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HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON SCIENCE AND INNOVATION

Reference: Business commitment to research and development in Australia

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HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON SCIENCE AND INNOVATION

Monday, 11 November 2002

Members: Mr Nairn *(Chair)*, Ms Corcoran, Mr Martyn Evans, Mr Forrest, Ms Grierson, Mr Hatton, Mr Lindsay, Mr Tony Smith, Mr Ticehurst and Dr Washer

Members in attendance: Ms Corcoran, Mr Forrest, Ms Grierson, Mr Lindsay, Mr Nairn and Mr Ticehurst

Terms of reference for the inquiry:

To inquire into and report on:

The international comparisons indicate that while the public sector in Australia supports R&D at an impressive level, business investment is less impressive.

With particular consideration of:

the R&D drivers in small and medium sized business;

the needs of fast-growing companies; and

the considerations by which major international corporations site R&D investment,

the committee seeks to address three questions.

What would be the economic benefit for Australia from a greater private sector investment in R&D?;

What are the impediments to business investment in R&D?; and

What steps need to be taken to better demonstrate to business the benefits of higher private sector investment in R & D?

WITNESSES

Committee met at 4.43 p.m.

LLOYD, Mr Morris Grahame, Executive Manager, Strategic Development, Grains Research and Development Corporation

CHAIR—I declare open this public hearing of the science committee's inquiry into the commitment by business to research and development spending in Australia and welcome the representative from the Grains Research and Development Corporation.

I wish to point out that, while this committee does not swear in witnesses, the proceedings here today are legal proceedings of the parliament and as such warrant the same respect as proceedings in the House. The deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public but, should you at any stage wish to give evidence in private, you may ask to do so and the committee will give consideration to your request. Before we ask questions, would you like to make an opening statement?

Mr Lloyd—Yes, thank you. I might just highlight that my introduction to the agriculture and agribusiness R&D field was only three years ago. I came from a different sector and I was very taken aback to discover the depth of antipathy to business processes and to business, the misconceptions, and how pervasive and damaging those antipathies were. I have spoken a little about that in my submission.

I have also touched on what I believe to be very important issues that go to the heart of some of the misconceptions around the issue of public good; around the issues of basic versus applied science; around the issues of what competencies we need to work with private capital and to develop public/private partnerships; and around the issues of market failure and so-called crowding out, which are common amongst the R&D community in Australia where a lot of our research is within the public sector.

I have begun to outline in the submission the implications for policy as well but I might just add one or two additional areas, because it is an ongoing discovery and exploration for me to think through some of these issues. I was looking today at the recent national survey of research commercialisation, but I was already alerted to it through some press coverage, and it reinforced my perception that there is a problem. I think there was an article in the *Canberra Times* to the effect that 'report card measures our R&D success'. It was purporting to claim that the so-called myth that we are good at science and poor at business had been exploded. I found the content in that report as quoted established quite the opposite, and the fact that it was being headlined in that sort of manner indicated the sort of misconception at the most senior levels that I talk about. That report was released yesterday.

What that report indicates is that we are high in patenting behaviours, we are high in start-ups but we are low in what is called 'bang for the buck'; that is, revenue or other tangible value creation. That does not surprise me at all because I know there is a lot of behaviour aimed at patenting and start-ups. I find there is quite a preoccupation with the start-up spin-off model universally in Australia amongst scientists and public sector science managers.

But I think the start-up spin-off model is a high risk model. It is often an inappropriate model. It tends to attract venture capital rather than other forms of capital which has lower capital

return expectations than venture capital and might have longer commitments to a particular field of scientific endeavour. So the fact we are high in start-ups to me is a concern, not a measure of a KPI. It highlighted for me that we are measuring the wrong things. To measure patenting behaviours and to measure start-ups, I think, is a recipe for going in the wrong direction. I think more appropriate performance measures can be thought about, and we might come to that if it is an area of particular interest.

I talk quite a bit about corporate governance in relation to what we need as a framework for development of public/private partnerships in the science and business area. There are many areas we could advance in the policy arena. More specifically, since writing that submission, I have spent a bit of time looking into some of the incentives and structures around our universities and the grant allocation system there. It really is quite extraordinary to consider that, with the research infrastructure grant blocks, which is a major incentive and driver of behaviour, as well as the IGS system, it depends on two features to deliver additional dollars to the universities.

First, it depends on a competitive and open process, which is very much the feature of the old grant allocation paradigm for doing these things, if you like. Of course, business, if it is going to be potentially post-competitive research, if it is looking for a relationship with academic institutions or scientists, will not be oriented towards a competitive, open process. It will be looking to build stable, strategic alliances based often on commercially sensitive undertakings.

Secondly, those sorts of grants are dependent on the money going to the academic entity through the university's accounts rather than being in any entity that has been created to hold the assets or the interests of a partnership between a university and a private company. So we have there another example of a major driver for restraining Australian partnerships between science and business through our leading academic institutions. I could go on but I think I might leave it there.

CHAIR—Thank you. Just following that point a bit further, would you see a model where public funds went more to the business sector and they, in turn, employed the university sector to carry out specific research as something that would work better than it does currently, do you think?

Mr Lloyd—It is not so much that we would necessarily give funds to a private entity rather than a public research entity. I think it is always a case of looking at where we believe there is the best business case. But I think the way of the future will be more and more in some of those private and public sector partnerships where different assets and skill sets come together, and there are much closer relationships that help build in the market that everybody talks to.

Where public funds are going to a private organisation, it should be achieving one of two things: it should be either looking for a synergy, if you like, extra value that is created through those private and public funds coming together that can be captured back to the stakeholder benefit from where those funds came; and/or it should more specifically be purchasing a public good through what is not necessarily a public pathway.

CHAIR—How do we make those links from that? Probably one of the major things that has come up in this inquiry is that there are still the links and there are various programs—one

called the linkage program—that are all designed to do that, but everybody still sees that there just are not strong enough links between academia and business.

Mr Lloyd—I think by re-engineering the incentives in relation to the grant system, a lot can be done. Again, a focused development of corporate governance processes to ensure that those partnerships between public and private sector come together easily and are well managed will achieve a lot. But related to that, when we look at the CRC system and at the RDC organisations that I come from, you will generally find that these are run by people who are primarily scientists trying to learn how to deal with business and who just do not know how to do it. The focus keeps coming back to identifying and valuing intellectual property, which is a very small aspect of what is required to do it well. I think a targeted approach of putting people with those kinds of skills for interface into the private sector in senior and controlling positions of those organisations can achieve a lot.

CHAIR—Do you see some obstacles in getting some of the scientists out of the academic area into private enterprise for a period of time and then being able to go back? Are there disincentives to having that sort of thing happening easily?

Mr Lloyd—Probably the way I would answer that is to say that I think the opportunities for scientists to move from the public sector to the private sector or to alternative hybrid entities in Australia are perhaps not all that expansive, and I think that is related to quite a conservative culture and a conservative policy environment.

Mr TICEHURST—I have a question related to some of the barriers to the R&D grants, the applications. When you looked at it from a small business side, did you look at the issues relating to the high bar, as it were? I think before you actually access a grant, you have to spend about $20,000 in a year. Did you find any problems relating to that type of obstacle?

Mr Lloyd—Generally, the classic grants system tends to be quite a bureaucratically intensive and paper based, high-transaction sort of system. I am sure it has its place for some sorts of areas of endeavour. But what we are trying to do within the GRDC, for example, is to move to a situation where it is much more driven by business strategy to business strategy with links from executive managers to executive managers in different organisations. Once we find some areas of shared interest and some ways that some of our skills and assets might fit together, we are then bringing in the scientific expertise to begin to scope it up and create something from it.

By its nature, I think that is a very different sort of process that has different sorts of costs. But we worked out for our own organisation that the traditional grants system of operation was creating some 10 man years of work every year just to feed in to our processes and we are trying very hard to change that. But there is enormous resistance to changing a grant based system because I think it is sort of like—if I can use a bit of licence here—a poker machine addiction. Scientists seem to be quite attached to creating multiple applications for money in all sorts of areas and, if one does not pay off, the other does.

Mr TICEHURST—You also mentioned in your introduction that a lot of R&D was developed in relation to high start-ups and a high number of patent type applications and that this would also be a barrier to a lot of small companies getting going. But what about ongoing R&D, a company that is up and has been running for a couple of years and then they want to

move into some more R&D? Do you find there are restrictions within the grants system for these companies to get help to be able to process an idea further?

Mr Lloyd—There are two issues there that I get passionate about. Firstly, there is the extent to which our current incentives are aimed at the small start-ups, and I think that is inappropriate for reasons I would like to explore more. The other is that, when a private sector organisation is interested in accessing grant money, first of all, you have the barriers of the university incentives that will tend to mean it has to be open and competitive; it cannot be commercially sensitive; they cannot create a separate entity from a university to work through to hold any of the value that it has created. So that is a big barrier.

Secondly, many of those organisations that I come in contact with tell me that that 175 per cent tax incentive is quite hard to access. I do not have particular expertise in accessing those incentives myself but I am told by those who do that it is not all that easy. But, having said that, I am a bit sceptical of tax incentives and the figures that they generate as a measure of how successful we are, because I am sure if tax incentives are high, then businesses will tend to find activities that look like R&D and highlight them.

Ms CORCORAN—Firstly, I want you to expand a bit on the last point you wanted to make. Secondly, you talked about the number of start-ups and patents being not a good measure. What is a good measure?

Mr Lloyd—I think a measure would be more along the lines of how much revenue or other tangible value—because it may not be in a revenue form; it may be in an asset creation form—is being generated by organisations that carry Australian equity, either by way of a public investment or by way of a partnership investment. So you are really looking at the outcome end, how much is being generated as revenue through people being prepared to purchase some good, some product or service as an outcome of that.

The problem we have, for example, with the external earnings ratios and so forth in CSIRO is that what it was measuring was input sharing; that is, the extent to which different public sector organisations have been running around to each other—CSIRO coming to the GRDC and different sources of different pathways to public money and trying to pull together predominantly public money, sometimes with a bit of leverage. It certainly was not a measure of any outcome, any revenue, in the sense that people were prepared to purchase or pay for something at the far end. It was shared inputs. In shared inputs, strategic alliance is important but it is not a measure of value creation; it is not a measure of revenue. So you need some sort of measure that is looking at what is being valued by the market in some sense at the far end.

Ms CORCORAN—What was the other point you made in your last answer about the start-ups?

Mr Lloyd—Start-ups by their nature, particularly in Australia but less so in the US, will tend to access what I call inexperienced capital and/or they will tend to access venture capital, which has very high demands for a return of 20 per cent plus or more and will have a philosophy of quick exit—getting out early if things are not looking good. I think the reason they are popular is that it opens the opportunity for the scientists or those on the technical side to retain some control of how it is going, which is its appeal and at the same time its danger.

But I would like to contrast that to the extent to which you can take a piece of intellectual property or incipient intellectual property and take that to a company—whether it is a relatively successful Australian based company or it is a NuFarm or an international company does not matter—and start to explore the extent to which they have assets or underutilised plant or existing products in that market or some other business synergy that makes it very attractive for them to invest in that and take a share in its ownership. Because there is a possibility with that experienced capital for them to have a business synergy, they are likely to engage in it with lower expectations of short-term return and lower expectations of a high return.

Of course, you will only succeed in that, in capturing value back to Australian stakeholders, to the extent that you are a very savvy negotiator and just do not hand it away, which is what I find quite often happens because of the nature of the skill sets we have in these positions. All I am saying there is that, if you are working with an experienced, established capital base where you have existing positions in related areas, they are likely to make much better partners and lower risk partners than a group of individuals trying to attract venture capital in an academic environment.

Secondly, and related to that, part of the assets an established, experienced capital partner will bring to it is links through to customers and markets and market intelligence and knowledge that you will just never find in the classic academically oriented start-up.

Mr LINDSAY—Your submission was refreshingly different, if I might say so. You pretty well said that academia and business are mutually exclusive in this whole process, yet they need to be together. You went through all of the reasons why and so on. I have long held a view that you get people in research organisations who then decide to create a position called business manager but they do not have the first idea about what they should be doing. Do you see this yourself?

Mr Lloyd—Yes. That is what I am talking about.

Mr LINDSAY—How do you say to this committee, for our report, that the two need each other? What would you recommend that we recommend that we do to try to get people closer together and be effective?

Mr Lloyd—I think a clear articulation of what business competencies are necessary can be helpful, because if you talk to the typical business manager in a public science organisation, they will not be able to tell you anything more than identifying the IP. So first of all a shared understanding about what it is important to be skilled in other than that is important.

I think a commitment—although I am not sure how you might back it up in terms of policy and action—to find the people who are best at doing that sort of thing, wherever you find them in the world, and bringing them in to our own institutions, can go a long way. I think when you start to align that with changes in policy around the RIBG incentive structure so that you actually have a policy framework that encourages universities to create entities and partnerships with well established companies that allows money to go through without the need for there to be an open and public tender where there is a commercially sensitive technology involved can help. I think starting to measure different things and track them can help—

Mr LINDSAY—But are you saying that, perhaps from a public policy perspective, the government ought to facilitate bringing people into the system, knowing good people and placing them in research organisations. Is that what you are saying?

Mr Lloyd—Yes.

Mr LINDSAY—That is an interesting philosophy. What do you think the research organisations would think about that?

Mr Lloyd—They would not like it. This is where the cultural conflict would come to the surface. But people that you knew were good at taking technology to market, from wherever you found them in the world, could be brought in—those who had extensive networks into the kinds of organisations that you knew would be good at that.

Equally importantly, you need to know that when a domestically based company such as NuFarm or an international company such as George Weston Foods, which is one of the companies we have worked with, moves to form a partnership with a quasi-public sector or public sector source of money, there is a sort of slippery pathway to do that. You need to know that the incentives are put there; that the governance structure is there; and that they are not going to come up against a wall of difficulties and resistance as well as the cultural opposition that is likely to be faced.

Mr LINDSAY—So are you saying that, in backing innovation to bring it to the marketplace, you think people are more important than money?

Mr Lloyd—I am not sure if I would put it that way. I think having the right people is essential. I think having the right sort of money is essential, too—for instance, as I talked about before, not just all high return and short-term venture capital. I think having the relationships within business entities so that you have people with that business background actually working side by side with people with technical background is the key.

Mr LINDSAY—Who would manage a program to find the best people in the world and bring them in to Australia and place them where they need to be in order to be effective? What organisation, group or model—how would you do it?

Mr Lloyd—I could take the question on notice.

Mr LINDSAY—Chicken!

Ms CORCORAN—Are you suggesting that as a public policy action or are you making the point to us, as policy makers, that that is needed and then letting the organisations do it themselves?

Mr Lloyd—I think you could build an incentive structure, for example, to say if certain sorts of positions were created and there was a global search to find people who fitted certain kinds of competency profiles that maybe there would be some contribution to the cost of the salary. That might be one way of doing it. I am sure policy makers could think up enormous—

Mr LINDSAY—If we found these people and wanted to plug them in somewhere, what sort of organisation should we plug them into?

Mr Lloyd—You have those organisations that are leading the charge for public and private capital to work together. They are primarily CRCs, RDCs, CSIRO and probably some of the larger associated individual state organisations linked up to their state development departments or whatever it might be. I notice there is an Institute for Commercialisation starting up in Queensland, too. They would be the sorts of organisations you would target.

Mr LINDSAY—Okay, now think the other way around: as a matter of public policy, should we be plugging people with ideas, science people, into business and saying to business, 'Hey, think of these opportunities. You should be doing so and so'? Is it a two-way street?

Mr Lloyd—Yes. Let me give you an example from some of our own activities to try to give you some concrete examples. We have recently been through quite a controversial restructuring change of our wheat breeding system in Australia and we have created business entities rather than a system of passing grant funds through to state agencies, breeding centres, which is typically how it has worked.

For example, we have an entity that is a combination of GrainCorp, a grower owned private sector entity, the GRDC and Sydney University. It is a business entity so it can pay what it needs to pay to get the best breeders, or the best intellectual property from wherever it needs to get it, to get the job done. It has not been set up primarily as a for-profit organisation, though it may become that in the end. But, because of the way it is structured, there is now the opportunity to offer to the best breeders in Australia whatever salary is needed to get the best breeder from Canada. You cannot do that from within a public sector agency. There are a whole lot of other flexibilities and possibilities that come with that kind of innovative structure.

Mr LINDSAY—Okay, think about this: if the committee is going to recommend something like this, inevitably it comes down to a recommendation that a government department will do this, that and the other. Sometimes government departments are not terribly committed or effective in relation to that. What if the government got a private sector something or other and said, 'This is your task. You don't get paid unless you do this, go to it'? Do you think that would be a better model than a government department?

Mr Lloyd—Yes, it sounds better to me, although obviously there would be a certain amount of thought to go into that. But I cannot imagine this being something that would easily be championed by a government department—

Mr LINDSAY—No. Just one final question on another subject: I think you said that you are unhappy with research funding going through university accounts. Did you say that?

Mr Lloyd—I was saying if they have to go through university consolidated revenue to attract an incentive payment, that closes certain doors that will often be attractive to a private sector partner who may want to create some particular research institution or separate business entity.

Mr LINDSAY—So you are not complaining about how the universities run their accounts or they are taking money where they should not take it or whatever—

Mr Lloyd—I would not start shooting from the hip on something like that. What I am trying to say is that the existing incentive system closes the door. If a university wants to create, say, a partnership with an international company to establish a research institution that has a very applied charter and very tight performance indicators, it cannot because it will lose its RIBG funding. It has to go to the market and go through the tendering process.

Mr LINDSAY—You also said that we see in Australia systems that are high in start-ups and low in bang for the buck. Is that right?

Mr Lloyd—Yes.

Mr LINDSAY—Can you just tell me what you meant by that?

Mr Lloyd—I was referring to the consolidated output of this recent report that is called the *National survey of research commercialisation*. It was really what I had always suspected but it was nice to find that when we actually had a consolidated view of what was happening, that is what it showed. When that report looks at how Australia is performing relative to Europe or relative to the US, that is what it is finding—lots of start-ups, lots of patenting, but not much bang for the buck at the end.

Mr FORREST—I have two themes, Mr Chairman. I am interesting in pursuing the model of levies. GRDC is the prime beneficiary of the process by which disenfranchised growers of whatever commodity it is, whether it is grain, tomatoes or apples, somehow or other gain the confidence to put their money into a pool, the government then has the confidence to say, 'They are so committed; we will match that,' and down the track an outcome results in a new variety of something or other—that allows them to grow wheat in three-inch rainfall areas or something like that. That is a really good model that works so well in primary industry.

I think I asked this question once before of another witness: why couldn't that work in this new era of high-tech innovation? You have disenfranchised people everywhere; it then gives the government confidence to contribute some taxpayers' funds. It is a good model, I think.

Mr Lloyd—I think it is a good model and I think it is a model that needs to take the next step. It is a good model that was ideal for where you had something dominated by lots of small business owners, if you like, that needed to collectively make things happen that by their nature were big investments. However, to the extent that these sorts of models can be less conservative in how they interface with the business world, they can go a lot further. I think growers have been wary of doing that, because there is a history of it not being handled terribly well, quite frankly. I would be happy to give you some examples of how we are doing that, if you are interested.

Mr FORREST—In terms of the GRDC, the grain growers are traditionally cynical and all the rest of it but the benefits in the last 30 years are more than obvious, which they concede, and on the basis of that they will continue to invest in potentially new breakthroughs. Your organisation, in that sense, is a good model but I hear that it is not going to work in the fisheries in developing offshore fishing initiatives and in health and biodiversity and things like that. I want to know why, because there are still a lot of players out there.

Mr Lloyd—I think the GRDC has done well. It has the reputation for having done better than many of the other RDCs, but I do not think it will continue to do well unless it actually takes some further steps in how it does business. Legislatively, we are quite free to do that. But what I am saying is that while the traditional way of operating—of using collected levy funds to hand grants to state agencies to do research that then creates knowledge, which hopefully gets transferred to a grower through some communication tool—still has a place, has limitations in what it can achieve, particularly in an environment where state governments are tending to wind back investment in agricultural research in certain areas. The GRDC has done well, but I think all the RDCs are getting to a point where, unless they are a little more courageous, to coin a phrase, they may not keep doing as well.

CHAIR—Is there anything the government can do?

Mr FORREST—Just give us an example of how you want to see that advance.

Mr Lloyd—I will give you a couple of examples; I will not specify the names of the companies, unless we go in camera, but I will describe the kind of arrangements that we have had. There is one private sector company that GRDC is working with in partnership with us and an Australian university in a breeding related area. It is a project joint venture.

In developing that contract with them, we have developed the following kinds of arrangements. First of all, 50 per cent of our money, 50 per cent of private sector cash; that is cash leverage. I should explain that this is technology that could lead to different kinds of products from wheat in either the industrial applications area and/or the health food product area.

Mr FORREST—Starch or anything like that?

Mr Lloyd—Starch type things and industrial adhesives is one possible pathway. The other pathway is certain health attributes. We have veto power in that relationship with a company that has strong international links to provide that, if this is successful technology, it cannot be bred into a foreign cultivar without GRDC endorsement. So it is a very powerful contractual basis to hold it as an Australian value capture, if it is successful.

We have an agreement with this company that, if it should lead to any contract growing with Australian growers, they will get a premium above and beyond the equivalent AWB rate of the day, that they will get a yield compensation and that there will be a dispute resolution formula if growers are not really capturing the premium they should through this new kind of grain. There is an agreement in the contract that we have an option, as a right we may or may not exercise, where if it leads to these kinds of products, we can share in the investment of product development for a commensurate return back of product royalty on the customer shelf. So if this led to a new product that landed on a Japanese shelf, in some bakery or whatever, a portion of that product royalty—not an end-point royalty or a seed royalty—comes back to us and can then be reinvested in research or offset against levies.

Those sorts of benefits streams—and I could give other examples—cannot be captured in your traditional contracting between GRDC and a state research agency. It needs those kinds of innovative relationships with private companies to do it.

Mr FORREST—By the sound of it, you have been able to achieve that currently without anything being changed. So what are you suggesting should be changed to allow more of that?

Mr Lloyd—Certainly we work under very liberal acts and there is no difficulty. However, it is more around the extent to which the rhetoric of government—the perception of ministers and the response if things get a bit risky—will get behind you. We tend to get the message, 'Go out and be innovative and be more business oriented but don't take any risks, don't make a mistake.' So it is not so much legislative change, but I think the sorts of things GRDC is doing there can be mirrored in a lot of organisations, such as CRCs and perhaps some of the big public sector science agencies. They can be held up as examples, encouraged and made even easier to do through incentive systems.

Mr FORREST—The other angle Mr Lindsay was getting at was this conflict between the scientists' priorities and commercial realities. All that a young scientist wants to do is to win a Nobel Prize and to do that he has to publish. Of course, once something is produced they want to control it and make a financial gain out of it. So that conflict is always going to exist, unless you somehow find a way to change the education framework.

You have to really go back further. I was faced with this in my own career. I was busy publishing and then one day I said, 'I'm sick of this.' I went the other way because I wanted to do things. But I was a bit steered by my university direction—that this is what you did with your career. I have not published since but I have made a lot of money since. I do not know how you marry those two. I was looking through your submission—you mention it but you are a bit timid about how to fix it. Do you think it is something that will always be there unless you build some bridges?

Mr Lloyd—I think it is about leadership. To the extent that we have a policy environment and a rhetoric at senior levels that create public/private partnerships, unusual business entities that are linking scientists to business interests, career possibilities for scientists will emerge and they will be much bigger than they are now.

I can give you another example. We were developing something with a couple of Japanese companies where, again, they were putting in cash contributions, as was GRDC, to create certain sorts of possibilities in grain related areas. As part of that, they would send their scientists out here and work on it with our scientists, using plant and machinery assets that were available here, testing things as they came out, with the Japanese market in mind, and then gradually moving it offshore and doing the product and market development as they did it. With that sort of arrangement, pretty quickly you are going to have high salary positions emerging for Australian scientists outside the traditional public sector positions when they are in those sorts of relationships.

Mr FORREST—But the scientist will always want to have the kudos of publishing his work and winning the Nobel Prize, or the potential to do so. Is there a way that you can marry the two? He is entitled to it: if it is entirely his own research that has developed this breakthrough—it might be a cure for cancer—he would want to publish.

Mr Lloyd—I do not think publishing is a problem in terms of commercially sensitive areas; it is just a matter of timing. Most things that are commercially sensitive at some point can be published and at some point the person who has developed it gets that scientific kudos. What

you are talking about there is the instinctive resistance of scientists to move in from a position of peer review and sharing knowledge to one where you have to actually lock it up at certain points. I think what is on offer here is that eventually a scientist will always be able to take credit from a professional point of view when it is published.

If we are creating more business focused vehicles for that technology to be taken to market and we are more successful in that area, scientists are also eventually going to be able to access greater rewards through salary structures, incentives and equity shares and the sorts of things you can do within business or private/public partnership entities that you cannot do within, say, the conventional CSIRO set-up or the conventional state department set-up. So initially I think there is a lot in it for scientists if we do it correctly and I suspect—I have not looked at this—that it causes a different kind of business environment in the United States. You would find many more scientists there on high salaries and collecting percentages of equity and royalties from their discoveries than we would here.

Mr FORREST—Maybe that is what we should do—take the committee over to the United States. I am pretty happy with that!

CHAIR—I have one last question before we finish, going back to your comments about measuring things through the number of start-ups and things like that. If they were measured more in positive outcomes, how do you think Australia would measure up with the rest of the world? Currently, we are compared based purely on certain percentages of GDP investment and not actually in final results, I guess. I know there probably is not any research but what is your gut feeling about how we would go if you were measured in the way in which you are suggesting?

Mr Lloyd—I think the reality is completely consistent with the anecdotal mythology—good at the science, lousy at the business and selling it—and I think this study has shown that. If you measure the number of ultimately successful bits of technology Australia has created per head of population, it would probably be good; and if you measure how much GDP we have generated through that, it is probably not so good.

CHAIR—Thank you very much for your submission and for your time. We will forward you a copy of the transcript when it is available for checking.

Mr Lloyd—One final point: I think some of the policy issues that flow from the perspective I am putting are not that difficult but require a particular policy mindset to focus on how to create a different environment in terms of incentives and rewards. It is not work that I have done in detail; it is not a main part of my job to do so, but I think they are doable. It requires somebody to take this kind of framework and look at how we can change the various measures, incentive systems and grants system incentives and so forth to create a different environment. I believe the committee could think about initiating that.

CHAIR—Thank you for that.

[5.31 p.m.]

BOSHIER, Mr John, Chief Executive, Institution of Engineers, Australia

COCKBAIN, Mr Peter, National Vice President, Marketing and Communications, Institution of Engineers, Australia

HARDWICKE, Ms Leanne, Director, Public Policy, Institution of Engineers, Australia

CHAIR—Welcome. I wish to point out that, while this committee does not swear in witnesses, the proceedings here today are legal proceedings of the parliament and as such warrant the same respect as proceedings in the House. The deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public but, should you at any stage wish to give evidence in private, you may ask to do so and the committee will give consideration to your request.

Before we ask questions, would you like to make a brief opening statement? I pass on the apologies of the deputy chair, Ms Corcoran, who was called to the House to do duty in the chair because of a few people being absent from parliament this week. However, we have several members of the committee present who I think relate fairly well to the Institution of Engineers.

Mr Boshier—Thank you, Mr Chairman. We would like to thank you for the opportunity to appear before you and your committee. I would like to greet Mr Forrest, who is a fellow of the institution, and Mr Ticehurst, who is connected with us as well in the electrical field. We are honoured to have you as a fellow, Mr Forrest, and trust that what we have to say is of interest to you. I would like to make a brief opening comment, if I may, which will take less than five minutes.

CHAIR—Yes.

Mr Boshier—The Institution of Engineers, Australia does appreciate the opportunity to give evidence before this committee in its inquiry into business research and development, because we believe that this inquiry addresses many issues which are highly relevant to the discipline of engineering and, indeed, economic growth in Australia.

As you know, we are the peak body for engineering practitioners in Australia and we represent all types of engineering and all branches of it and we have now 70,000 members. So we are the largest and most diverse body of engineers in Australia, and the second largest professional association in Australia.

We hold the view, and I am sure your committee does, that engineering is central to economic growth because it is engineering that provides that bridge between scientific innovation, scientific ideas and commercial reality in the form of technology and commerce. So it plays an essential part in meeting the material requirements of society in the generation of wealth. It is engineers who translate technology into resources and products for the future. So this is clearly in mind when we are talking to you about business research and development.

For us, a strong R&D base cannot exist without a highly educated and technologically literate society. The institution has identified seven issues as those that need to be addressed if the level of business expenditure on R&D is to rise in the future, and those issues are explained in detail in our submission to your committee.

I would like to highlight them for you. I refer first to corporate culture. We say that leadership—and in fact the previous witness said exactly this—is a vital influence in a company's decision to be innovative and to undertake R&D. We need to develop a corporate culture that seeks continuous improvement and excellence, creating the conditions in which leaders are willing to take risks. These cannot be simply addressed once people are in senior management positions. Many of the attributes need to be developed earlier on in people's lives, and therefore opportunities should be offered to students throughout their school lives, exposing them to new ways of thinking, thereby creating new conditions for this learning to occur.

Chairman, you might like to talk about that to Mr Cockbain who is, in my opinion, a living example of a person who started off on the shop floor and who has risen to be the owner of a very large and successful company. He has a very interesting story to tell.

Secondly, the availability of technology resources and strategic alliances, access to resources, including networks that provide a stimulating environment and information, are major incentives to innovation. Sometimes we call these clusters. Most small and medium enterprises know nothing about assistance packages for collaboration or what facilities are available within research organisations. So a cluster or a network can pass that information around.

Thirdly, I refer to finance issues. The financing of technological development and venture capital funding are two of the significant weaknesses facing wealth generation in Australia. Australia needs a low interest rate environment, which the government has made a lot of progress in. And an internationally comparable capital gains tax regime is required.

Fourthly, informed clients are a vital factor in encouraging innovation in R&D. In particular, government as an informed client can have a major effect on the amount of innovation in the marketplace, and you know we have had a lot to say about government as an informed client. The reason for this is that it assists in lowering the perception of risk on the part of the innovator.

Fifthly, there are government incentive programs—and this is the area that we would like to talk to you about in some detail because it is public policy that the previous witness was steering away from. Direct government assistance through grants such as the R&D START program, repayable grants, loans, interest rate subsidies, tax incentives such as the 125 per cent tax concession and the additional tax incentives offered under Backing Australia's Ability all act as incentives to innovation in R&D.

Many companies feel that the ability to undertake value adding R&D in their industries results from the impetus given by government incentive programs. Many of our best export companies say they would not have been able to carry out their R&D base and get their base off the ground without some assistance. There is general agreement that competing on a global scale with high margin innovative products and services requires a commitment by government to fostering high export and new technology industries. That support does not amount to business welfare assistance but is a strategic decision with a huge payback for this country.

Sixthly, I refer to education and skills. Skilled labour is fundamental to R&D, and education and training policies will affect the capacity of companies to undertake R&D projects. There must be a sufficiently high quality skills base to draw upon and there must be sufficient demand for education. And our institution, we believe, is playing a major part in that.

Finally, there should be a national strategic approach to R&D. Australia needs to be competitive as compared to other nations. It is our view that Australia needs a long-term technology plan, which should include a comprehensive statement of national priorities for science, engineering and technology research. It is unnecessary and unrealistic to expect every industry in Australia to be competitive in a world market. Rather, Australia's competitiveness depends on the success of particular industries or technologies. The government's choosing of R&D priorities under Mr McGauran is, we think, a very healthy, positive process and we applaud it. We think that he, Robin Batterham and Jim Peacock are doing a very good job.

In conclusion, governments have focused at the moment on the drivers for competitive advantage; namely, the macroeconomic environment, education, taxation and financial regulations. They provide the environment for companies to become more innovative. However, it is our clear view that realistic and positive signals must be given to industry that there are areas of activity where Australia is able to gain a present and future advantage.

This approach will provide guidance to business on areas of strength and potential market opportunities. It improves business cooperation, it promotes risk sharing—I believe it actually lowers risk as well—and it makes governments and businesses take an active part in addressing the changing global environment. This approach will provide industry, market analysts and investors with greater confidence to invest in R&D, particularly for high risk industries.

CHAIR—Thank you. Could I start on the tax side of things. You talk about capital gains tax needing reform and you also mention the taxation concessions. If you were given a free run in Treasury, what sort of reforms would you make from a capital gains tax point of view?

Mr Boshier—I would lower capital gains tax. I would provide a means by which entrepreneurs who create and who are committed to their businesses do not need to face capital gains tax to the degree that they do now. We applaud the fact that the government has lowered the capital gains tax, but I think it is a blockage to entrepreneurs, like Peter Cockbain, taking a risk and building up a business of their own. I think Peter would be good at answering this question. In terms of the R&D tax credit, may I comment on that as well?

CHAIR—I was going to put to you on that that one of the suggestions we have had is to have a number of rates, basically. I know we have two rates at the moment, 125 and 175, and you might like to comment on the operation of that. However, it has been put to us that we ought to look at several rates that might start at 115, for instance, through to 200 and apply on the basis of the more you invest in R&D, the greater the rate you will get, so that there really is a strong incentive there—and it being revenue neutral, which was the reason you would have to drop probably the bottom rate from 125 to 115. Would you like to comment on that?

Mr Boshier—Yes, I would. We would support that. We would go a stage further and attempt to link those areas of higher concession to the R&D priorities that the government is presently identifying. We would support and applaud that idea. We believe that the R&D priority setting exercise, which Mr McGauran has embarked on, has got industry support. A wide degree of

consultation has gone on, and we believe that attempting to make a linkage between those two would be very desirable.

CHAIR—Mr Cockbain, did you want to comment on the earlier part of the answer that Mr Boshier gave?

Mr Cockbain—On the capital gains tax, in my opinion, allowance should be made to reinvest that and not just take it out as a gain. There should be an allowance made against the capital gains earned—reinvestment, in other words, and enhancement of the economy by further investment and employment.

The R&D taxation is the second consideration for a small to medium enterprise if, regardless of what the taxation rate was, it is something that is returned to a company up to 24 months after it is spent. In other words, there is a cash flow implication for small to medium enterprises which, in many cases, discourages them from spending the money. If we are going to talk about a reasonable amount of money to effect employment, export/import, then we are looking at $100,000 to $250,000 or $500,000 out of a small to medium enterprise. Now, for that to come out of cash flow to an organisation that has relatively low margins is something that it is not committed to.

I think the START grant was a great idea where there were cash refunds if milestones were reached. It was a far better incentive for small to medium enterprises who really need to watch their cash flow, and obviously in conjunction with their bankers.

Australia was in a stupid situation with tariffs that were far too high, and industry was sitting behind 30, 40 and 45 per cent tariffs. I think any industrialist with any commonsense would argue that that had to change. However, having regard to the way in which it was changed, I think industries were not allowed to prepare for the change, and that caused a lot of angst amongst a lot of organisations.

Newcastle is a great example: BHP was the milking cow for a lot of industries. It supplied an industry within itself for a lot of other support industries and nobody went outside Newcastle. Now, I think, if you went back to Newcastle, you would see that some industries have gone because they could not adjust to the change, and others have decided that there is something over the hill and they have gone from a local to a regional to a national focus, and quite a few now are internationally focused organisations. That has been by necessity but also by planning et cetera.

The idea of research and development has to be backed up—this is where COMET comes in very well—by focusing organisations on a total business plan for research and development. It is not that you have come up with a good idea in your opinion and now you have to go and try to find a market for it, having spent hundreds of thousands of dollars maybe on producing a widget. It is the fact that the whole thing was put together, and obviously you have talked to venture capitalists, because that is what they are looking for. They are not looking for a great idea because they are not in that marketplace; they are looking for a total business plan to show a return on investment associated with their investment in that organisation.

The whole risk side of things is, once again, the result of risk management and risk minimisation if it is high risk and there is no risk management in place to evaluate it and to

manage the risk, when and if it does occur, and to minimise the risk by various strategies—in other words, taking on an international partner to market your equipment overseas, for argument's sake. Australia has been very good in niche markets and particularly in mining, which is a large part of my business, such as underground coal mining, open-cut mining, whether it is iron ore or bauxite et cetera, and particularly in mineral sands where we are amongst world leaders in technology. The niche markets for Australia to pick on and to become exceptionally good at then give us a home market size which allows us the financial support to springboard to export.

Once you go into the export market, you are looking at two or three years before you generally get a return on that export incentive. You might be spending $100,000 a year just knocking on doors. With respect to import replacement, I can speak quite personally on this. We manufactured what is called a rectiformer for copper refining, zinc, aluminium et cetera, and for us to get a guernsey to organisations in Australia takes a reasonable amount of technical presentation—let us say, to Mt Isa Mines or Western Mining. But if we want to go on to an import replacement strategy, say with Comalco or Hydro, who have now taken over the Kurri Kurri aluminium smelter, we have to go and represent ourselves in New York, Toronto, Paris and Frankfurt, in order for them to recognise that we are an Australian company capable of supplying equipment and compete against their already recognised multinational suppliers.

Once again, for us to go over there and represent ourselves, it has to be costed into the business plan. Once we are given the guernsey to use these items in Australia, to sell them to their Australian companies, we then have created a home market which provides us an income and a profit stream that allows us then to support an export drive.

On the other side, where we have encouraged the import of capital into Australia—in other words, we are encouraging overseas investment into Australian industries—I think that is a great incentive to allow us to have that capital, rather than trying to raise it from a personal company point of view or even from a small to medium enterprise, as long as we can then support that capital coming into Australia with the human resources. We might have arranged the financial resources to come into the country, but where are the trained engineers, technicians, scientists, tradesmen and even the process workers that we are going to need to support that income stream? Once again, we have to make sure that what we promote, we can provide. And it is the same from an industry point of view. It is easy for us to create an image but, if we go overseas and then we cannot fulfil that image when they come to visit Australia, then we have really done ourselves and Australia a disservice.

CHAIR—Thanks for that.

Mr FORREST—Thanks for making a submission. It is a good one. There are a lot of points I would like to talk about but we are probably not going to have a lot of time. I was alarmed to read that Australia produces the lowest percentage of engineering graduates. That has changed a lot in the 30 years since I graduated, when there were too many of us, there was a glut, and I had to walk the streets. That leads me to ask: why has that happened? I think it is a perceptional problem. I remember one of my aunties, when I announced I was going to university to become an engineer, said to my mother, 'Johnny would be better off becoming a doctor. Being an engineer and getting his hands dirty doesn't suit him.' It is a perceptional thing. I note you are recommending school programs and innovative promotional things. Is the institute doing anything in its own right to achieve some of that?

Mr Boshier—It is a good question. Part of the problem is that, in schools, engineering is not taught. In schools you learn science and social studies and all the rest of it but you do not learn engineering as such. So it is quite difficult, particularly for women, to enter engineering because they have no role models such as teachers or they have no school programs in which to hear about it. We have identified that as being a major problem, which is why we want to do a lot more work in schools.

That is a relative statement in some ways. If you look at the engineering graduates in, say, Singapore, Taiwan, Korea and the United States, proportionately it is a much larger number than here. Even if you look at the make-up of the cabinet in Singapore, half of the cabinet ministers in Singapore are engineers. Here, the number of engineers in the House is just about represented in this room.

Mr FORREST—I know. There are two of us. We regard Gary as a bit of one of us.

Mr Boshier—To us, that is quite a serious matter because it means that there is a certain degree of lack of awareness of what it is that it takes to convert scientific ideas into commercial reality. I think it is something the Institution of Engineers is very concerned about and is spending a lot of money on now in order to try to fix that problem. In Backing Australia's Ability, the problem was addressed through the innovation awareness grants that were announced, but we do not think enough money is spent on raising awareness of engineering in schools.

Mr FORREST—What about the Prime Minister's engineering excellence award? Are we doing our bit to give you—

Mr Boshier—Yes, in terms of the excellence awards, the Deputy Prime Minister, Dr Nelson and Mr Macfarlane will all be at those awards this year—in fact, they take place on Wednesday evening right here—but it is a big job. I think PMSEIC, the Prime Minister's Science, Engineering and Innovation Council, is making very good progress but, again, it has taken time. The Prime Minister himself is increasingly referring to engineering, and we appreciate that. People do tend to take a lead from that kind of thing. But I would have to say that you are correct that, in our view, insufficient numbers of engineers are entering the work force.

Mr FORREST—Returning to the terms of reference, you are talking about the R&D tax concession and the chairman has mentioned figures of up to 200 per cent. I have this anxiety about creating distortions because, if you give people a tax break, you can get the wrong sort of people involved. I am thinking particularly of the problem in the wine industry where they get a fairly significant tax concession to invest in the infrastructure of vineyards, and the wrong sort of people are growing grapes as a result. It might be better to tailor it and say, 'Here is a tax concession so that you've got an incentive to invest,'—there is an incentive to invest, anyway, in broad research—'but if you get a result, we can offer you 20 per cent.' If we give credit for all of that investment, it puts the carrot there for people to pick not just research for research's sake but the one that will get a result. What do you think of that as an idea?

Mr Boshier—I would be interested in hearing Peter Cockbain's view but personally I would counsel against that, because that means that after the event you have taxation clerks in ATO trying to make a judgment as to whether something was successful, and how do you declare a profit in some of these companies anyway? I would not think that was an easy solution.

To us, the best and most direct thing is the Start grants system. There is a legion of stories in the engineering world to say that Start grants are one of the best forms of getting R&D off the ground and commercialising it, because they provide cash up front to a start-up company. We were very disappointed to note that the Start grants amount of money in the budget was diminished from $200 million to $150 million approximately. The reason for that, as I understand it, is that the Start grants system was $50 million overspent this year. So, to keep the total the same, they have wound it back to $150 million instead of $200 million. Now, that is a shame.

CHAIR—Too successful.

Mr Boshier—It was too successful. But we say: go with a winner. Maybe there was a problem with financial control as it was going on, but it is clearly a very successful program. In some ways we would rather see, if there is a total budget constraint, more money going into Start grants and a bit less going into R&D tax concessions, if one is interested in innovation.

Mr FORREST—There was another one in food innovation development that was announced last month on 19 September, but they are not substantial. They are only small amounts—$50,000. Is that enough? It is targeted for small to medium enterprises.

Mr Cockbain—But R&D means different things to different people. To a small company, research might allow them to make a more competitive and more profitable product just through getting some manufacturing assistance, say, from a CRC at a university. So for a small company, that could be quite a transition and they would call that research or development. To a medium company, it may be against import replacement of a higher value added product of hundreds of thousands or something like that. To a larger organisation, they are looking at the world market and the export side of things. So I do not believe you are going to have one-size-fits-all.

If you look at what innovation does and the products associated with that, from the anecdotal evidence we have, the ratio of employment downstream for taking innovation to ultimate commercialisation is at least 20:1. So the one professional engineer or scientist is looking at least at 20 to 50 downstream employment opportunities by the exploitation of that idea. I think all of those sorts of things have to be taken into account in funding research and development and its associated benefits.

Mr Boshier—Chairman, just to finish off an answer to that question, if I may, we would not be promoting open-ended tax credits. I think that the tax credits, particularly if they are allied to priorities, ought to have a five-year and at the most 10-year life. That ought to be said up front so that there is a sunset to some of these tax priorities and so that they cannot be milked or farmed, because you are not in the business to farm tax credits.

Mr TICEHURST—Just on this tax business again, with a lot of smaller companies, the tax incentive for R&D only works if you are making a profit. If you have a small enterprise who might be running for a year or two and then they have to expend quite an amount of money on capital equipment, they have a situation where the depreciation on that capital equipment can be quite high and can offset a lot of the expenditure that they have actually had on R&D.

In such a case, they are still carrying out research and development, which may well be directed towards import replacement, but in that tax year they cannot claim any R&D benefit because on paper they have not made a profit. But then, as years go by, and the depreciation level drops and they start making a profit, they are taxed at a fairly high rate because they do not have a large number of expenditures—they have spent their money in the earlier years when they had offsets against capital. But when they start to make a profit in the end and there is not the need to carry on R&D on that particular product, they need to pay high taxes. Do you see any way that the government could initiate some support programs for the period when the development is actually being carried out?

Mr Boshier—I would like Mr Cockbain to comment on that. But can I say that we did quite a lot of work on this in a publication which I launched at the Press Club, which you will remember, Mr Nairn.

CHAIR—I recommend anybody to read Mr Boshier's speech that he gave at the Press Club. It was good.

Mr Boshier—We found that the major users of the R&D tax credit are the mature companies, particularly the mining industry, and it bears out exactly what you are talking about. In fact, farming and mining were the predominant users of the R&D tax credit—I had better not quote numbers because I do not have them in front of me. It just proves what you are saying is correct. Mr Cockbain, do you have some thoughts as to—

Mr Cockbain—If the scenario that you put forward is correct, it signifies that that company was rather short-sighted and opportunistic in exploiting its one-only R&D tax excursion, because if it is successful, as you have suggested, what it should be doing is reinvesting that money in further research and development. So the taxation issue only becomes relevant if they no longer continue to invest. I think that is the issue.

Investment in research and development has to be the cornerstone of any company's business planning future. It cannot be a one-off thing. Sure, they are going to make money, and we do, out of, let us say, our rectiformers. We are coming towards the end of that START grant, which was a $250,000 grant to us, and obviously a similar amount on our part. We are now supplying rectiformers to Tomago Aluminium, to Townsville, to Boyne Island, to Western Mining, but we are now moving on into R&D for the Collins class submarines for manufacturing a particular item for them.

Mr TICEHURST—But you are talking about a larger company. Smaller companies probably do not have that ability. They can certainly put amounts of money into R&D but there is usually a limit with smaller companies.

CHAIR—The smaller company would be eligible for the cash rebate in those early years, which is one of the changes that we made.

Mr TICEHURST—Yes.

Mr Cockbain—But once again the cash rebate is better in a loss situation than a profitable situation. I appreciate what you are saying but I still go back to my first statement that, if that is

all that small company ever did, then they are destined to fail. We have to move. We have to stay in front of our competitors, whether they be in the local suburb or national or international.

We cannot say we have made the world's best widget and it has a life span of 50 years. Talking about my products, our first one had a life span of 20 years, the one that followed it had a life span of eight years, the one behind it was three, and we are now replacing it with one that we can see is going to have a life span of 18 months. In the early days, and I come back to Mr Forrest's comments, there were plenty of engineers around because we were isolated—we were an island, and we were producing enough of our own. We were making our own transformers, switch gear and connectors in the electrical game. We do not make any of that any more. It is all coming in from overseas.

Mr TICEHURST—I used to be in that game for many years.

Mr Cockbain—Our incestuous market has gone. We are now exposed to the big, bad world. Because of the stupid tariffs we were living in a fool's paradise for far too long. We had to recover from that, which I believe we have done. There has been a lot of blood on the floor as a result of it, but we are now in a situation where I think our industries, whether they be small, medium or large, are now focusing on foreign competition and also on foreign opportunities. We need to continue to develop our products and services; otherwise those companies are doomed to failure or absorption by a more innovative and more business-smart organisation.

Mr TICEHURST—On the subject of education, there is a lot of work going on now in the vocational education and training side where there are apprenticeships available now for year 10 students, and through years 11 and 12 they can actually participate as apprentices doing trade type courses as part of their HSC. Years ago there used to be cadetships in engineering. Have you looked at the possibility of having perhaps a similar scheme to the VET but based on cadetships where you could have students involved in engineering type programs through, say, year 10 through to the end of high school to try and get some more focus back onto engineering, mathematics and those sorts of science type subjects?

Mr Boshier—That, again, is quite perceptive. Because we are a member-owned organisation, we do not have a lot of money to devote to scholarships, cadetships and so on. However, I would offer the following information as to what we are doing. We are beginning a new careers service. This careers service is aimed at giving young people the assurance to enter their first career in engineering. We are saying that we are going to give them assistance in writing their CVs, in finding their first job and then mentoring them either personally with people like Mr Cockbain or through e-mentoring. We are going to give them advice on how to go about becoming professionally developed—that is, doing their continuing professional development—and give them that assurance that there is somebody holding their hand and mentoring them once they begin their career. Once they get going and on their feet, then they are fine. The idea of engineering cadetships has been raised and I have thought about it, but I am not quite sure how to actually implement it. But it is a good idea that I just do not think we can afford at the moment.

Mr TICEHURST—Maybe it is something we can talk to Brendan Nelson about, too, to look at a strategy—

Mr Boshier—Yes.

Mr TICEHURST—Because I was quite surprised to read in the weekend paper how mathematics is now not a compulsory subject.

Mr Boshier—That is right.

Mr TICEHURST—We are losing so much. I was stunned to read that. Maybe we need to have some sort of incentive in the education system where we bring those sorts of things back and perhaps look at this idea of cadetship.

Mr Cockbain—Next time you have some free time in Newcastle, if you would like to come to Warners Bay, we will show you what we are doing. We have a pilot program going on in Toronto, in West Lake Macquarie, where the school kids have to apply to our company for just what you are talking about. They have to put a CV together, they are invited in for an interview, and they are given the opportunity to do just what you are talking about. That is within our company and also in conjunction with the University of Newcastle.

Mr TICEHURST—Excellent.

Mr Cockbain—Some kids will go into the trade side of things; other kids will go into the university side of things. We are providing an opportunity for both of those in a pilot program for West Lake Macquarie and the University of Newcastle. This will be its second year and we think once we have knocked all the rough edges off it, it will be put forward on a wider scale.

The other thing we have to address as a country is that the average age of our science, engineering and technology teachers at school and lecturers at university is now above 50. Whilst I or we as an institution and all the industries that form part of our institution can provide the practical training, the academic training is a real problem that is looming, because the younger people are not going into that strand of teaching and lecturing.

Mr TICEHURST—What is the HunterNet scheme that you have mentioned?

Mr Cockbain—HunterNet is a network of industries in the Hunter. It is a consortium; each of the industries is complementary and they can go out and compete for larger projects rather than individual portions of a project that they would hope to win but they cannot compete for a larger part of it. The complementary aspects of various industries are put together to form a consortium on larger projects.

Ms GRIERSON—Thank you for your submission. The committee is getting very used to hearing success stories from Newcastle, so I am glad you have done that for us today. I would recommend that perhaps HunterNet's document on knowledge based manufacturing be provided to the committee, because it is a very successful cluster and it has been in place for some time. That is perhaps a key to why they have succeeded in this difficult climate post BHP. The other one is the strong links to the institution and professional associations. So it is embedded in the culture there and has certainly assisted.

However, you are right in saying that there are still major skills problems. You and I both know that, for example, the most recent four power engineers recruited by a company that exports in our area were from overseas. That is always a great sadness to us that, with only one institution training power engineers, the supply is just not meeting demand at all.

Part of your submission suggests there is a need for some cultural change in enterprise culture in industries generally, and you make some recommendations in that regard. We have had other submissions that have said sometimes it is very difficult to move a small and medium enterprise onto a different stage because they do not have an understanding of or the skills to take it to that new level and use R&D as part of that development program for the business. If government were to assist in that sort of management and culture training in terms of the value of innovation and how to do it, should that be through bodies like AusIndustry or cluster organisations or professional organisations such as yours? How do you think that could be best assisted by government?

Mr Boshier—Good point. The main area the government can assist in, I think, is just leadership, to be honest. Here is an idea: if the Prime Minister were to announce a prize for engineering and if the Prime Minister were to put as much emphasis on engineering—that is, the commercialisation of science—that is currently going into raw science, industry and management would take a lead from that and would feel better about engineering. It is all about trying to lower risk for a given output. I think that is important.

Also, again it is a cultural thing in Australia where, if you do have 10 projects and one falls over, as these technical projects do, one should not be seen as a failure and get pasted by the media or by senior leaders. It is just one part of your portfolio that did not work out. For every project that earns negative 5 or 10, provided it does not pull the whole company down, if you have got a couple that earn plus 30, then it compensates.

So we should look at failure in a portfolio sense, and that is the thing that the Californians have taught us. In fact, it is a badge of honour to have become bankrupt at least once and survived and come back, because now you know the experience. It is hard to see, Chairman, how governments can influence that, apart from people like you, Ms Grierson, who have shown up to our programs in Newcastle. We appreciate all of you making the effort publicly to stimulate and promote the engineering profession. But more than that, it is not just the profession; it is the conversion of science into real projects.

Ms GRIERSON—For success.

Mr Boshier—That is what needs to be celebrated and promoted. I do not see that government can directly intervene in that process.

Mr Cockbain—There is an avenue that the institution is actively promoting now where we have started the Centre for Engineering Leadership and Management. In the past engineers have got a buzz out of being engineers, and it is the commercial people who have told them whether it is going to get a guernsey or not. For all of this to succeed, and we are talking about the R&D as well, whilst a small to medium enterprise might know some of the opportunities they have, they do not understand all of them, nor do they understand some of the commercial opportunities—they rely on their accountancy people for that. They might not understand the legal side of things, so they rely for their intellectual property protection on the legal people. There are various other avenues that engineering and science et cetera have to become better at to understand the overall implications of what they are doing.

As I say, we have our Centre for Engineering Leadership and Management within our institution. We are talking to universities about introducing business planning and commercial

aspects to engineering courses so that an engineer understands the total implications of what it is he is trying to promote or get funding for. The universities are naturally—I would not say reluctant—displaying an inertia there that we are gradually starting to overcome. They say, 'We teach engineering; other departments teach commercial and legal approaches.' So we are introducing a concept of business understanding in the engineering aspects of training, because without that we are once again living in isolation. It is only this total collaboration between all of it that is going to allow Australia to succeed in these aspects of promotion of our intellectual property and value added manufacturing.

Ms GRIERSON—Yes, I think that is a good recommendation in terms of a more holistic approach to training through the universities. A report was released today from science, physics and those sorts of faculties about their skills problem, the training problems and take-up of their courses. I will get that information for the committee.

I suggest to you that tax concessions are very much favoured throughout the submissions we have had. Do you see that government could use those more strategically to support areas where we might identify a potential loss of skills or a potential loss of opportunities or support for national priorities or support for regional clusters or clustering that is needed to give a critical mass? Do you see any way to be more strategic with tax credits or tax concessions?

Mr Boshier—Yes, Mr Chairman, we strongly believe that tax incentives should be used more strategically. It would require consultation and it would require a phase-in period. It would require clear rules as to what is important and what is not and how it is defined. There are legal implications and accounting implications. The ATO would need to be brought into the picture as would the minister for industry.

But, in principle, we would strongly favour tax incentives being more strategic. A couple of things would need to be done. We do not see them as being open-ended at all because priorities change. Australia may feel, for example, that water over the next five years is very important as a priority. So it is announced that, for the next five years, there would be a 200 per cent tax incentive—a tax write-off, if you like—or an R&D tax concession for things to promote the better use of water. That would be made public and everyone would know about it. You have to do something in five years, but then it stops. It would be quite transparent and everyone would know. That is one example.

Ms GRIERSON—Given the loss in some super investment funds, one would think that people would like some concessions that were targeting some national development programs in areas that would be strategic. So I note your point regarding the use of superannuation funds, too.

Another area that you mention and that I would like to know more about is: when you are tendering for overseas contracts, does government do enough to be a referee or some sort of guarantee for bodies that are tendering? Is that a problem or is it available already?

Mr Cockbain—EFIC is certainly very important to us. As a company, we are doing quite a reasonable amount of work in China now, which is a risky market. Having EFIC there in the background to ensure that we ultimately get paid—I must say that, in our dealings over the last three years with the Chinese, we have found them to be absolutely faultless; so our perception

of risk has not matched the actual risk—gave us more backbone, if you like, for going into the Chinese market.

Another is having Austrade there, but Austrade cannot be all things to all people. They have been talking to us about underground mining things; they go and talk to somebody else about selling fresh fish; they talk to somebody else about selling automotive parts. I think they do a great job trying to be all things to all people. They are certainly exceptionally important when we try to set up meetings, finding who's who in the zoo in various locations such as Beijing, Hong Kong and Singapore.

Just going back to something you mentioned before, on the taxation side of things—and I appreciate it is hard to do—consistency in approach is something that is very awkward. This was something that was mentioned at the meeting in Sydney. If we are going to encourage foreign investment and we are going to be on again, off again, it really does not encourage a foreign investor to come into Australia in a long-term situation.

One of the other things that certainly was of benefit to industry, or those that used it, was the training levy whereby we were given some tax credits for training apprentices, trainee professional engineers, technologists, engineering officers et cetera. If you did not spend X amount of your money on training, then you forfeited that into a fund. I do not know why that was disbanded or why the fund itself was not able to provide funding to organisations who could take up that training aspect, because it certainly was of benefit to my organisation.

Ms GRIERSON—What would you feel about those sorts of funds being allowed to be used to raise other capital—say, to be a guarantee for a low interest loan in some way?

Mr Boshier—I have a view on that, but Peter has direct experience. I am not sure that is a good idea. I think that the system is ideally aimed at smaller companies, SMEs, who do not have cash turnover. They are not able to access the R&D tax credit. They are, in a sense, smaller amounts of money—$100,000 or $200,000.

I was a director of a company that got several million to make fuel cells, and it was absolutely essential to get our company off the ground. But it has to be used directly in creating hardware or benefiting the R&D effort. If it goes into the pockets of consultants for other reasons, like lawyers and accountants and goodness knows what, that can be very expensive. I myself do not feel that is the spirit of the system.

Ms GRIERSON—I suppose one submission that I am considering was that, if the application of the program was rigorous enough, then in a way it should be perhaps acceptable as enabling a sort of guarantee for a loan for further development of the company. But I will leave that one.

Mr Boshier—Could I just ask Mr Cockbain: do you have a different view?

Mr Cockbain—Not knowing whether the devil will be in the detail, whilst the concept sounds attractive, you would have to look at it. If I could ask a question: what does the government see as a return on investment in what it is doing—higher employment, greater export, minimising imports?

CHAIR—All of those things.

Ms GRIERSON—Everything.

Mr Cockbain—We as a company or as an institution are looking at how best we can fulfil the goals of what the government is trying to achieve by these financial incentives. But it would help if we knew what the government was looking to achieve as a result of doing this.

Can I go back to what I was saying earlier about research and development for R&D's sake and you end up with a widget at the end of the day and you get paid your Start grant. But where is the incentive for you to then take that to commercialisation and provide a return on investment, firstly, to the company and, secondly, to the government, which is basically an investor in the product that you have created? I think there has to be a greater perspective in what it is that we have been trying to achieve rather than having a cupboard full of great ideas where you have proven the prototype but you never did anything with them.

Ms GRIERSON—Do I have time for one quick question?

Ms GRIERSON—You make some comments on user procurement or purchasing policy that favours high-tech goods that supports an industry base. Is that possible; is it being done; are there better ways to do it?

Mr Boshier—We think that is a really important thing. As I said in our opening remarks, having an informed buyer is very important to an entrepreneur, because the entrepreneur is able to feel that it lowers risk as well. An informed buyer also does not always just go for the lowest price and an informed buyer will understand that sometimes innovation does cost more money.

What we are arguing is that the government can take a really important lead role here in being an informed buyer. When you look at how much the government spends in defence industries, in roads, water infrastructure and all the other infrastructure such as telecommunications, yes, it is very important that the government deliberately tries to push the boundary but it must be informed in doing so. It must not go for high-tech things because it feels good. It must understand the risks involved.

Ms GRIERSON—Thank you.

Mr FORREST—Just back on the educational angle, one of the terms of reference is: what are the impediments to business investment in R&D in Australia? Obviously, if you have not got the people with the arms, the legs and the brain power, then we have a really long-term problem in terms of the profession are you talking about. You made reference in your submission to the British model, some sort of partnership model—

Mr Boshier—The Graduate Start program in the UK.

Mr FORREST—and after that you mentioned that we had something in Australia but it was not working, but you did not say why.

Ms Hardwicke—With the Graduate Start program, one of the things we have found is that it was not promoted very well, and there were a couple of administrative things that were happening with it that made it not work as well to get the linkages between industry and universities. We put in a submission about it to what was then the Department of Industry, Science and Resources in 2000. Some of those internal administrative things have been fixed, but we still think there is a huge problem with the promotion of it within industry and within universities. I can leave a copy of our submission with you. It is the Graduate Start program and it has also been put on hold.

Mr FORREST—But that was two years ago, and it is still not working?

Ms Hardwicke—We do not believe that it has been promoted as well as it could. It is not actually creating the benefits that it has the potential to do.

CHAIR—It is to be resumed, I understand.

Mr Boshier—Chairman, the leading country, in my opinion, that solves the problems Mr Forrest was talking about is Ireland. What I would like to do, if I may, is get some material from Ireland. My president and I visited there earlier this year and we were very impressed. The government in Ireland has plenty of money to transform the country to a high-tech nation, but they realised with a shock about two or three years ago that they did not have the expertise—the engineers specifically—to do it. The Irish institution and the government formed a very innovative partnership for cadetships and all the things you were talking about before and achieved outstanding results. If you are interested in that, Chairman, I would like to get that information for you and send it to Ms McInnis because I think you would find it very helpful.

CHAIR—That would be very useful. I think a lot of Australian engineers are over there.

Mr Boshier—That is right.

CHAIR—Just to finish off, I was interested that you were using the term 'innovation' at times instead of 'research and development' and backwards and forwards, which I think is excellent. Do you think there is a difference between research and development and innovation? Or should we be talking more about one and the same thing?

Mr Boshier—We view research and development and engineering as a partnership. They are not in competition with each other. One absolutely needs the other. Both of them equal innovation.

CHAIR—The reason I ask is that I suspect—and I do not have the hard data but just from a lot of the submissions we have had and other information—that there is a lot of innovation going on out there which is not fitting, particularly once we talk about government programs and tax concessions and things like that, the so-called R&D assistance side of things and possibly it should be. I wonder whether you have a view on that.

Mr Cockbain—Innovation is the embryonics, I believe, of your research because unless you have an idea to research, then you cannot start. In my company, we have what we call the PIGs—and I am boss hog—which are the product innovation groups. We just sit down and throw ideas on the table, 'Why don't we do it this way?' I use the example that if we did not

think about innovation to achieve an end, planes would be flying by flapping their wings. There are other ways of doing things, and innovation can lead you in the direction of starting your research to see whether that idea is possible or feasible and where we go from there to achieve the objectives to turn an innovative idea into an end product.

CHAIR—I think you can argue that innovation fits in at the front end and also at the other end of it as well. But I think particularly for a lot of small and medium firms, which are taking possibly existing products or ideas and innovating those to address a particular problem that they have within that particular firm, I do not think that is getting picked up as research and development as such. And effectively it is. It fits at both ends of the R&D scale.

Mr Cockbain—As I said earlier, for a small company, just having an innovative idea to make a more profitable or more competitive product could be as simple as buying another machine to do something that they had not even conceived was even available. But you go from that side of things to something that creates its own market, such as post-its. There was not a market for post-its until we had one, and then it created its own market.

CHAIR—Yes. Thank you very much for the submission and for your evidence this afternoon. We really appreciate it. The transcript of the hearing will be sent to you for checking as well.

Resolved (on motion by **Mr Ticehurst**):

That this committee authorises publication, including publication on the parliamentary database, of the proof transcript of the evidence given before it at public hearing this day.

Committee adjourned at 6.37 p.m.