

Cofnod y Trafodion The Record of Proceedings

[Y Pwyllgor Menter a Busnes](#)

[The Enterprise and Business Committee](#)

25/11/2015

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Cynulliad
Cenedlaethol
Cymru

National
Assembly for
Wales

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Weddill y Cyfarfod
Motion under Standing Order 17.42 to Resolve to Exclude the Public
from the Remainder of the Meeting

Cofnodir y trafodion yn yr iaith y llefarwyd hwy ynnddi yn y pwyllgor. Yn
ogystal, cynhwysir trawsgrifiad o'r cyfieithu ar y pryd.

The proceedings are recorded in the language in which they were spoken in
the committee. In addition, a transcription of the simultaneous interpretation
is included.

Aelodau'r pwyllgor yn bresennol
Committee members in attendance

Mick Antoniw	Llafur Labour
Rhun ap Iorwerth	Plaid Cymru The Party of Wales
Mohammad Asghar	Ceidwadwyr Cymreig Welsh Conservatives
Jeff Cuthbert	Llafur Labour
Keith Davies	Llafur Labour
Yr Arglwydd/Lord Elis-Thomas	Plaid Cymru The Party of Wales
William Graham	Ceidwadwyr Cymreig (Cadeirydd y Pwyllgor) Welsh Conservatives (Committee Chair)
Eluned Parrott	Democratiaid Rhyddfrydol Cymru Welsh Liberal Democrats

Eraill yn bresennol
Others in attendance

Geraint Green	Pennaeth Busnes ac Arloesi, Llywodraeth Cymru Head of Business and Innovation, Welsh Government
Ian Menzies	Cyd-gadeirydd Cyngor Cyngori Cymru ar Arloesi Joint Chair of the Innovation Advisory Council for Wales
Adam Price	Cyd-gadeirydd Cyngor Cyngori Cymru ar Arloesi Joint Chair of the Innovation Advisory Council for Wales
Richard Rossington	Pennaeth Cydnerthedd, Risg a Busnes Gwyddoniaeth y Llywodraeth, Llywodraeth Cymru Head of Science Resilience, Risk and Government Business, Welsh Government
Yr Athro/Professor Julie Williams	Prif Gynghorydd Gwyddonol Cymru Chief Scientific Adviser for Wales

Swyddogion Cynulliad Cenedlaethol Cymru yn bresennol
National Assembly for Wales officials in attendance

Rachel Jones	Dirprwy Clerc Deputy Clerk
Gareth Price	Clerc Clerk
Anne Thomas	Gwasanaeth Ymchwil Research Service

Dechreuodd y cyfarfod am 09:29.

The meeting began at 09:29.

Cyflwyniad, Ymddiheuriadau a Dirprwyon Introductions, Apologies and Substitutions

[1] **William Graham:** Good morning and welcome to the Enterprise and Business Committee. I've received apologies from Gwenda Thomas and Joyce Watson. The meeting is bilingual. Headphones can be used for simultaneous translation from Welsh to English on channel 1, or for amplification on channel 2. The meeting is being broadcast, and a transcript of the proceedings will be published later. May I remind Members, but more particularly witnesses, there's no need to touch the microphones; they should come on automatically. In the event of a fire alarm, I ask people to follow directions from the clerking team.

09:29

Craffu ar Brif Gynghorydd Gwyddonol Cymru Scrutiny of the Chief Scientific Adviser for Wales

[2] **William Graham:** Our first session this morning is scrutiny of the Chief Scientific Adviser for Wales. May I welcome our witnesses? May I ask you to give your names and titles for the record?

[3] **Professor Williams:** My name is Professor Julie Williams, and I'm chief scientific adviser to the Welsh Government.

09:30

[4] **Mr Rossington:** I'm Richard Rossington, and I'm a member of the chief scientific adviser's division.

[5] **Mr Green:** Geraint Green, head of research and innovation and the Horizon 2020 unit in the Welsh European Funding Office.

[6] **William Graham:** Thank you very much. Now, I'd better ask Members if they've got any declarations that they need to make.

[7] **Yr Arglwydd Elis-Thomas: Lord Elis-Thomas:** I should declare Dylwn i ddatgan fy mod i'n dal swydd that I am chair and chancellor of cadeirydd a changhellor Prifysgol Bangor University. Bangor.

[8] **William Graham:** Thank you.

[9] **Eluned Parrott:** Chair, I have a husband working in the university sector.

[10] **William Graham:** Thank you very much. One of our issues for discussion this morning is to try to identify the key developments made in the last 12 to 18 months as part of the 'Science for Wales' strategy. Could you, in your answer, give us an idea of what, perhaps, some of the highlights have been, and also perhaps touch on some barriers and difficulties that perhaps you've experienced?

[11] **Professor Williams:** Okay. The main programme that we've been focusing on is Sêr Cymru—the Welsh stars programme. That now is split into two. We have the phase 1 Sêr Cymru programme that comprises four research chairs: these are stars that have been brought in from places like Switzerland, two from the States, and one from Imperial College London. The main advance, I suppose, in the last 18 months has been the appointment of the first female who is a physicist, coming from a university college in California. That is dovetailing very neatly and strategically with strengths that we have in industry: IQE, namely, in compound semiconductors. So, she will take up her post, or is currently taking up her post, in Cardiff University.

[12] I'm very pleased that we have a female physicist as a role model and a chair that we've been able to tempt in from a very successful university in the States. Indeed, all our chairs have got a very good pedigree. They are in various stages of embedding themselves within the academic community, and we're very pleased to see that they're already bringing in grant funding. I believe that we have a figure of £80 million that is being brought in in grant

funding already, which is higher than I would have expected as some of them have only recently started their positions. So, I'm very pleased at the way that that is progressing.

[13] The second element, the Sêr Cymru II, we've been working on for the last 18 months. That now comprises two components. The first of which is the co-fund application that we made to Horizon 2020, and this was an ambitious application. It actually is the largest grant that they have awarded, for €24 million. We were successful. So, that has brought in additional funds into Wales. I'll tell you what that is going to fund in a moment. That dovetails in an innovative way with funding that we've also applied for through WEFO—a €39 million package that works in an integrated way. So, we have Horizon 2020 funding working in an integrated way with structural funds, which is innovative and something that Europe are showcasing as a very positive activity and step forward.

[14] The whole package is around increasing our capacity to be more successful in Wales. A little bit of background to show why we are doing this: we know that we have excellent scientists and researchers in Wales. We have now independent reports, such as the Elsevier report. We have independent evidence from the Research Excellence Framework—the UK-wide assessment of research that was undertaken recently. It shows that we have researchers who are punching above their weight on the world stage. What we lack are numbers. We are around about 600 to 650 researchers light in Wales, and that is the simple reason why we don't bring in the funds that you would expect us to bring in from Research Councils UK and Horizon, I would say. So, that's the problem and the solution is to increase those numbers.

[15] **Rhun ap Iorwerth:** I just wanted to ask—

[16] **William Graham:** Yes, please.

[17] **Rhun ap Iorwerth:** This number—it has struck me, this shortage of researchers, 600 to 650—is that a fairly recently identified figure?

[18] **Professor Williams:** Yes. Peter Halligan and Louise Bright looked at this issue and produced a report recently, and that has identified that, for our population size, we would expect to have another—I think it's about 650 researchers in Wales.

[19] **Rhun ap Iorwerth:** And was it a surprise when that kind of figure, of

that magnitude, was identified?

[20] **Professor Williams:** Perhaps not so much to me, but to others. I think it has been an issue for the last 20 years. Wales has been rumbling along with a success rate with Research Councils UK funding, for example, that has gone between 3 per cent and 3.8 per cent, and there have been a lot of initiatives to try and address that—you know, putting in more grant applications and a variety of different policies. But the problem is, actually, that we just don't have enough researchers, and the researchers who are there are actually performing very well.

[21] **Rhun ap Iorwerth:** Okay, thank you. Sorry to interrupt.

[22] **William Graham:** Another question, then.

[23] **Eluned Parrott:** If I may follow up that, we've identified the deficit and it is a large one by comparison to the scale of the universities here in Wales. We're talking about a significant percentage increase required in each university in Wales. How do we begin to rectify that because, clearly, the universities don't necessarily have the space, the capacity or, let's face it, the money to employ those people?

[24] **Professor Williams:** Well, I think the policy is to facilitate that by bringing in funds that are direct spend onto research excellence and building the numbers, which is what we're doing with Sêr Cymru II. So, the funding package will comprise 130 research fellows for three-year periods across the whole of research, but mainly focusing on STEM and applied social sciences because that's where our deficit is, unfortunately, the greatest. If you look at the amount of money that we bring in from those associated research councils, that's where the deficit is. So, 130 research fellows and between 20 and 30 rising stars. So, these are individuals that are just beginning to show their leadership qualities. They have already got evidence of success, and we want to bring them in to grow their research groups in Wales. I think we want to embed them here, and I think that's a strategy that we feel is most likely to sustain that growth and, given that platform, we would expect them to grow naturally by getting in more funding from Europe, from research councils, from charities, from industry. Industry is also a very focused component of our strategy going forward. With the research fellows, we are currently—. We have a database with 800 researchers who can partner, because it's very much about building around the strengths, and we want to build the critical mass around the current strengths. So, these fellows will

join and partner with researchers that are of high quality so that we can grow those groups naturally. That's where the success will come.

[25] We do have capacity. There has been quite a lot of investment in buildings. We do have some really excellent infrastructure now growing around a number of the universities, and others have that planned. So, I think the weak link is people. In terms of bringing in the funding, the whole package, I think, will come to about £56 million—Sêr Cymru II—and £30 million of that is coming from Horizon 2020 and Welsh European Funding Office funding. Ten million pounds comes from Welsh Government, including the Higher Education Funding Council for Wales component, and less than £10 million will come from the university sectors. So, in this way, we can promote and facilitate this increase in capacity and, hopefully, we'll be able to continue this in future.

[26] We've recently been out to Brussels, and we had a very positive response and even an encouragement to possibly think about putting in for another grant before the end of the one that we were successful with. So, I think there's the potential to grow and look at other European sources of funding. We need to do more with the money that we've got, and this has certainly been our strategy for Sêr Cymru II.

[27] **William Graham:** And you're confident that you'll be able to recruit.

[28] **Professor Williams:** Yes. I think the way it is set up, we are using the researchers as their own recruiters. The best way to get the right people is for the researchers on the ground to go out and look for the people they want to bring in and partner. That, I think, is a very strong model to try and get the best and the right way of growing. I forgot to mention we are encouraging industry to partner with these fellowships. We are in the process now of producing a resource of industries that want to support this, and to give some examples of the sort of research areas they would like to partner with universities and the leading scientists and researchers that we have. So, that is being constructed currently and will be out there for others to access.

[29] **William Graham:** Excellent. In terms of timescale, have you set targets?

[30] **Professor Williams:** Well, the first call for the COFUND fellows is just open and will close on 1 March. We hope to have a second call very soon—we think probably just before summer; we're looking at that at the moment. Then, a third call will follow afterwards. We have set up a panel. And, I'm

delighted, we advertised and we got 50 applicants, and they are stellar. These are people that know what research success looks like. It is chaired by Wendy Ewart, who is a former No. 2 at the Medical Research Council and is working now in the Wellcome Trust, advising the head of the Wellcome Trust. We have Sir John Enderby on engineering. You know, it's a star-studded panel. These are people who will really pin our excellence standards, and independently assess all of these applications.

[31] So, I'm not going to set targets now. I've had a lot of interest from researchers, I'm going on a tour of universities shortly to speak to the researchers—I've started in Cardiff University—to tell them what we want to achieve here. We're getting PowerPoints made so that they can put them at the end of their talks when they go to international conferences, so that, if there are prospective fellows out there, they can make the contact. So, I think we'll get a reasonable number in, and the way we're doing it is probably the best way I can think of to get the right standard of people coming in.

[32] **William Graham:** Keith.

[33] **Keith Davies:** Good morning.

[34] **Professor Williams:** Morning.

[35] **Keith Davies:** You've got a National Science Academy now, and you've got a STEM in education group, and you're targeting parents of children in the seven to 14 age group—and I'm all with that—but my concern is with schools, really. I remember actually moving my daughter from one school to another, because I wanted her—or she wanted, and I did as well—to do maths and further maths and physics at A-level.

[36] **Professor Williams:** Yes.

09:45

[37] **Keith Davies:** I went to this school in a very posh area of Cardiff and I was told by the deputy head and the head of the sixth form, 'No, no, no. Maths and further maths? No, no, no. Parents in this school would prefer children to do chem, phys, biol, so they can go into medicine, or English, French and history, so they can go into the legal profession.' I said, 'Well, what about science and engineering?'—'Oh, parents in this part of Cardiff are not really interested'. In the end, they did allow my daughter to go in there

and she did a degree in maths in the end, but it seems to me that we need to have more influence with headteachers. I actually lost, in one school where I was a governor, when I wanted key stage 4 to offer separate sciences, not double science, and, in that group of parents, I lost the vote 7-1, and that school still continues, to this day, to offer double science and not separate sciences. So, I think it's fine for the National Science Academy to work with parents, but I think we've got a bigger problem with schools.

[38] Again, on the same story of maths and further maths, when I went to the engineering laboratories in the University of Cambridge, because there was a school in the Cynon Valley that wanted to do some electronics endorsement, and I asked the admissions tutor in Cambridge, 'Now, if youngsters want to study engineering in Cambridge, what should they be doing at A-level?', and the answer came back: 'Maths, further maths and physics'. Now, if you look at the schools in Wales, you will find—and, to me, this is a real problem—that perhaps 50 per cent of our secondary schools don't offer separate sciences at key stage 4, and very few offer maths and further maths, but there's been some work on that with the WJEC, and that's increased. But it seems to me that we need to work with the profession.

[39] **William Graham:** Okay, let's have the answer. Thank you.

[40] **Professor Williams:** I think there are now incentives for more triple science in schools, and I think we will see that increase. I am very interested in education; I'm interested in teachers; I'm interested in inspiring children. I'm now on a curriculum committee, and I chair a committee within Welsh Government on education. What I'm trying to look at is how we make these subjects a little more relevant, actually. We're at a point where we can look at these things in the curriculum. I'll give you an example: we funded a series of teachers of physics to go out to CERN, and they came back and they were really fired up. I said, 'Well, can you put this into your teaching?', and they said, 'Well, actually, it's not part of the curriculum'. So, I think we need to look at the curriculum and look at introducing bigger issues to children, and then hone down onto the learning, the concepts, that underpin those, and get a little more relevance.

[41] One of the issues that I'm most concerned about is getting more girls interested in physics, and this has been a problem that has dogged us for many years. But relevance, I think, is one thing. You see a lot more girls take biology; it's more obviously relevant. You have that, 'You can do good'. Those things seem to have an influence, but you can do equal good in some

areas of physics, but it's not obvious. So, we're looking at those sorts of ideas and trying to—with the changes, with Donaldson and the curriculum—actually see if we can change some of those basics that will inspire the next generation.

[42] **William Graham:** Jeff, on this point?

[43] **Jeff Cuthbert:** Yes, on this point. I think it's logical that I come in with my main question now. You make the point in your evidence about the need for more STEM skills, and clearly it's a no-brainer. In the Welsh economy, especially in terms of renewable energy, for example, we're going to need far more people with the right level of skills, and therefore it has major implications for the teaching of STEM in schools. You've alluded to, just now, Professor Donaldson's review, but could you expand a little bit more on how you think that review will encourage more young people, especially girls, to take up STEM as a serious career choice? Also, in—. No, I'll leave it there, if I may, and maybe come back.

[44] **Professor Williams:** I think the Donaldson review, in itself, may not alone do a lot to encourage. I think we need to do other things, and this is why we are focusing on two aspects within the National Science Academy: more girls in science and more people thinking about science, focusing at the age when they make that decision to go on in science. So, I think we need to actively encourage children. One of the things that I've pointed out—we circulated a poster to all schools demonstrating the ease with which you can get jobs in science-related activities and the salaries that went with it. That was to try and get through to parents as well as children, because I think sometimes those sorts of issues are not appreciated. It's trying to introduce some of the real-world realities to children that might help decisions being made. It is an issue. We know that there are biases out there, and, within families and even in the teaching profession, there are still these issues out there. So, we still have a lot of work to do to get the message or the messages out there, and I think it's something beyond Donaldson as such.

[45] **Jeff Cuthbert:** Okay. Could I ask you, just finally on this point? A key partner in all of this must be industry itself—the engineering industry, and employers as well. We've had a number of innovative projects that have certainly caught the imagination, like the Bloodhound project, which I know Swansea University did a lot on, and I know many schools were engaged in that experience, so, maybe you have some comments to make on how successful those sort of things are. And, of course, we have the tidal lagoon

in Swansea, which we trust, depending on what comes out in a few hours' time from the Chancellor, will see the light of day, and could excite that type of interest and make engineering in its broader sense more attractive. So, do you have any comments on that? And the final point is: in terms of the STEM in education group, what would say its main positive outcomes are so far?

[46] **Professor Williams:** What we've done, we've reviewed the National Science Academy and there were just under 30 projects that were funded when I took it over. We now have honed down on the best 18. We're just about to announce the funding of the last nine of these, and these have all gone through independent review. We've instigated annual meetings where we bring in people who are working in this area. The Wellcome Trust have a very good group looking at how you assess what is good and not good in public engagement. So, we want to grow this area in a more academic way, to be frank, and share best practice. We will be bringing all of these groups together for an annual meeting, so they can work a little bit more together, a bit more cohesively, know what everybody else is doing, and know what works—know what is good out there, both from an experiential point of view, but also, increasingly, from an empirical and academic point of view. For us to judge our effects may take 10, 15 years to see what children actually do in terms of the decisions they make later on, because we are focusing very early in their school careers. So, it's very difficult to give you now any objective measures, but it's something we are really focusing on and trying to do the best we can within the confines of a shorter-term type of assessment. We look at the number of girls that we can bring in. We've got the Ford Saturday Club, we've got Engineering Education Scheme Wales; there are got a lot of very—. I visited their competitions in the Celtic Manor last year, and there are a lot of enthusiastic boys and girls doing fantastic things, really getting the point of research and science: that it's about problem solving, it's about fun, and bringing all of your attributes to try and solve problems, you know, from design to understanding some very basic research concepts. I was very impressed by what's going on. So, I think there's a lot of very good stuff going on. We're now trying to cohere that together, so they learn from each other and develop the way we can assess what is the best way to go forward.

[47] **Jeff Cuthbert:** And are employers working with you, relevant employers?

[48] **Professor Williams:** These groups work with relevant employers. I don't work directly; we put a call out for these areas of activity to be funded, and they work with those employers. Some of them, as I say, Ford—. We've

had increasing interest actually from companies like Renishaw, and Tata Steel. We're working with them to bring them into this sphere. I think this is new for them. So, they weren't successful on this call, but we want to work with them to encourage them to do work onsite, bringing children in on their sites. I think that's a very exciting development. So, we hope to develop that a little more in the future, and bring them together perhaps with people who have more experience of doing that in a Welsh context.

[49] **Jeff Cuthbert:** Thank you.

[50] **William Graham:** Eluned.

[51] **Eluned Parrott:** Thank you. I wanted to ask about how teachers are supported in delivering science education on the ground. It seems to me, and there's good evidence from the public engagement in Science World, that, particularly gender biases, but some of the biases against science are set very early in life, and not helped by the fact, for example, that many schools will take classes out of their normal class in primary school and a male teacher will take over for a science lesson or a maths lesson, and this unconsciously reinforces a gender bias that science and maths are too hard for my normal teacher. This is a very frequent case. So, what are you doing to ensure that primary school teachers have the confidence and the ability to deliver good quality lessons in science and maths, regardless of their educational backgrounds themselves?

[52] **Professor Williams:** I'm very interested in that. And we have some continuous professional development within the National Science Academy; it is something that we focus on. But I think there's more that can be done there, and I know, with the education department, there are talks with the Open University for example, and others, to look at how we can support teachers that are not confident with teaching science. We have other elements. STEMNET ambassadors—we now are encouraging them to go into primary school, and we funded an NSA project with STEMNET to do that. But I think we need to come at it from a number of angles and support teachers to upscale their skills in science, and give them confidence. And, indeed, the STEMNET ambassadors were there probably to give the teachers confidence and a connection with science, as much as showing children what you can do when you're older. So, that's something I'm developing at the moment, and I'm speaking with the Minister for Education and Skills, who is also keen to push that forward.

[53] **Eluned Parrott:** I'm aware of the STEMNET—

[54] **William Graham:** I'll pick you again in a minute, but I want to make progress. We're nearly half way through and we haven't got to half our questions. Mick, I think you have a few on the National Science Academy.

[55] **Mick Antoniw:** Well, I think most of them have actually been covered. The one area, perhaps just to complete what you've been saying about it, is really what the key outcome was of the strategic review that you had, the strategic plan. What is different now to what you were doing before?

[56] **Professor Williams:** Okay. Focus. We focused on two main activities, general activities. Of course, there are a variety of ways you can address those. The first was trying to encourage more girls to get into science, and the second was to relay information about science in general at an appropriate age; at an age so that, when they come to make those very crucial decisions, very early in their career—. We do that very early in the UK. That may not be a good thing, but you make those decisions at the age of 13, possibly, that you're going to opt for certain subjects and not others, and then final ones a little later on. So, we wanted to make sure that we would deliver as much of that information to those children before that time. So, those were the two areas that we focused on and, of course, we honed down the number of and variety of activities and asked them to focus more on these.

10:00

[57] **Mick Antoniw:** There was one—. Of the number of projects that you have, one of them is—is it the lorry lab?

[58] **Professor Williams:** Yes, a lab in a lorry.

[59] **Mick Antoniw:** Tell us a little about that. What's that?

[60] **Professor Williams:** So, that's physics. The Institute of Physics run this, although I think it's going a little bit more independent now. I think that the person who runs it has actually bought the lorry and is doing it more independently. But it's about going and visiting schools so that children who may not be able to get to institutions such as Techniquest, for example, or other ones, can experience and get enthused about physics. So, they do a variety of experiments. They will come in in groups and be enthused by

individuals there who show them what physics can be about and make it exciting and interesting. But it's taken to the schools.

[61] **Mick Antoniw:** It's very difficult to measure, particularly over a short period of time, so how do you gauge the effectiveness or the success of what you're doing?

[62] **Professor Williams:** Well, I think this is something—. This is what we want to look at and we're encouraging all of the applicants to put in more pre and post assessments. I think we're not quite there yet. I think these annual meetings now mean that we're trying to increase the skills levels throughout. This is a focus for us. We want to know what the best minds are thinking about in the Wellcome Trust. They came to talk to our last meeting and they're going to come and talk again so that we can embed better ways of measuring change and impact. As I say, we're not going to get the full impact, but we can get some measures of attitudes changed, for example. So, we're building up that skillset at the moment.

[63] **Mick Antoniw:** Okay, thank you.

[64] **William Graham:** Eluned, did you have a question on this one?

[65] **Eluned Parrott:** No, thank you.

[66] **William Graham:** Okay. Thanks very much. Rhun, on the national research networks.

[67] **Rhun ap Iorwerth:** Yes, on the national research networks. I know it's been a desire of yours to make sure that they're on firm footings in terms of staffing structures at a senior level and so on. Could you just reflect on the past year or two and where you've got to, considering that there have been some difficulties with staff leaving and things like that.

[68] **Professor Williams:** Yes. Javier Bonet—and that is how you pronounce his name, apparently, because he's told me—has moved on and is going to another position, but because the network in itself is a series of principal investigators from a variety of universities that are working together, there is still quite a talent pool there where we can find a new leader, and, in fact, that is what has happened. I've talked, I've had meetings, with Javier and somebody who is acting as an interim and there are adverts going out now and interviews are taking place to appoint a successor.

[69] That has been a very successful network, and I have some figures. I think that they have, in themselves, brought in around £5 million in terms of research funding and have submitted about 83 grant applications, of which 24 were funded. So, they are very good; they're already active. So, I don't have worries about that perpetuating beyond the leader leaving.

[70] **Rhun ap Iorwerth:** Perhaps these changes in staffing were pretty much unavoidable, but are you perhaps slightly behind where you would have been otherwise?

[71] **Professor Williams:** I don't think that one is at all; I think that one's fine. The three are very different actually in the way they've approached their areas. We have an issue with illness with one, but the individual involved is very dynamic and, even though he's very ill, he is still involved in seeing that succeed. So, I don't have concerns about what's happening in the networks. I think they are achieving things in their own right.

[72] **Rhun ap Iorwerth:** And in terms of—I think it is £22 million in total that has been brought in as research income. Is that around your level of expectation?

[73] **Professor Williams:** Well, actually, we've had a few additions to that. That is now £27 million, and at the moment, they've only spent about £8.4 million of the funding going in—our support—and they've brought in £27 million. And I think that's ahead of what I would have expected after two years, to be honest.

[74] **Rhun ap Iorwerth:** And do you have some examples of the international recognition that is being afforded now to the networks that you mention in the report?

[75] **Professor Williams:** Well, a lot of these are playing on the international stage. You know, their one grant, it came from Cancer Research, but this is funding stem-cell cancer research that is world-leading. There's no doubt that we have world-leading researchers within all of these networks that are achieving, and they're very ambitious. Low-carbon energy and environment are taking groups of their—they've got clusters of people working on different areas, and they're taking the clusters out of Europe, and they're going and knocking on doors, and they're always learning something of value that way. So, they're ambitious about their international impact, be it in

their actual research or in actually getting more funding in.

[76] **Rhun ap Iorwerth:** So, the focus now becomes even clearer on what they are to do in the period ahead. What is that? What do they need to hone now over the next few years?

[77] **Professor Williams:** Get more research grant funding in. That's my mantra. You know, I think they've done very well for where they are. They have done better, probably, than I would've thought after two years. Investments in any sort of research take a number of years to come to fruition, so I'm very pleased with where we are now, and I'm ambitious that we do even better in the future, and I think there is the potential there to do that.

[78] **Rhun ap Iorwerth:** In addition to the aim to bring more in, do you have targets on the outputs of the research?

[79] **Professor Williams:** Yes. We set them individual targets. So, we would set them targets on papers, and they have 97 published research papers so far from the networks and the chairs. They've got 121 PhDs, 16 postgraduates, 69 fellows supported, and abstracts for international conferences—there are over 200. So, they're already hitting a lot of the marks, and we do take them to—we won't take them to task, but we have targets with them. My role is to facilitate their success. These are enthusiastic researchers, and I do need to point them sometimes in the direction of, 'Well, we need some RCUK funding; we need to be looking at that'. But they know what success looks like, and I'm very pleased with what they're doing so far.

[80] **Rhun ap Iorwerth:** Thank you.

[81] **William Graham:** Oscar—women in science.

[82] **Mohammad Asghar:** Thank you very much, Chair, and thanks to you, Professor Julie Williams. Given that the brief regarding my question is relating to women in science, would you please tell this committee what are the barriers and what are the challenges you are facing as a woman and, in Wales, what women are facing to come into the science field?

[83] **Professor Williams:** There are barriers, and, in fact, I've commissioned a task and finish group to report on this, and we hope to have the report

published, probably around National Women's Day next year. They are looking specifically at the barriers in Wales, but also looking at solutions. That's been very much the focus of the report, and I look forward to their recommendations. We know that there are subtle barriers; there are subtle biases there. One of the things that I have focused on in some of the Sêr Cymru work is to bring women who have dropped out of research and science back in. We have figures. If you look, for example, at universities, it's roughly 50:50 in terms of the staff when they enter their careers, and by the time you get up to professorial level, you're looking at anything between 14 to 20 per cent. Twenty per cent is, I think, average in Wales, which is slightly better but still not, in any way, a good figure. So, it's this leaky pipeline; we lose women. It's usually at mid-career and it's usually related to families. I think there is a perception within the research community that there's only one way that you become a really productive, top-class scientist and researcher—you have to be there 100 per cent, every day, all the time. And I think that's wrong. I think people can take breaks. If a man took a break in industry for five years, that might be seen as a positive to come back in. But I think we need to start knocking down some of these erroneous perceptions that that's what success looks like. It's very much, 'Well, this is how I did it, so this is the way it must be.' Actually, it doesn't have to be that way.

[84] I have personal experience because I took time off to have my own family. I intended to take a year, maybe two. I took seven, because it took me five years to get back in. So, I think you can succeed. I think there's a lot of women out there who could be contributing to our universities and also to industry. We need to be cognisant of these barriers. I hope that this report that will come out next year will address that.

[85] **Mohammad Asghar:** Thank you very much, professor. But the thing is, because you said the report is coming in early January 2016—

[86] **Professor Williams:** Yes.

[87] **Mohammad Asghar:** Can you tell this committee of some key areas where you think these barriers can be removed and where something can be achieved better in Wales?

[88] **Professor Williams:** I don't want to pre-empt the report, but I think one of the concrete things that we've already done is to have the recapturing talent—. We have 12 research fellows who are about recapturing talent. This could be men or women. I think it's more likely to be women. These are

fellowships focused on bringing people back into academia, into research, and these will be a part of the Sêr Cymru II programme. We hope to partner with others. There are agencies out there that have great experience in facilitating and bringing people back in and we hope to partner with one of those to help this succeed.

[89] **William Graham:** Dafydd.

[90] **Yr Arglwydd Elis–Thomas:** Diolch yn fawr, Gadeirydd. Mae'r pwyllgor yma wedi bod yn cymryd diddordeb ar hyd y Cynulliad yma yn yr holl gwestiwn o gyllid Ewropeaidd ac o gyllid ymchwil, gyda golwg ar berfformiad Cymru yn Horizon 2020 a gwella ar yr hyn a ddigwyddodd yn y fframweithiau blaenorol. Roeddwn yn falch iawn eich bod yn rhoi blaenoriaeth i hynny. Felly, fe garwn ofyn ychydig o gwestiynau ynglŷn â hynny. Roeddwn â diddordeb yn yr astudiaeth gan CM International yn cwmpasu Horizon 2020 ac yn chwilio am ffyrdd i Gymru allu gweithio'n fwy effeithiol. A ydych chi'n hyderus y bydd yna fodd inni gael cadeiriau ymchwil o'r Cyngor Ymchwil Ewropeaidd yn dilyn y buddsoddi newydd yma?

Lord Elis–Thomas: Thank you very much, Chair. This committee has been taking an interest throughout this Assembly term in this question of European funding and research funding, with a view on Wales's performance in Horizon 2020 and improving on what happened in previous frameworks. I was very pleased that you gave that priority. So, I'd like to ask you a few questions about that. I had an interest in the CM International report encompassing Horizon 2020 and looking for ways for Wales to work more effectively. Are you confident that there will be a way for us to have research chairs from the European Research Council following this new investment?

[91] **Professor Williams:** What I will say to that is that we have genuine quality in Wales, and a number of those have been successful in gaining ERC funding. And this is very difficult to get. But the whole problem to me still stems from numbers—that we need to increase the numbers. When I look at all the reports—that, to me, is still the problem. We will solve this when we have the right number of people who are working in this area. I have no problems with the quality. We've got that. We can achieve world-leading science and research in Wales. That's not an issue. So, I have every confidence that we will get more of these ERC-funded posts in future, and I do hope that some of the fellows and the rising starts will feed into that in years to come.

10:15

[92] **Lord Elis-Thomas:** I was particularly interested that the report from CM International focused in the scoping study on comparable European regions and nations. I think that this is a—*[Inaudible.]*—way of operating, and I would obviously—*[Inaudible.]*—Geraint Green on this as well—the comparisons with Ireland, Scotland, Northern Ireland and, obviously, I would want to say Catalunya, and Sweden perhaps as well—*[Inaudible.]* What particular role do you see—and we've spoken to them already in this committee—for the EU ambassadors in relation to stirring up possibilities in that direction?

[93] **Professor Williams:** Okay. I'll answer, and then I'll hand over to Geraint to finish off. I'm very impressed by the EU ambassadors. We met only yesterday, and we have regular meetings. I think they have a lot of intelligence to bring to that area, and there are more things that we may be able to do, but working together. I think we have the resources within Welsh Government and, with a little more cohesion, we can actually share those to get more added value. So, I think they've been very useful, and I look forward to greater input in future. I'll hand over to Geraint.

[94] **Mr Green:** Yes. Just on the comparisons, as you say, the scoping study looked into those regions in particular. That allowed them to look at the UK angle, but also at other regions like Catalunya, which is very active in that, and pull that together. That was very important for us because there were a number of suggestions as to how we could do things differently in Wales, but I think there was very much an evolving support system, both in the UK and in Wales, and we needed to ensure that what we did added value to that. So, what we've done is picked out the bits of those regions that fit what Wales could do. It's very important to understand that comparisons with Ireland, for example—. Ireland is a member state, and we are not a member state, and we would not—

[95] **Lord Elis-Thomas:** Yet.

[96] **Mr Green:** Yet. *[Laughter.]* I couldn't possibly comment. *[Laughter.]* So, what we do—. What the study did, and what we've done as a unit, is try and pick out those bits of better practice that are practical and realistic as well in the funding regime. But I agree with Julie's earlier point that a lot of these investments that we are putting in place—and Sêr Cymru and COFUND are

excellent examples of that and attracted a lot of attention from Europe—will build that momentum in the medium to long term. So, the statistics are looking quite decent now: up to £35 million already coming into Wales now; I think it's over 60 participations, and 12 from SMEs. So, there's a decent cohort of activity already, and a number of these interventions through schemes that Julie's involved in and through our innovation team as well, as well as higher education, are going to make a difference in the medium to long term.

[97] **Lord Elis-Thomas:** Obviously, I have a bit of an interest in the marine and the regional dimension with Ireland. But, obviously, the integration of structural funds and the European Investment Bank, alongside funding, is also another key. Obviously, I should declare an interest because, basically, we have benefited, as you know, in Bangor, as has Swansea, substantially from the European Investment Bank. It's clear that they want to undertake that kind of work.

[98] **Professor Williams:** I think that we would like to get more industry involved in that and to understand more about the options and potential with loans. It is increasingly likely that grant funding—some of it—may become loans in the future, and we need to be aware of that going forward. I think there are events for industry, and Geraint can talk a little bit more about that, and upcoming meetings where we are trying to focus bringing together industry with these new options, in terms of European loans, to really get the ball rolling. I don't know if you want to—.

[99] **Mr Green:** Yes, there was a very good event the other week around the options around what the EIB and the EFSI can offer to Wales, and certainly in terms of our annual event, which is planned for March now—. It's a Horizon 2020 event, but we've always embraced that sort of stairway to excellence approach: so, the European territorial co-operation fund and loan funds—whether it's through Finance Wales or through the EIB—and bringing those communities and clusters together with industry and academia. A number of our schemes that we've supported, and existing schemes, are doing that. I think Wales now is a little more switched on to the sort of culture change about working together and building those kinds of consortiums that will make an impact on the European stage. So, in doing that, they need to consider all funding sources, and we're doing our bit to ensure that they do.

[100] **Professor Williams:** Just to comment on the integration of academia and industry, I'd just like to point out that, in Wales, we are above the UK

average in terms of research excellence and research impact. We're above it. Just an observational comment: Wendy Ewart who chairs our panel has gone round to each university to understand their strategy, what they want to achieve, and one of her comments was that she thought that Welsh universities were far better integrated with industry than the universities that she's very familiar with in England. So, that's something that we are keen to capitalise on and something we should be proud of, I think.

[101] **Lord Elis-Thomas:** Thank you.

[102] **William Graham:** Jeff and then Mick.

[103] **Jeff Cuthbert:** Thank you. Linked very much to the questions that Dafydd has just asked, I've heard it said that one of the reasons why, on the face of it, we have a lower success rate in terms of Horizon 2020 than, say, Scotland and Northern Ireland is because it's relatively more straightforward to apply for structural funds and many, of course, of the HEIs in Wales are in convergence areas. Do you think there's any truth in that?

[104] **Professor Williams:** I think it might have a small effect—you know, a small effect. I think the biggest effect is the capacity, as I said; it's the people. If you look at Scotland, I think they have 8 per cent of the population; they have 12 per cent of the population involved in research. So, they are above their average. So, we mustn't forget that those big issues are having, I think, the majority impact. I think a minority of people might be diverted to writing grants for European funding, but this is a minority. They will still be writing grants for RCUK and other funding. So, I think, if it has an effect, it's a very minor one.

[105] **Jeff Cuthbert:** Okay, thank you.

[106] **William Graham:** Mick.

[107] **Mick Antoniw:** Just a short question that follows on: in terms of the strategic approach to seeking funding, some countries—. I mean, you know, Horizon 2020 is intensely competitive now and increasing year by year, and it is the same with other funds. But some countries do have a fairly strategic approach in terms of setting objectives of what they think they should be achieving and they're working towards those targets. Is that an approach that we adopt here or is it one that we should consider? Is it viable?

[108] **Professor Williams:** I think, in my view, I know what the problem is. The main problem is capacity—

[109] **Mick Antoniw:** It's chicken and egg, isn't it? You have to have one to have the other. Somewhere along the way—

[110] **Professor Williams:** Setting targets? Possibly. I think possibly the institutions themselves can look at how they facilitate and encourage and make sure the time is there for researchers to put these applications in and monitor their performances. That is increasingly happening. The Research Excellence Framework has made that pretty obvious, and, having objective measures of your performance, you know what success looks like and you know what failure looks like. I think some universities are acting on that. There are obviously a minority that may not be working at the rate they should, and they need to look at that, but I think the main issue is in terms of capacity, actually.

[111] **Mick Antoniw:** One of the things EU ambassadors are looking at is this whole thing of Welsh Government, the Wales Office and the strategic link between the different factors, whether it be from local government or whether it be from higher education and so on. Is that something that you think is a positive move? Do you think there is benefit from achieving that?

[112] **Professor Williams:** Yes, I think so. I'm very impressed by the EU ambassadors, and I think that they can help us integrate a little better and share information. It's about facilitating the researchers out there and communicating intelligence. All of that helps to pinch that inch and get that little bit of success rate up and get people in the right place at the right time. But the bulk of our success comes from what researchers are doing and the capacity that we have in that area.

[113] **William Graham:** Thank you, Professor Williams, for your evidence today. You've touched on a lot of subjects on which this committee is particularly keen. May we wish you every success in your endeavours?

[114] **Professor Williams:** Thank you very much.

[115] **William Graham:** The committee will retire now until 10:45.

*Gohiriwyd y cyfarfod rhwng 10:25 a 10:42.
The meeting adjourned between 10:25 and 10:42.*

**Craffu ar Waith Cyngor Cynggori Cymru ar Arloesi
Scrutiny of the Innovation Advisory Council for Wales**

[116] **William Graham:** Can I welcome our witnesses, and may I ask you to just give your names and titles, for the record?

[117] **Mr Menzies:** Ian Menzies. I'm the co-chairman of the innovation council for Wales.

[118] **Mr A. Price:** Adam Price. Also co-chair.

[119] **William Graham:** Thank you very much. The microphones will come on automatically, hopefully. I will ask the first Member to ask our questions today, which is Jeff Cuthbert.

[120] **Jeff Cuthbert:** Thank you very much. Good morning. In terms of innovation, would you like to begin by commenting more generally on what you think is the effectiveness of the approach to innovation in Wales, particularly highlighting any recent improvements and perhaps any areas of concern?

[121] **Mr Menzies:** Certainly. Yes, innovation is the catalyst for growth. That's been well recognised and demonstrated, I think, from experiences from what we've done in Wales, but also from other nations as well, and other sectors and regions from that. Going back to your point about evidence of making a difference, I think certainly what we see is that people look pretty positively on Wales for its being a hub of innovation, effectively. I think that, to some extent, is stimulated by the demographics of the kind of companies and industries that we have here, in fact—actually, the large anchor companies who are very focused on their desires for stimulating and supporting innovation—but also the large community of small and medium-sized enterprises and entrepreneurs that we have here as well, which does actually provide quite a rich hotbed, let's say, for innovation from both ends the spectrum, effectively.

[122] **Mr A. Price:** Yes, I think Ian is right. We look at evidence from across the world and we see a very strong correlation between innovation and economic development more generally. So, it's a critical area for Government to focus on. I think it's a mixed picture in Wales, historically. I think, generally speaking, we come from a position that has been a low base,

particularly when we think in terms of business innovation, or commercial innovation. Having said that, in the UK innovation survey, which is the main source of evidence, Wales, of the four nations, is the highest, actually, in terms of businesses that are innovation active. If you drill down a little bit further, it's a more mixed picture, because if you differentiate between innovations—if you think about innovations that are new to the businesses themselves, so they're new innovations in the context of the business, then there's a higher record of achievement.

10:45

[123] But if you're thinking about global innovations then it's a slightly lower position than Wales has. So, it is a mixed picture. There are some centres of excellence that are reflected in some of the evidence that we provided: the new compound semiconductor centre, where there was an announcement recently. So, there are points of light and an improvement, of late, in the level of business expenditure on research and development. In the earlier session, of course, you were hearing about R&D focused on the higher education sector. Business expenditure on R&D has traditionally been low, but we've seen a rising position in recent years. So, from a low base, there is some reason for encouragement but further room for improvement as well.

[124] **Jeff Cuthbert:** Thank you very much. So, you're quite clear, from what you've just said, that the situation regarding allegations that used to be made about poor performance in business, in terms of R&D in Wales, is improving. Can you tell me: how do you monitor that? Do you have targets that you expect businesses to meet, so you can measure whether that is indeed the case, and likely increases in progress? Finally, Adam, you referred to the previous session. You're right: that, of course, was focusing mainly on HE. We did allude to the issue, though, of industry generally engaging with education. You can debate forever whether you can teach innovation. But in terms of the subjects—particularly the STEM subjects—that are going to be taught, do you think that this can only help, or is there more to be done in terms of creating more innovative future employees and employers in Wales?

[125] **Mr Menzies:** Yes. I mean, just picking up on the point about the improvements that we've seen, I think the 2012–13 figures show a 37 per cent improvement against a low base. The latest figures have shown that Wales has an 8 per cent improvement in business investment—certainly on the research and development side of things. We had wondered whether that

would go down because of the high increase from last year, and whether there would be some settling or whether there was a particular factor there. So, I think, certainly, that's a positive sign we're seeing from businesses' desire to invest effectively in the innovation and research side of things at the moment. I still think there's more that can be done with regard to collaboration between industry and academia at the moment. Certainly the A4B system, which is now being replaced by the SMART Expertise piece, is still something that more work can be done on.

[126] From my perspective and, I think, from the council's perspective, we have talked about whether there are things that can be done to incentivise more of that collaboration, for instance. How do we make sure that, effectively, industry is pulling on the demands of academia for that innovation as well? So, instead of it having to be pushed, it is a pulling type of thing. In other words, innovation is about the commercialisation of ideas. If you haven't got someone there wishing to commercialise it, then it doesn't really tend to go anywhere and just gets left on the technology shelf, effectively—if we're not careful, in fact.

[127] So, I think that, absolutely, there is more that can be done. I think there's a desire to do it. I see a desire within the universities to do more of that collaboration. You can see that several of the universities are now bringing more business-focused individuals into their organisations to actually bear in mind that commercialisation piece, in fact. So, I think there are improvements there. I think there's still more that can be done. I think that's really what we're trying to do in the council is to try and help bring that kind of collaboration and that thinking towards that collective.

[128] **Mr A. Price:** Specifically on the higher education side, in the submission, we did point out one particular difference between Wales and England that is listed as a weakness. Certainly from the perspective of universities, the higher education innovation fund—which is a specific pot of money that the Higher Education Funding Council for England makes available, particularly for technology transfer in relation to the commercialisation of knowledge within universities—doesn't exist within Wales. There are other things that do exist within Wales, but that, actually, has been quite useful, if you speak to English universities, because it works through a formula in the same way that other higher education funding works. So, it gives a little bit of security and a bit of strategic drive behind innovation infrastructure within a university. So, that's something that possibly is worth looking at.

[129] On the measurement piece, I think this is a very, very good point, because part of the problem, I think, is that traditional economic statistics don't reflect the economy as it exists today, certainly when we're talking in terms of innovation. If you think of an industry like the video games industry, we have some successful companies within that sector, and there's some activity within HE in Wales as well. And yet, you can look at the traditional industrial statistics, and that industry is spread across about 12 different categories; there isn't a single one that says 'the video games industry'. And that's reflected right across the piece. If we're looking at innovation in the economy and the emerging sectors, of course, the statistics that really reflect the economy of the past don't help us. So, one of the things that we did early on was to look at what we need to actually address this. If we are to work out where our smart specialisation teams are and where our competitive advantage could lie in terms of the Welsh innovation economy, then we need to use better new tools for measuring. So, there is a new two-year project that is looking at creating an innovation dashboard—basically, giving policy makers more up-to-date and more granular information. That will help us to see where our potential competitive advantage lies in terms of innovation, which will be a useful guide when we're trying to make decisions about where we target resources.

[130] **Jeff Cuthbert:** Thank you.

[131] **William Graham:** Eluned and then Mick.

[132] **Eluned Parrott:** Thank you. If I can indulge the Chair with two short questions—

[133] **William Graham:** By all means.

[134] **Eluned Parrott:** First, clearly the council is relatively new: you were established a year ago. What support do you have to implement the recommendations that you're coming up with? Who is it that is actually working to make this happen, and where are they based?

[135] **Mr Menzies:** So, against the ideas that we've come forward with, there are four particular areas. We've touched upon the measurement aspect, and, actually, the branding aspect; we combine those two together because we think there's a real branding issue for innovation. We've got some great innovation, but we're still shy in our desires to publish that. We're also looking at the centres. We're looking at collaboration. And we've also got a

public sector innovation piece that we think is really key. We call it a ‘moon shot’, actually, because it’s going to be quite difficult to do, but we think the impact of it will be quite significant.

[136] So, we are actually now through all those activities, and now our thoughts about a national innovation body as well, which we’ve talked to the Minister about. Equally now, what we’re doing is we’re going out to stakeholders in industry, in academia and the public sector to solicit their ideas about what the council has done to date, and literally tomorrow we have our first session in that regard.

[137] **Eluned Parrott:** Sorry; I think maybe you misunderstood what I meant, if I could rephrase it. I’m wondering how many members of staff you have to enable you to do what is a very ambitious programme, and whether they are based in the Welsh Government, in other organisations, or—.

[138] **Mr Menzies:** Sorry; I do apologise. So, at the moment there’s 12 of us on the council, including myself and Adam, effectively. We are supported by the innovation team from the Welsh Government at the moment. Against those pieces of work we talked about, we’ve just put together the final business cases for those to find the resources that we need to make that happen. But, on the dashboard work, we have gone out and sought work and support from outside agencies in that regard as well. So, it’s a blended response to that.

[139] **Eluned Parrott:** That’s great; thank you.

[140] **Mr A. Price:** Just further on that, I suppose it’s important to emphasise that the council is an advisory body. So, obviously, we have some capacity through the support that Ian referred to from Welsh Government officials to work up proposals, so that they provide a proper business case for the Minister, effectively, to make decisions upon. We also work to support other agencies; particularly, we’ve worked with WEFO, for example, in helping them to assess some of the innovation-related proposals that are coming forward as part of the structural funds.

[141] But we are an advisory body. In the context of that, as Ian mentioned, we have commissioned a report and had discussions with the Minister on the question of creating a national innovation body, which would be an executive body. Whether it provides precise governance arrangements, of course, is a question of detail that would need to be addressed, but they exist in many

nations and regions across the world. There's a strong body of evidence that having a specific executive body, concentrating on innovation, is a key lever in driving up innovation capacity. So, whereas our role is advisory, I think there is a case to be made. Certainly it has some merit and we're currently commissioning some further work and having an ongoing discussion with the Minister on that basis.

[142] **Eluned Parrott:** That's really interesting. The universities, for example, already have such departments within them to facilitate, to encourage and to drive innovation forward. I'm wondering what analysis you've made of why it is that we're starting from a low base, given the fact that, for example, Cardiff University is second in the UK in the Research Excellence Framework for the quality of its innovation and engagement. It seems to me that if we have universities, around Wales actually, that are outperforming other places in terms of the innovation and engagement assessment made by the UK Government and the research councils, why is it that that isn't translating into more innovation on the ground in the commercial setting?

[143] **Mr A. Price:** I think that's an excellent point. I think it really goes to the heart of the matter, really. There's generally a consensus that raising our innovation capacity has to be a core economic driver for us, but the reality of it is—. And, again, sort of hearing some of the discussion from an earlier session, which is relevant, because things like Horizon 2020 raising the knowledge base of our economy are an important component within the innovation system, but if you think about it, in Wales, there are relatively few institutions that have the resource—the capacity—to actually think strategically about raising their own innovation capacity, let alone that of Wales as a whole. So, I can think of maybe half a dozen or so anchor companies—large multinational companies—that basically have the spare time and effort to say to someone, 'Let's invest in this; let's explore funding opportunities; and let's actually create a centre here for our emerging cluster', and then some of our leading universities. So, maybe a relatively small 10 to a 12 institutions.

[144] I think the potential role for a national innovation body is to act as a co-ordinator, working with some of those major stakeholders, but also to tap into the knowledge and opportunity for innovation with some of the SME sector that don't have the spare capacity to think about blue-sky thinking and new-horizon opportunities always, because, of course, they have to be focused on the day to day. I think it's no accident that many countries and regions have come to the same conclusion about having a co-ordinating

body that is able to think, 'Right, what have we got in terms of a competitive advantage, and how can we collectively move forward?'. I think that that might be the answer as to how we can resolve the contradiction—you know, the fact that we have excellence in many areas, but it isn't always coming through in terms of innovation.

[145] **Eluned Parrott:** Thank you, Chair.

[146] **William Graham:** Mick.

[147] **Mick Antoniw:** Just a small point, really, to help my understanding of what actually happens on the ground. Obviously, there's a lot of support that comes in from the Welsh Government, and obviously there's the accessing of European funding and so on, but with regard to Innovate UK, you referred in your paper to there being an advantage for Welsh companies to be able to go to one or other, but then you started referring to the fact that there are other innovation funds that, in fact, we don't have access to. So, how does that sort of picture work out? How well do we do from things like Innovate UK, and how is this sort of interaction? Because, again, if we're to move to setting up a sort of innovation body to develop a more focused strategy, the sources of funding around it are quite sort of disparate and not very joined up themselves, it seems.

[148] **Mr Menzies:** So, from Wales's position with Innovate UK, we have—as I guess you're alluding to—struggled in the past to actually source that. I think we were just under £8 million last year from Innovate UK. It's improved and I think just under £14 million is the number for this year to date, effectively. So, we're heading towards having doubled that access, effectively.

11:00

[149] I do think, however, that we need to provide—. One of the challenges we've had, probably, with Innovate UK—and we actually have a representative from Innovate UK sitting on the council, now, just to try and answer some of those concerns—is actually to be a bit more forward-leaning in some of our ideas, and, as opposed to following, to lead. We have a right to lead, so no-one's disputing that fact, but we may, to an extent, have been a bit passive in that regard, I think, in the past. So, I think there is, absolutely, research funding out there that we haven't necessarily tapped into, so there are opportunities to grow in that regard. And I think, equally, from the Horizon 2020 side of things, I know industries and academia have been relatively

successful in their pursuits in that regard—industry probably less so in that regard, I think, just because of how to signpost access to that finance. So, I think, certainly, we see that has been a challenge for people, knowing where to go to and how to present themselves in a successful light, therefore.

[150] **Mick Antoniw:** Thanks. I've got some other questions, but I'll ask them later on.

[151] **William Graham:** Thank you, Mick. Oscar.

[152] **Mohammad Asghar:** Thank you very much, Chair. Hello, Adam and Ian, and thanks, both, for giving us a broad picture of innovation in Wales. The question is—. The companies or businesses here have got access to Innovate UK for funding and also the Welsh Government. What is the relationship between Wales and Innovate UK? That's the first question—the relationship between the two in respect of innovation. And a 2013 survey showed that only 56 per cent of Welsh firms were found to be 'innovation active'. What progress has since been made? Do you think that that progress can be developed more? Finally, you said, Adam, earlier that one of the best parts of innovation is low business expenditure. You said that earlier. So, could you elaborate on that, and whether some progress can be made in other areas in Wales?

[153] **Mr A. Price:** Sure. I think, as Ian was saying, it's very good that we have a representative in Innovate UK on the council. And we had, in October, the announcement of the creation of the precision medicine initiative—one of the catapult centres for precision medicine is going to be in Wales, so we're starting to open the batting in terms of maybe we will, later, get on to the crease, but we're making up for that. Up until last week, I was senior manager at Nesta, which is another UK innovation foundation, and, from a very low base, you know, I'm pleased to say we managed to ramp up Nesta's involvement with Wales. In fact, the only major base that Nesta has outside of London is now in Wales, Y Lab, which is a public service innovation lab, because, of course, innovation within the public sector is also an important part of the piece. Also, further investments: I think there will be five full-time Nesta employees based in Wales now. So, I think that, on engaging with these UK bodies, much the same as with Horizon 2020, if we're underperforming, I think the best way is actually to provide some compelling propositions to them that actually tap into Wales's unique competitive advantage.

[154] I don't know the actual proportion. The last figure I saw was that 1.4 per cent of Innovate UK's expenditure is in Wales, so do a quick population calculation and you can see that, as we are underperforming with the research councils in HE, just in terms of population share, there is a policy debate to be had about devolving those budgets, which is a matter for you and not for us. But, obviously, everything is in flux at the moment, including the future shape of research councils, as we know, through the Nurse review, and, similarly, the future role of Innovate UK. So, that's a policy debate that I'm sure you'll want to engage with. But I think that if you put compelling propositions in front of these UK bodies then the opportunities are there for Wales, and I think we're beginning to demonstrate that as well.

[155] In terms of the business expenditure on R&D, as we touched on earlier, let's be clear, 1.1 per cent of gross value added at the UK level is spent on business R&D. We're roughly around about 0.9 per cent, you know, but there was a very, very considerable catch-up, particularly, as Ian said, in 2013, and we've maintained that position. We're now up to about 5,000 people working in business R&D in Wales. So, from a low base, there has been a significant improvement in recent years. You know, it would be great for us to get up to UK parity, continue this trend, and actually beyond it as well.

[156] **Mohammad Asghar:** Thank you. Rhun, please.

[157] **Rhun ap Iorwerth:** Jest i ddod **Rhun ap Iorwerth:** Just to come back, yn ôl, os caf i, at— if I may, to—

[158] I don't know if you want to put those on.

[159] Ynglŷn â'r corff arloesedd Regarding the national innovation cenedlaethol i Gymru, rydym ni wedi body for Wales, we've already sefydlu'n barod fod arloesedd yn established that innovation can mean golygu rhywbeth eang iawn, iawn, a great many things. Is that, in a way, iawn. A ydy hynny, mewn ffordd, yn a problem in terms of getting an broblem o ran cael corff *executive* ar executive body on innovation, arloesedd, o ystyried bod ei *remit* o bearing in mind that its remit would mor eang ac amwys? be so broad and ambiguous?

[160] **Mr Menzies:** I'll take that. It's an interesting question. What is we've done to date, just on the national innovation body—we've already commissioned a piece of work that has reported back, which was done by

Cardiff University, as was, interestingly, mentioned earlier, and Nesta as well, to look at some examples of innovation bodies around various countries, the Basque region, for instance, and south Moravia, which are, actually, quite similar from a demographic point of view to Wales in that regard. As you were suggesting, they are quite diverse—the roles and responsibilities of those. But I think the one thing that is clear from that work and the operation of those national innovation bodies is it is an arm's-length advisory body into Government, and that seems to be a successful model that we see. There is a variety in this, but we do see there is real value in not only having a strategy aspect to it, but also a delivery aspect to it as well. So, that is certainly where we're thinking is, really, the appropriate kind of implementation.

[161] Early stages—because we want to do some further work on what it would look like practically, and that's the work that we're just about to commission further—are to say, 'Okay, so what would it be? How would it act? What would its governance be?', effectively. But, certainly, we already have the starting point about what it would want to do. Now, as we said earlier, and I think Adam mentioned it himself, the council hasn't just focused on business innovation, it's focused on public sector innovation as well. So, it is important that, through that, we do make sure that it doesn't become too thin, which I think is what you're pointing to, in its operation.

[162] That is, actually, a point—we often talk about branding, and I mentioned it earlier, because it's quite important that, if we are going to establish something, its roles, its responsibility and its posture out to the international community is quite clear in that regard. So, we have some ideas about how we would like to do that. We're quite keen, as I said, on the public sector one, and we're already getting some very interesting ideas and traction from that community in some of the ideas the team have put forward already. So, I do think one of the things we will do over the immediate period is actually define more explicitly what its role will be and, therefore, what outcomes it'll be producing and the impact it will therefore get.

[163] **Mr A. Price:** I ategu'r hyn roedd Ian yn dweud yn awr, rwy'n meddwl ei bod yn bwysig i ddiffinio arloesedd mor eang ag sy'n bosib. Mae hynny yn cael ei adlewyrchu yn strategaeth Llywodraeth Cymru. Hynny yw, mae yna duedd yn **Mr A. Price:** To endorse what Ian was just saying, I do think that it is important to define innovation as widely as possible. That is reflected in the Welsh Government strategy. That is, there is a tendency, traditionally, to think of innovation as

glasurol, felly, i feddwl am arloesi fel rhywbeth yn ymwneud â thechnoleg a gwyddoniaeth yn unig a hynny wedyn yn cael ei droi i mewn i gynnyrch masnachol. Wrth gwrs, mae hynny'n elfen gref a phwysig, ond nid yw'n cyfleu'r darlun cyfan, oherwydd, fel oedd lan yn dweud, mae arloesi mor greiddiol bwysig i'r sector gyhoeddus—sut ydym ni'n mynd i fynd i'r afael â'r holl heriau mawr rydym ni'n wynebu o ran delifro gwasanaethau cyhoeddus o dan y gwahanol fath o wasgfydd sydd arnom ni, ac, wrth gwrs, arloesi cymdeithasol hefyd, sydd yn fwyfwy, yn ystod y cyfnod diwethaf, wedi dod i'r brig. Rwy'n credu bod cyfle fan hyn i Gymru arloesi o fewn arloesi, os mynnwch chi. Hynny yw, i greu'r corff arloesi cenedlaethol cyntaf sydd yn dod â'r tri pheth yna ynghyd: arloesi busnes, arloesi cymdeithasol, ac arloesi o fewn gwasanaethau cyhoeddus, oherwydd maen nhw'n gallu bwydo ei gilydd.

[164] Y ddwy farchnad sydd yn tyfu cyflymaf yn y byd datblygedig ar hyn o bryd ydy iechyd ac addysg, oherwydd, pan fo'ch incwm yn codi, yn gyffredinol, beth rydych chi'n gwario mwy arnyn nhw yn aml iawn ydy addysg ac iechyd. Mae yna gyfle economaidd fan yna. Hynny yw, pe bai Cymru yn rhagori yn y pethau hyn a phe bai Cymru yn troi yn rhyw fath o *test bed*, os mynnwch chi, ar gyfer arloesi o fewn y sectorau iechyd ac addysg, mae yna farchnad fyd-eang i ddatblygu busnes, allforion ac yn y

something to do with technology and science alone and that's then turned into a commercial product. Of course, that's a very important component and element of it, but it doesn't give you the full picture because, as lan said, innovation is so crucially important to the public sector—how we get to grips with these big challenges that we're facing in terms of delivering public services under the different pressures that we face, and, of course, there's social innovation as well, which has increasingly come to the fore during the latest period. I do think that there is an opportunity here for Wales to innovate within innovation, if you will. That is, to create a national innovation body that will be the first to bring those three things together: innovation in terms of business, social innovation, and innovation within public services, because they can feed into each other.

The two markets that are growing fastest in the developed world at present are health and education, because, when your income increases, generally speaking, what you spend more on very often are education and health. There is an economic opportunity there. That is, if Wales were to excel in these things and if Wales were to turn into some kind of test bed, if you will, for innovation within the health sector and the education sector, then there is a global market to develop

blaen ynddi. Felly, rwy'n credu bod yna gyfle inni greu, efallai, yr asiantaeth arloesi eang cyntaf yn y byd.

[165] **Rhun ap Iorwerth:** Mae hynny, mewn ffordd, yn clymu i mewn i beth oeddwn i'n mynd i ofyn fel cwestiwn nesaf yn deillio o'ch tystiolaeth chi. Hynny ydy, sut mae'r cyngor yn, ac rwy'n dyfynnu,

[166] 'hyrwyddo Cymru fel cenedl nodedig a chysylltiedig a phartner gwerthfawr ar gyfer prosiectau ar y cyd'?

[167] Hynny ydy, mae arloesi mewn arloesedd yn rhywbeth rydych chi'n trio gwerthu i'r byd fel rhywbeth y mae Cymru yn gallu neu yn dymuno ei wneud.

[168] **Mr A. Price:** Rwy'n credu, gan ddefnyddio'r gair hyll yma sy'n cael ei ordddefnyddio, 'brandio', bod cyfleu natur unigryw Cymru a chynnig Cymru i'r byd mor greiddiol bwysig. Rydym ni wedi ei wneud e yn y gorffennol yn llwyddiannus iawn am wlad fach ac mae eisiau inni feddwl am beth yw ein brand arloesedd ni. Byddwn i'n dweud, 'Beth am inni droi'r hyn sy'n cael ei weld yn draddodiadol fel gwendid, hynny yw'r ffaith bod gennym ni, ar hyn o bryd, sector cyhoeddus sydd yn gymharol fwy fel cyfran o'r economi na llefydd eraill—? Wel, beth am inni droi'r gwendid yna yn gryfder? Hynny yw,

business, exports and so on in. So, I do think that there is an opportunity for us to create, perhaps, the first wide-ranging innovation agency in the world.

Rhun ap Iorwerth: In a way, that ties into what I was going to ask as my next question arising from your evidence, which is, how does the council, and I quote, promote

'Wales as a distinctive and connected innovation nation and a valued partner for collaborative projects'?

That is, innovating within innovation is something that you're trying to sell to the world that Wales is able or wishes to do.

Mr A. Price: I do believe, using this awful word that is overused, 'branding', that conveying the unique nature of Wales and Wales's offer to the world is so crucially important. We've done it very successfully in the past for a small country, and we do need to think about what our innovation brand is. I would say, 'Why don't we turn what has been seen traditionally as a weakness, that is that we have, at present, a public sector that is relatively larger as a proportion of the economy than in other places—? Well, why don't we turn that weakness into a strength? Why don't we excel in terms of

beth am inni ragori o ran arloesi yn iechyd, addysg ac yn blaen?’

innovation in health, education and so forth?’

[169] Felly, mae syniad yma o Gymru fel *test bed*. Mae rhywbeth am wledydd bychain, sydd yn eu gwneud nhw yn addas iawn ar gyfer y math yna o beth. Mae Seland Newydd yn aml iawn yn cael ei ddefnyddio gan gwmnïau telegyfathrebu er mwyn treialu pethau mas. Felly, mae gwledydd bychain yn gallu ffeindio rhyw fath o *niche*, ac mae yna enghraifft dda ichi'r wythnos yma. Mae lot o gyhoedduswydd wedi bod, erthygl yn *The Guardian* ac yn y blaen, am Brifysgol Caerdydd yn creu'r parc gwyddoniaeth gymdeithasol cyntaf yn y byd. Mae pawb yn gyfarwydd â'r syniad o barc gwyddoniaeth, ond dyma'r *social science research park* cyntaf yn y byd. Mae'n syniad tebyg iawn i'r parc gwyddoniaeth ond ar sail gwybodol gwahanol iawn. Mae hynny'n rhywbeth mae Cymru mewn lle da i ragori ynddo fe. Caerdydd ydy'r brifysgol sydd ail neu gyntaf o ran rhagoriaeth yn y gwyddoniaethau cymdeithasol.

So, there's an idea here of Wales as a test bed. There's something about smaller countries that makes them very suitable for these kinds of things. New Zealand is very often used by telecommunications companies to trial things. So, small countries can find some kind of niche, and there is a good example this week. There's been a lot of publicity, an article in *The Guardian* and so on, about Cardiff University creating a the first social science park in the world. Everyone is familiar with the idea of a science park, but this is the first social science research park in the world. It's a very similar idea to the science park, but with a very different knowledge base. That is something that Wales is in a very good position to excel in. Cardiff is the second or the first university in terms of excellence in social sciences.

[170] Felly, dyna'r fath o beth, rwy'n credu: meddwl ychydig bach yn greadigol a pheidio â threial mynd ar ôl yr un hen farchnadoedd â phawb arall, jest ffeindio mas ble mae Cymru, efallai, â rhyw elfen o *niche* lle rydym ni'n gallu creu naratif o ran brand sydd yn gredadwy ac sydd â rhyw fath o seiliau cadarn iddo.

So, I think that that's the kind of thing that we can do. We can think a bit more creatively, and not try to pursue the same old markets as everyone else, but find out where Wales, perhaps, has some kind of niche element to be able to create a narrative in terms of a brand that is credible and that has some kind of firm foundation to it.

[171] **Rhun ap Iorwerth:** What kind of work has your group been able to do on that already, in terms of the position in Wales?

[172] **Mr Menzies:** So, one of the work group areas that the council identified very early on was a collaboration piece, in fact, actually, and that's both national and international collaboration. So, we've already come up with some ideas about that. I mean, clearly, the report we've had about areas, regions and innovation regions at the moment, which we've just talked about, does stimulate that. We do see that there are real opportunities for these collaborations, which become, you know, like a multiplying effect and then started opening up new, international avenues for some of our thinking and, therefore, greater collaboration, effectively. So, that's one thing we're very keen on, and I guess the work that we've just done on the national innovation body has just amplified the possibilities for that, in fact.

11:15

[173] **Rhun ap Iorwerth:** Thanks.

[174] **William Graham:** Could you tell us a bit about your relationship, or of the working group that you've had, with the Welsh European Funding Office, and how that has helped to tailor any particular projects?

[175] **Mr Menzies:** Yes. We were very pleased. WEFO did approach us, looking for the council to support them on some of the evaluations of the projects that they were doing. We have already had either two or three—I think it's a couple—meetings with them, where they've brought to us specific projects from an investment point of view that they were looking at, really to make sure that—. And so, we had sub-groups that were actually supporting WEFO in that regard, to actually look at the projects and give some views and feedback from that. Certainly, the feedback we've had has been very positive, and WEFO have asked to maintain that engagement going forward, which we're delighted to do.

[176] **William Graham:** Would you like to expand on the impact of the innovation dashboard Wales?

[177] **Mr A. Price:** Yes; it's early days in the project. I think they've just appointed a data scientist, a data visualisation expert, who is going to be based in Cardiff University. As I was referring earlier, really, we have to be

innovative in trying to actually use new data sources. A lot of it is about using big data—to use, again, one of these jargony words. Essentially, we live in a universe of information that, when I was doing economics at Cardiff University 25 years ago, we could only dream of. Economics was essentially built out of the necessity to aggregate information, to clump things together that actually probably didn't belong together because they were very different. Now, we actually have the opportunity to disaggregate everything. We can actually drill down to the level of the firm and the individual in a way that we were never able to do before. But that isn't, at the moment, reflected in the very old-fashioned economic statistics that we have.

[178] We have this thing called 'standard industrial classification'; it exists at different levels of aggregation. So, you can go down to around about several thousand codes, but even those codes of sub-industries actually, as I was saying earlier, don't reflect what those people in those companies think they're actually doing. So, in big data, for example, there are loads of companies in and around Cardiff and elsewhere in Wales that absolutely believe they are working in the big data industry; you won't find that in the standard industrial classification codes. But there are ways in which we can use the different forms of data that are available in very, very innovative ways. So, if you're looking at the digital industry, one of the things that people use is Meetup, for example, to get together to talk about things that are of interest to their particular commercial sector. So, you can begin to map that, and you can actually use, yes, Twitter and a whole range of innovative sources, which allow you—. You can look at job advertisements, as most of them are online these days, they're not in the pages of the *Western Mail*. If I can see what people are recruiting for, then I can actually build up a much better picture, a more current picture of the industries that are out there.

[179] So, in answer to your question, what we're doing is using all these different data sources to create a picture, a map—a live map, a current map—showing us what are our key innovative sectors in Wales, where are they, geographically, what sectors are they related to, and where are the gaps, as well. That's an incredibly useful policy tool, because if you think, as elected Members and as decision makers, about an emerging sector, you could be able to say, 'Right, we've got good companies emerging in this sector, but we don't have a large multinational company. Let's go after a large multinational company that can actually plug into this innovation ecosystem'. I think the project aims to deliver by 2017, and Wales will be the first in the world to have built that. Many people have talked about this in

theory; I shouldn't say this, but another region was very, very keen to get there first, but Wales got there first, and it's great to see in innovation that we're beginning to see a pattern of world firsts in Wales, which I think will set us in a very, very good position in years to come, hopefully.

[180] **William Graham:** Thank you. Mick and then Dafydd.

[181] **Mick Antoniw:** Just one thing; you've touched on a number of things, and you started touching on the issue of perception of Wales, and, of course, within the international market of how Wales is actually perceived. It's all very well having all these growths of innovation taking place, but to some extent it's also how we're perceived as a country that's at the forefront of excellence and innovation, and so on. What do you think we should be doing or what are we doing wrong in respect of how we present Wales within that world economy of innovation and development?

[182] **Mr Menzies:** Just picking up from the dashboard piece that we were just talking about, in that regard, one of the debates we've had at council is about what are our unique selling points, and therefore what we truly believe that we should be representing internationally as those key components that we have the right to, effectively, extol as being our discriminators in the market. So, certainly, we're keen to make sure that we do that. We talked about the semi-conductor work earlier and the precision medicines side of things, and I think we truly have unique world-recognised capabilities in that regard. I think that's part of the challenge at the moment; we've tried to maybe spread ourselves too thinly in that regard, and therefore people have got confused about what is brand Wales from an innovation point of view. So, I think one of the things we're very keen to do is really focus on—going back to the point about not focusing too much—but focusing on the things that we can really make a difference with, and build upon, effectively. So, I think that's really one of the things that we would be quite keen on, hence we talked about the collaboration and branding work group that we have. Well, that was deliberately done with that in mind—to work out how do we really go to the world and extol why Wales is really this hotbed of innovation.

[183] **Mick Antoniw:** Do you think it's a missed opportunity? I mean, it's a horrible phrase—'branding'—but it's about putting over the image of what you have to offer and what your potential is.

[184] **Mr Menzies:** Yes. So, if you want businesses to come to Wales, then you truly have to have those discriminating reasons for them to choose that.

I think that's one thing that we just have to do a better job of—defining effectively, certainly from an innovation perspective, what our industry capabilities are here. So, I do think that's something that really does need to be—

[185] **Mr A. Price:** It has to be credible, and has it to be specific. I think the whole reason why this smart specialisation idea was developed across the whole of the European Union was the fact that every region, nation and city region was going after the same generic sectors. There was a point when everyone wanted to be in nanotech because, I don't know, they'd read an article in *The Economist* and thought 'That's the way to go'. Everyone adopted the green economy, as they should—there are massive opportunities there—but you've got to be more specific than that. It was a 'me too' kind of approach where everyone was trying to be the best in the same sectors. Well, you're never going to beat—. You know, if you're not one of the core cities, you're not going to beat them at those very generic areas, and what you should do, therefore—. This is common sense, but sometimes common sense isn't always reflected at a policy level. The idea is very simple; you need to find your niche areas where you have a competitive advantage—a discriminator, as Ian said—and that is the key. Then you can talk credibly and say 'Look, actually, we don't claim to be world class at everything, but we are world class at these things', and around that we can build an ecosystem and a cluster. That actually then leads to others, because you often see innovation jumping to the adjacent possible, so you build up world-class potential over here and, over time, you develop sectors around it as well.

[186] **William Graham:** Dafydd.

[187] **Yr Arglwydd Elis-Thomas:** **Lord Elis-Thomas:** I'm very grateful Rwy'n ddiolchgar iawn i Adam am ein hatgoffa am adroddiad Sir Paul Nurse a'i adolygiad ar gynghorau ymchwil y Deyrnas Unedig. Rwy'n meddwl mai'r frawddeg fwyaf allweddol i'r drafodaeth yma'r bore yma ydy hon: to Adam for reminding us of Sir Paul Nurse's report and his review of the research councils in the United Kingdom. I think that the most crucial sentence to this discussion this morning is this:

[188] 'It is recognised that there is a need to solicit and respond to distinct research priorities and evidence requirements identified by the devolved administrations.'

[189] Yn hwnnw, rwy'n meddwl bod In that, I think that there is a very

yna gyfle pwysig iawn i ni i gydweithio gyda'r argymhellion newydd sydd yn adroddiad Nurse ynglŷn â'r cynghorau ymchwil, a gweld sut y gallwn ni, drwy hynny, gynyddu ymateb adeiladol i ofynion ymchwil penodol a fydd wedi cael eu diffinio yng Nghymru. A fyddet yn cytuno ag hynny?

[190] **Mr A. Price:** Byddwn yn cytuno 100 y cant. I fynd yn ôl at yr enghraifft benodol y soniais amdano gynnu, sef y parc gwyddoniaeth gymdeithasol yma sydd yn cael ei adeiladu fel rhan o'r hyn y mae Prifysgol Caerdydd yn ei alw'n system arloesi newydd, mae'r cyngor perthnasol—yr ESRC yn y cyd-destun hwn—wedi mynegi diddordeb mawr, wrth gwrs. Hynny yw, nid oes unrhyw un o fewn eu cyd-destun nhw wedi arloesi trwy greu'r math hwn o adeiladwaith ffisegol ar gyfer ymchwil ac arloesi. Hwyrach, efallai y byddai ganddynt ddiddordeb mewn cyd-fuddsoddi ynddo. Dyna, rwy'n credu, yw'r meddylfryd sydd ei angen—meddylfryd o bartneriaeth ac o weithio gyda nhw i weld sut rŷm ni yng Nghymru, gyda'r saith cyngor ac o dan y ffurfafen newydd—os mai dyna'r cyfeiriad rŷm ni'n mynd tuag ato—yn gallu helpu nhw i gwrdd â'u nodau nhw ar draws y Deyrnas Gyfunol. Beth sydd gan Gymru i gynnig o ran creu'r cyfleoedd unigryw yma? Dyna'r math o feddylfryd adeiladol y mae'n rhaid i ni ymgymryd ag ef a, thrwy hynny,

important opportunity for us to collaborate with the new recommendations that are in Nurse's report in relation to the research councils to see how we can, through that, increase the constructive response to specific research requirements that will have been defined in Wales. Would you agree with that?

Mr A. Price: I would fully agree with that. To go back to the specific example that I referred to earlier, namely the social science park that is being built as part of what Cardiff University is calling a new innovation system, the relevant council—the Economic and Social Research Council in this context—have expressed a great interest, of course. Nobody within their context have innovated by building such a physical infrastructure for research and innovation. Perhaps they would be interested to co-invest in it. So, I think that's the kind of thinking that's necessary—this thinking of partnership working and of working alongside them to see how we, in Wales, with the seven councils and under this new firmament—if that is the direction in which we are going—can help them to meet their aims across the United Kingdom. So, what does Wales have to offer in terms of creating unique opportunities here? That's the kind of constructive thinking that we need to engage in and, through that, I think that there will be opportunities for

rwy'n credu bod cyfleoedd i collaboration.
gydweithio.

[191] **Lord Elis-Thomas:** I have one related question—I can't let this opportunity pass—on IBERS, in which, obviously, I have an academic interest, in Aberystwyth and in Bangor and the new investment there. This seems to me to be the major investment that we've had in the field of food and agriculture sciences, relating to climate change and all of those issues. This is obviously something that you would support, as innovators, and you would seek more of and more development.

[192] **Mr Menzies:** Absolutely. We did discuss, certainly, the work that's going on in Aberystwyth with the Welsh European Funding Office when they came to us and the council and sub-council were supportive of that work—absolutely.

[193] **Mr Price:** It's a jewel in the crown—there's no doubt about it. It is a genuinely world-class, world-leading institution and has been for many, many years. I think that the challenge, in policy terms, is how can we make more of that and utilise it and exploit the opportunities that it represents. This isn't a criticism, in any way, of IBERS, but it's about how we can build an ecosystem around them: where are the commercial opportunities, for example, because of that massive knowledge base? It exists in other contexts. With the Office for National Statistics, we probably have more statisticians per capita now than in any other part of the UK and, actually, that's a huge economic opportunity because data scientists, as they're called now—that's the sexy term for statisticians—represent huge sectors of the economy because of big data et cetera. There's a knowledge base there that has some economic value. So, this is the mindset that we need to adopt: what have we got and what can we build around it? It's great to see the new science park developing in Bangor as well—

[194] **Lord Elis-Thomas:** In Ynys Môn.

[195] **Rhun ap Iorwerth:** His university; my island. [*Laughter.*]

[196] **Mr A. Price:** I was referring to the university affiliation, but I respect the comradely correction. [*Laughter.*] But also, quite rightly, trying to relate itself to the unique resources that pertain to the local economy as well as to the university itself in terms of the energy sector and other sectors.

11:30

[197] **William Graham:** Jeff, did you have a question on this one?

[198] **Jeff Cuthbert:** I think, to a degree, it's been dealt with. But, about international co-operation, you mentioned several times now the role with WEFO. What similar schemes or projects are you co-operating with across Europe, or indeed further afield?

[199] **Mr A. Price:** Further afield, the Welsh Government has joined the regional entrepreneurship acceleration programme, which is actually run by a Welsh woman out of Cambridge, Massachusetts, in the Massachusetts Institute of Technology. It is seen as a world-leading programme, in terms of how you raise your innovative and entrepreneurial capacity. So, the 'e' in the REAP is entrepreneurship, but there's a very strong relationship, as we know, between innovation and entrepreneurship, and it's very fortunate that Wales has been able to join this second wave of nations and regions that are looking to learn from the best and looking to learn from each other about how you actually upgrade your economic capacity. So, I think that's a great example of thinking internationally, developing these collaborative international networks, and working with some great global institutions like MIT. It's the kind of approach that I think should be adopted in every area, and it's very, very good to see that we've joined the next cohort.

[200] **Mr Menzies:** There are only a few regions and countries that are actually invited on an annual basis, so I think that's quite a coup for Wales, in fact.

[201] **William Graham:** Oscar, on this point.

[202] **Mohammad Asghar:** Thank you very much, Chair. You mentioned New Zealand and telecommunications. We know how Nokia, the telephone, came into being; they just wanted to protect their forests, and that was the greatest invention of the last century, or this century rather. So, what is your specific—? Because you've few people and limited resources, and you can't achieve everything. You mentioned the social science park and all of that. What is your specific area in Wales to develop on the line of the Scandinavian pattern I mentioned, where they want to protect certain areas? Lord Elis-Thomas just mentioned the environment, or it could be education or social sciences. Which is your specific area for Wales to develop innovation?

[203] **Mr Menzies:** We've touched upon a few areas. I think the important thing is to make sure that, when we do definitively answer that question, we actually understand why and we have a clustering around it. I think that's the thing. We need to bring—. Certainly, what we've seen, from a council point of view, is a need—. There's lots of really great innovation going on across Wales, but it's in islands, as I call it, effectively, and there's a real need to bring that together more collectively. We've touched upon some of the specific areas already; we talked about the compound semi-conductor areas. So, talking about where we really have a right to promote capability nationally and internationally, as we've said, we've talked about precision medicines, and, obviously, the centre of excellence that Innovate UK have now committed to here is a great coup as well.

[204] So, there are areas that we would certainly pick out—ICT; we talk about the cyber security side of things—but we're nervous about going on and saying, 'These are the only ones at the moment'. So, we haven't done that; we're doing some work at the moment to really work out what we think are those real exemplars, effectively, which is what you're asking for: what are we actually promoting? I don't think it's right that we will actually get to pick and discriminate others by just having a specific list at the moment. I don't think we've got to that maturity where we just say, 'These are the top five areas that we would particularly focus on at the moment.' We have a view, and I think we need to mature that view at the moment. And I do think that we shouldn't be shy from picking a smaller number, as opposed to—your point—trying to be too wide in that regard.

[205] So, I've alluded to two or three of the ones that we would put forward, with justification, in the first instance. But I do think there are other areas where we do need to just test that decision as well before we go and promote it to the extent we've talked about today, in fact.

[206] **Mr A. Price:** Ian's right; I think we have to be evidence based in trying to ascertain where our competitive advantage lies. We don't have all the evidence that we need yet. We're doing something about that. So, we may or may not be coming back to the committee, but maybe there'll be another opportunity where we can share that with you. We all have our theories and our hunches. Ian mentioned cyber security. There's a major potential customer just over the border in Cheltenham. Certainly, there are reasons why, and, with a historical involvement in the defence and security industries, there's a reasonable basis for that theory. But we'd need to test it.

[207] I mentioned big data: we've not only got ONS, we have Companies House and the Intellectual Property Office here. We are the big data super-cluster in Government. Surely, we should be able to turn that into economic innovation. There are other opportunities as well. If you think about education, Wales is the perfect scale for working with digital technology companies that want to develop new products using technology to close the attainment gap. There's something about small countries that are big enough for you to do something significant—it's a big enough test bed for you to have plenty of data, but it's small enough to be manageable. So, I think that's the kind of approach.

[208] Some of the answers will come from the new dashboard that we're developing and there'll be some surprises in there, by the way, or we'll be very disappointed—there'll be some sectors that we didn't even know about that are actually there, and there'll be others where it might be the case that it's worth making a strategic bet on, because we think, 'Well, actually, we have some of the infrastructure or the resources available, let's actually concentrate our resources and try and create a platform for innovation in those sectors'.

[209] But we don't have all the information. It would be wrong to try and misdirect you today because—we're working on it, but we don't have the answers yet.

[210] **William Graham:** Thank you. And our concluding questions, Mick.

[211] **Mick Antoniw:** No, thank you.

[212] **William Graham:** You're happy with that. Just one for clarification, really—you've given us a great idea of how your council operates and how you have hopes for the future. In terms of those sectors that are always after finance, both in terms of capital and revenue, you wouldn't expect them to approach you directly, would you? Or would you?

[213] **Mr Menzies:** As of today—we talked about the national innovation body both from a policy point of view and from a delivery point of view. If the ultimate conclusion for it is that it would do both of those roles, effectively, then you would expect resources to be provided as part of a delivery organisation under the remit from the Government.

[214] **William Graham:** The committee is interested in what you're doing,

but, at a constituency level, all of us get concerns from various firms who are perhaps a little bit tired of the bureaucracy, which they find time and again when they're seeking various grants for innovation, expansion, et cetera. Could you be different?

[215] **Mr Menzies:** Certainly, it's quite interesting the feedback we've had from the first phase of the initial assessment work. So, successful regions, from a national innovation point of view, the reason they're successful is because of the agility they're able to provide and the decision making they're able to provide, which is why we talk about an arm's-length body that is empowered, effectively. It's a very good point. I think the trick is—and, as I said, the positive exemplars are ones that can actually bring more agility to that decision-making process. So, that's what we would look to do. So, the next piece of work is quite important in that regard, where we actually say, 'Well, what's the Government's regime around it? What are its powers? What are its decision-making powers?', which plays exactly into the point you're raising there.

[216] **Mr A. Price:** One of the reasons that not as many businesses invest in innovation as we would like is that innovation, by definition, involves risk. It involves doing something that you haven't done before in a different context. I know this from personal experience. It's part of the high-risk, high-return formula. That's the nature of the game. When it's successful, of course, then you reap the benefit. Part of the policy challenge is to lower the threshold of acceptable risk for a greater number of companies. Large companies have deep pockets. They have what innovation experts in Harvard and the Massachusetts Institute of Technology call 'slack', which is, 'Go and work on this'—you know, there's a team of five—'Go and work on this for six months. Hopefully, something will come of it, but if it doesn't we're not going to go bust.' Small and medium-sized enterprises, even medium-sized enterprises in Wales, don't have that luxury and, therefore, they have to be more careful. They see the opportunity, they have knowledge that they could turn into new products, but could they afford to take that risk?

[217] So, I think that the role of the national innovation body—. There are different ways you could do it, but one example of what the Basque Country did was invest in a network of research and technology centres that, essentially, do the innovation projects with you and for you on a sort of a co-funding basis. So, on average, they get a third of their money from the Basque Government, they get a third of their money from EU sources, Horizon 2020, and a third of it is paid for by their private sector clients. So,

effectively, I'm an SME, I'm only paying a third of the cost and I'm getting 100 per cent of the value, and that changes the risk profile because I'm then only losing 30 per cent. That has been hugely successful. Remember, the Basque Country was a kind of a laggard in terms of innovation. It's now seen as leading the pack in many ways. So, I think there are ways in which we can solve this problem and, yes, do it in a less bureaucratic, more agile way, which is one of the reasons—. These national innovation bodies are executive bodies of Government. It's important to have that umbilical cord because there are things that only Governments can do. But the arm's-length nature means that you can move a little bit quicker and, possibly, in a more business-like way than you are able to once you are within the heart of the Government civil service, with all the understandable rules and regulations that have to come with that.

[218] **William Graham:** Quite so. One of the things that surprised me, talking to the executives of a large international firm, was that, not only were they in competition with their obvious competitors, but, because they were an international firm, they were having difficulty accessing finance from their parent company because there were other parts of the group that were making broadly similar products in other parts of the world. In order to make their concern more viable, they were looking directly, as you say, at innovation in improving their product, but finding the access to capital difficult. But the timescale was reducing all the time. So, something like your council being able to take—. This is an anchor company and was very keen to hear of help.

[219] **Mr Menzies:** I can speak from experience in that regard, from General Dynamics as an anchor company in Wales, of course. In the same vein, actually, we looked on Wales very positively from the levers that were available to do that. I think we don't recognise the benefits that can be brought from those levers that are available. The open innovation piece of funding that was available to those companies was hugely useful for myself in General Dynamics. We were able to bring a lot of small and medium enterprises along with us in that process as well.

[220] **Mr A. Price:** I think it's a very strong point you make, Chair, that, actually, the multinational companies that we have we want to retain in Wales. Actually, working with the local management of those multinational firms in helping them win the internal competition, if you like, to create the next wave of products is critically important. Of course, we are familiar with the Sony example, where they had to completely change their focus. They

have done so terrifically, and they are one of the most profitable parts of the entire organisation. It shows what can be done. But, yes, working with multinational companies on their innovation pathways is going to be very, very important as well in the future.

[221] **William Graham:** Well, thank you very much for your attendance today and for the way you have given evidence, stimulated our questions and answered them so very well. Thank you for your attendance.

[222] **Mr A. Price:** Diolch.

[223] **Mr Menzies:** Thank you very much.

11:45

**Papurau i'w Nodi
Papers to Note**

[224] **William Graham:** Can I ask Members to look at item 4, please: papers to note? Any questions on those? Okay, thank you.

**Cynnig o dan Reol Sefydlog 17.42 i Benderfynu Gwahardd y Cyhoedd o
Weddill y Cyfarfod**

**Motion under Standing Order 17.42 to Resolve to Exclude the Public
from the Remainder of the Meeting**

Cynnig:

Motion:

bod y pwyllgor yn penderfynu that the committee resolves to gwahardd y cyhoedd o weddill y exclude the public from the cyfarfod yn unol â Rheol Sefydlog remainder of the meeting in 17.42(vi).

accordance with Standing Order 17.42(vi).

Cynigiwyd y cynnig.

Motion moved.

[225] **William Graham:** So, then, item 5: I move a motion under Standing Order 17.42 to resolve to exclude the public from the remainder of the meeting. I see agreement. Thank you very much. The meeting is now closed.

*Derbyniwyd y cynnig.
Motion agreed.*

*Daeth rhan gyhoeddus y cyfarfod i ben am 11:45.
The public part of the meeting ended at 11:45.*