues here to do with timescale. We are partly working to a long-term strategic picture in which higher education, and Swansea University in particular, is a driver for the knowledge economy, and we work with companies, providing very skilled people and attracting people in, especially from the region, to give them those high-level skills that give them exciting jobs. It does not have an immediate spatial dimension to it—that is the fundamental knowledge economy concept, which is the same concept that is being rolled out across the world. In the shorter term, we have considerable concerns about what can be achieved quickly in terms of the areas of greatest deprivation. The important thing is that we discuss these issues all of the time through the spatial planning groups, and through organisations such as the south-west Wales economic forum, where we deal with shorter-term issues as well as the longer-term ones. However, there is a conflict—and it is a fair question—about how distributed you can be, because if you are distributed you will be less efficient. The key issue is that we have various opportunities, especially through European funding, to get over deficiencies in the market, which allow us to work over a much bigger area than one would normally consider as being efficient.

[132] In that context, we are also working closely with other higher education suppliers in south-west Wales, such as the new university in Swansea, Swansea Metropolitan University,

which we congratulate tremendously on getting that title last week, and Trinity College in Carmarthen. We have several operations that we are working seamlessly. We received funding to do that. On the economic side, we will reach out to industry, commerce and business, jointly across the three institutions. We plan to roll out skills development that can reach out to every part of the south Wales region between the three institutions, so that, somehow or other, every workplace and community in south-west Wales can be reached by higher education. We will not do all of that work, because some of it will be done by what was Swansea Institute and is now Swansea Metropolitan University, and some of it will be done by Trinity College. However, we are producing strategic plans and working together to enable that to happen. This is all happening at different speeds, but we are utterly committed to it.

10.30 a.m.

[133] To return to something that is very dear to me, how do we attract people from disadvantaged backgrounds into the most career-enhancing opportunities? It is not just a matter of getting people into higher education, because some higher education courses are much more career-enhancing than others. It is incredibly difficult to get people in to study engineering if they have not had a good secondary-level schooling in mathematics and physics. How do we attract more women into engineering when, as I understand it, only about a quarter of A-level physics candidates are female? Therefore, to correct inequalities, we must look to schools too. We talk a great deal with local authorities and the Assembly about trying to place more emphasis on raising aspirations. As you heard Nigel say, we contribute to that in disadvantaged areas, particularly with regard to women in science and technology.

[134] **Janet Ryder:** That is opening up another huge subject. I am conscious of the time, and of the fact that we have not returned to part of David's question about the Bologna process, which we have a paper on. David, can you remind us of that question? Sandy would also like to come in on that.

[135] **David Melding:** I thought that the paper was very politely critical. In a sense, we look at the more negative aspects when we have witnesses present. I suppose that it is just human nature to do that rather than to concentrate on what is working. The paper says that

[136] 'One major priority must be to broaden debate with employers, students, parents and other stakeholders'.

[137] Yes, that is the case, but why have we not done terribly well on that, particularly with employers—and then with the consumers of courses that may lead to better jobs through enhanced skills? How is the Bologna process shifting us along? Are there major barriers of which we need to be aware that can, perhaps, be addressed at this level, at the Welsh Assembly Government?

[138] **Sandy Mewies:** I thought that the paper was constructive rather than critical. I agree with many of your recommendations. You spoke about the interaction between universities, but you also talked about mobility. We must recognise that mobility is a two-way process. We are not only attracting students into this country; there may be students here who might be better served, or who would prefer to study, in another country. Over the past few years, as the Chair of the Assembly's Committee on European and External Affairs, I have been welcoming people from the four motor regions to Llangollen, for example, to the ECTARC, the European Centre for Training and Regional Co-operation. I also used to be a schools inspector, and I therefore used to inspect the links with Europe, and it struck me—although I might be wrong—that, across Wales, the opportunities for students to go to university in another country, and the advice on those opportunities, are patchy. It depends very much on where you are and on the enthusiasm of the person who provides that advice.

[139] Do you agree with that assessment, and, if so, is that a disadvantage? Many students who study abroad come back to this country with much-enhanced skills that they then use here. Another factor is that many of these programmes are quite small and limited financially. I was told by one person that they do not tell people too much about these opportunities because they could not cope with lots of people. I am not clear that that is the right way to handle that situation.

[140] There is also a competition element. People have been talking about European and convergence funding. That funding is important, but it will not be here forever. I live in an area that previously came under Objective 1. It can come as a shock when that ends; people know that it will happen, but they do not actually think about it. They assume that you are planning for what happens when that ends, because there is a real element of competition here. I am concerned to know how you will compete with other European universities. I understand that there are some concerns in England that, because of funding difficulties—as I am sure you will know—many of the big American universities offer a particular type of specialism in postgraduate studies, so, if people want to study a certain speciality, they will go to that university and so on. I have heard that there are concerns about that in England because of the blind funding. You go for a blind interview and you will be funded, so it can be more attractive for some students to complete their studies in America rather than in England. Could that be a problem for us here?

[141] **Professor Davies:** I will start, before handing over to Huw Morris, our Bologna promoter, who is one of the UK's experts on Bologna.

[142] You raise more general issues about internationalisation, which is hugely important for universities. In a traditional university like Swansea, we provide an environment to which young people—18-year-olds—come to mature and develop intellectually, socially and in every other way. Our hope and purpose is to produce graduates who then go on to contribute towards making the world a better place. I am an idealist and that is what this is about.

[143] In the new global world, we cannot do that by being parochial. I would certainly like to get to the position, and it might take some years, where every UK student has the opportunity to spend at least a semester in another country as part of his or her studies. Many of our students already go to mainland Europe and many go to North America. We have exchanges with North America that are well developed and we will expand those. We are currently working on an internationalisation strategy, which covers everything, including the syllabus. We want to internationalise the syllabus to ensure that we are teaching it relevantly—even in terms of professional courses. We do not only want to qualify people on professional courses to meet UK requirements, but to consider whether they meet the requirements of professional bodies in America, Australia or France, for example. We want to test everything against international standards. Also, in terms of research, we want to test our international collaboration for research purposes vigorously. So, huge things are happening. If I were here in a year's time, I could talk about it for hours, but, in the meantime, I can only say that we are working on it. However, we have been working on the Bologna process for some time and Huw can tell you about that.

[144] **Mr Morris:** Diolch am y cyfle i **Mr Morris:** Thank you for the opportunity to siarad â chi heddiw. talk to you today.

[145] I would like to put the quotations included in the Bologna paper into context and explain that the process has been ongoing since the 1990s. It currently involves 46 countries, some of which, such as the UK, are extremely well developed in terms of higher education, and others that are less so. The critical comments to which you referred were taken from a document called 'Trends V', which is a stocktaking exercise that takes place every two years

by the European University Association on developments throughout Europe. The relevant quotation is included to encourage those countries and institutions that have not fully engaged with industry.

[146] **David Melding:** That absolutely reflects the skills agenda at the moment, so it clearly hits a nerve.

[147] **Mr Morris:** Yes, and I must admit that I feel that the UK, in particular, has a lot to offer the Bologna process. I fear that it is not offering enough in that context. We can also learn a lot from the European agenda. I believe that Wales's proactive engagement with the Bologna process will ultimately benefit us. We clearly can contribute a lot. We have heard about the examples of interaction with industry today, and I am pretty sure that some of these degrees, such as the engineering doctorate, could be further extended. We have talked about European funding, and funding is available to extend academic provision outside the European higher education area. I would like Welsh higher education establishments to benefit from that.

[148] I would like to concentrate on one or two of the main aspects of the European higher education area, which will replace the Bologna process by 2010. This refers specifically to collaboration—working collectively as institutions and as countries, and focusing on the mobility of staff and students. We have again spoken about funding, and I am aware that €60 million, I think, will be set aside to support phase 2 of the Erasmus Mundus programme. This programme was established in the last five or six years to promote joint degrees between universities, with an integral and compulsory mobility component.

10.40 a.m.

[149] On the point about competition, 105 such programmes have been approved. I am proud to say that Swansea University is involved in two consortia, as is Bangor University. The competition is extremely tough; we are talking about the top European universities, so we were particularly proud to be one of the first consortia to have been approved in that process.

[150] Phase 2 of Erasmus Mundus will include doctoral degrees, and there is an encouragement now to develop joint doctoral degrees between the European countries. So, I would like to see Wales engaging in that debate and benefiting from it. I feel that through engagement on joint doctoral degrees, we could benefit from joint research, and, through mobility opportunities for doctoral students, we could also engage with industry as part of that process. You referred to mobility not in terms of students coming to the UK, but of our outgoing students. It is a concern to me, and to others, that we are not sending enough of our students to other European countries and further afield. The Bologna process has the capacity to help to develop that, but, again, I believe that we need to go back to the schools. We spoke about nurturing entrepreneurial skills, which is needed in schools, and I can see that being done through the Welsh baccalaureate. My son is currently studying for an A-level, and he is following the Welsh baccalaureate. There is a Welsh baccalaureate module on Europe and on mobility, and universities need to build upon what is being developed in school sixth forms.

[151] In terms of mobility, I believe that we need to send our students abroad, to gain not only language skills, but cultural awareness, so that when they come back, they are far more employable in terms of our SMEs. I came across the statistic the other day that 19 per cent of business is lost to SMEs because the employers do not have the competence, or the confidence perhaps, to engage with international markets. So, it is about not only training our students to be more employable throughout the world, but bringing them back to this country as more skilful and skilled employers.

[152] **David Melding:** I am still not sure whether we have heard about any employer input

and how we anticipate some of the requirements—and I know that anticipation is difficult—of tomorrow's employees and employers. Is that part of the process? I thought that it was.

[153] **Mr Morris:** Yes, it is. I came across an article within the last month on a conference held in Lisbon, I believe, in November, which brought together representatives of higher education institutions and employers. The conference was designed to assess the requirements of employers, from our students and from the Bologna process. Every seminar that I have attended relating to Bologna has had an input from employers and students. For instance, we organised, alongside the Assembly, a seminar in Swansea on enhancing European employability, and, of course, employers played a significant part in that conference. Our recommendations were fed into the London ministerial meeting and became known as the Swansea recommendations on employability. I understand that the UK Government is chairing the next phase of the project on employability, and employers are engaged in that. So, in answer to your question, the Bologna process facilitates interaction with employers. I was pleased to learn that, at the Lisbon conference, a presentation was made by Bangor University, and you might wish to discuss that with the university when you meet its representatives in future.

[154] **David Melding:** That is very interesting. I do not know whether you have further evidence, but if there is anything that you could submit on that, it would be useful.

[155] **Janet Ryder:** We have covered a wide range of questions today, but no doubt we have not covered everything. Do any Members have further questions?

[156] **Alun Cairns:** I would like to take us back almost to the beginning, to the core reason for the evidence session and what we are driving towards. Obviously, this subject is so broad that we could easily be drawn along many different tangents.

[157] There is no doubt that universities have a huge role, and not only in their locality, in driving economic development and the skills development that we have spoken about of late. There is no question that funding is a huge issue. Higher education is an international market, and the best students will go to the places that have the highest accreditation, which is primarily driven by the quality of research. So, can you tell us, as you look forward five or 10 years, about any issues or concerns that you have in relation to funding? I am thinking not only about Wales vis-à-vis England, Scotland, Northern Ireland and the rest of Europe, but about how competitive we are internationally. The £50 million of investment in the Institute of Life Sciences partly came from European funding. However, in other discussions that we have had, you have talked about the relatively low levels of research spend in Wales in comparison with that in other parts of the United Kingdom. So, could you perhaps reflect on that, or comment on the funding and capacity in universities? If we are to get the best value out of the excellence that already exists, we must maintain that excellence, and unless the funding is there, we will not be able to do so, which means that the potential economic impact of HE might not be as big as it could be in five years' time.

[158] **Professor Davies:** I obviously welcome that question because funding is something that we always worry about, and we are approaching a rather difficult period, as are all sectors that rely heavily upon the public purse. However, universities' dependence on the public purse has been declining in recent years; it has certainly been declining dramatically in Swansea and will continue to decline. So, the real pressure upon us is to find alternative income sources, and particularly in areas that allow us to continue to fulfil our mission. We do not want to be diverted into other areas that are not core to our mission. The most exciting aspect is working more with industry, and I was delighted that David agreed to come with us today to demonstrate the way in which we are doing that. We are finding that this provides additional income, but it also provides enhanced scholarly activity—dealing with people who need results, who have problems, and who want solutions. It makes the research environment

in universities more exciting.

[159] So, some of the diversification is very positive indeed. We have to work very hard at recruiting more students from around the world, to keep our base up in terms of funding and the scale of our activities. We will have to continue to do that. However, although we have a specific issue, the UK as a whole does not do very well in university funding.

10.50 a.m.

[160] Looking at the latest figures from the UK, I see that combined public and private expenditure on higher education was only 1.1 per cent of our gross domestic product. In the United States, it is 3.3 per cent. So, as a percentage of GDP, the States spend three times as much on higher education. Their productivity increases have outstripped the whole of Europe, and that is year in, year out. So, there is an issue about the scale of the higher education sector. I am not too negative about it, because the European funding window of opportunity—we know that it is only a window, and we are planning for what happens afterwards—provides us with an opportunity to increase capacity, particularly with partners such as Rolls-Royce, BAE Systems, IBM, and Boots. So, we can grow our capacity, and we must do careful analysis to ensure that we can sustain the income streams in the future to maintain that. Please believe me that we are working creatively to maintain the expansionist approach to higher education that we need if we are to deliver on the knowledge economy. It is tough, and we would love to have more support from the Assembly, but we will do it in any case.

[161] **Janet Ryder:** That is a positive note on which to finish this morning. We have covered a wide range of topics, and I thank you for coming in to give evidence. It has been very interesting and challenging in certain areas. If you wish to submit further written evidence, we would be willing to accept any further information.

[162] **David Melding:** We need the Swansea principles. [*Laughter.*]

[163] **Janet Ryder:** Before we finish the meeting, I remind Members that Aberystwyth University is coming to give evidence next week. David suggested a visited to England to see some of the enterprise parks or university campuses.

[164] **David Melding:** The science parks in Warwick or York seem to be good places to visit, and are probably more relevant to us than going to Cambridge.

[165] **Janet Ryder:** Would the committee members like the committee clerk to investigate that and come back to us with some details? I see that you do. The committee clerk was talking about the Lambeth review, which was published in 2005, looking into the connections between business and higher education institutions. Would you be happy if we asked the clerk to circulate that review for us to read, given that some of the evidence that we have heard this morning would pick up on issues raised in that report? I see that you would.

[166] There is a paper to note, namely the minutes of the previous meeting. Having noted that, I thank you all. See you all at our meeting next week.

*Daeth y cyfarfod i ben am 10.53 a.m.
The meeting ended at 10.53 a.m.*