



HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON INDUSTRY, SCIENCE AND TECHNOLOGY

Reference: Effects on research and development of certain public policy reforms

SYDNEY

Monday, 23 March 1998

OFFICIAL HANSARD REPORT

CANBERRA

HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON INDUSTRY, SCIENCE AND TECHNOLOGY

Members:

Mr Bruce Reid (Chair)

Mr Beddall (Deputy Chair)

Mrs Bailey	Mrs Johnston
Mr Martyn Evans	Mr Allan Morris
Mr Richard Evans	Mr Nugent
Mr Forrest	Mr O'Connor
Ms Gambaro	Mr Zammit
Mr Jenkins	

The committee will inquire into and report on the effect of public policy changes, over the last ten years, in the areas of corporatisation, privatisation, outsourcing and competition policy reform on the matters listed below:

the amount of R&D being carried out in Australia;

the nature of the R&D being undertaken (that is, basic or applied);

the relevance of the R&D to the commercial needs of industry;

the level of investment in research infrastructure and equipment;

the scientific and technological skills base and the demand for scientists, technologists and engineers; and

the education and training opportunities for future research staff.

WITNESSES

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Present

Mr Reid (Chair)

Mr Beddall	Mrs Johnston
Mr Richard Evans	Miss Jackie Kelly
Ms Gambaro	Mr Allan Morris
Mr Jenkins	

The committee met at 9.30 a.m.

Mr Reid took the chair.

BALDWIN, Dr Kenneth George, Convenor, Science Policy Committee, Federation of Australian Scientific and Technological Societies, PO Box 218, Deakin West, Australian Capital Territory 2600

CULLEN, Professor Peter, President, Federation of Australian Scientific and Technological Societies, PO Box 218, Deakin West, Australian Capital Territory 2600

GASCOIGNE, Mr Toss, Executive Director, Federation of Australian Scientific and Technological Societies, PO Box 218, Deakin West, Australian Capital Territory 2600

CHAIR—I declare open the public hearing of the inquiry into the effects on research and development of public policy reform. I welcome you this morning and thank you very much for your attendance. We will be taking evidence today from the Federation of Australian Scientific and Technological Societies, the MTIA and the Institution of Engineers.

I remind you that the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. The deliberate misleading of the committee may be regarded as a contempt of 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. Would you like to make an opening statement before we proceed to questions?

Prof. Cullen—The reforms that have been coming out of, initially, the Hilmer review and then the national competition policy, which flowed through into COAG, have done a number of things. The overall thrust was to try to get more of a separation between purchaser and provider, in a whole lot of ways. It also encourages purchasers to develop alternative suppliers so they can get competition both on price and on the quality of service.

The bureaucracy in many of the technical areas that we represent, as a scientific organisation, had tended to be reducing their technical capacity before these reforms started, as a general response to cost cutting. There was a reduction in the technical expertise in many of the agencies at state and federal level. This reform has accelerated it and virtually given a justification for outsourcing that technical expertise. We think it has had some quite serious and perhaps unforeseen consequences.

The first point is that governments and their agencies now have considerably less in-house technical expertise than they once had, and they often do not even know the right question to ask of external experts or consultants. If this model is to be made to work, the purchasers need a certain level of expertise to know the right question.

There have been a number of serious mistakes in technical areas because of that lack of capacity. Governments have generally got a reduced capacity now to deal with science intensive issues, like telecommunications, media, air safety and public health. Internationally, issues like mad cow disease and the chicken issues in Hong Kong demonstrate the public hysteria that can come about because of some of these issues, but it also makes it plain that they are technical issues that require very skilled analysis. In each one of those there are doubts that it has had the right level of analysis, and that has certainly not helped the policy making process; in fact I think it has led to a number of mistakes.

If purchasers do not know exactly what they need, providers also have some problems because providers are trying to keep teams of people together. Therefore, they have an interest in selling whatever they can to keep the money flowing in to keep their teams intact. If the purchaser comes up with a proposal that is perhaps not very well thought through, is going to take a lot of staff and be quite costly, the temptation for the provider is to say, 'Certainly we can do that, and here's what it will cost you.' But it may not be the right thing, whereas in earlier days there may have been more bargaining as to what was the appropriate thing to happen. Now, the providers are pretty desperate to keep the flow of work coming through their organisations. You can even take that further. In the environmental area it is not hard to argue, in fact it has been argued in the United States, that these reforms have led to pressures to beat up issues just to generate funding. There are a whole lot of interesting issues coming along which can be beaten up for those sorts of reasons.

When we run down the capacity of scientific capacity within government agencies, one of the things we have done is to reduce career prospects for young science graduates. When I graduated from science, virtually everyone had expectations of getting a job in government somewhere in science. That, of course, is totally gone. For that reason, and because of the lack of adequate career paths, we are having trouble attracting good young people into science. They do not see the government offering employment prospects. Consultancies are still full up with public servants who have been pushed out, so there is no alternative happening there—it is being downsized. Their best prospects are a string of short-term appointments and, quite rightly, many of them are choosing to do other things. We have held symposiums on that issue to try and explore those issues. But part of these pressures has led to lack of career prospects for young scientists and that is leading to difficulties in attracting the best people into science courses. That may well have very serious long-term consequences for this country.

We are now cutting science departments in our universities. Monash University is coping with a nine per cent cut in science at the moment. That probably means that some disciplines will go. That may, or may not, be a bad thing—that needs to be argued. But the consequences certainly need to be thought through very carefully, rather than just chopping the most expensive discipline.

More alarming to me is the fact that I am informed by some colleagues at Charles Sturt University that there are a number of regional high schools in rural New South Wales that no longer offer year 11 and 12 chemistry and physics. I just wonder, firstly, what they are doing to the career opportunities for those kids and, secondly, what they are doing for the scientific literacy of the Australian community when we are not even offering senior science in those secondary school situations.

Our submission points to the shift that these reforms have caused in pushing us to short-term rather than long-term issues. The purchaser provider model works reasonably well when you have got short-term issues that need instant advice. It finds it much harder to invest in things that might be five or 10 years out. There are many such issues for which it is hard to generate funds which may yet be big issues in five or 10 years that we will not have information on.

Let me give you an example. There is an emerging issue at the moment of what I will call endocrine disrupting chemicals. These are chemicals in the natural environment that mimic oestrogens. They were first detected in Florida where they found that some alligators had shrunken penises. It was then connected with falling sperm counts. There are now a number of stories where people are talking about sex imbalances in fish from sewage outfalls, and things like that.

These chemicals can come about from both pesticides, as used in cotton and other areas, and plasticisers. They are ubiquitous in the environment and we do not know whether they are having much impact. You can imagine the political and public furore if that sort of story was run on national television. The Academy of Science is treating this seriously and it is having a symposium on it next month. We are treating it seriously. We have a small project going looking at sex imbalance in tortoises in some of the return dams on the cotton irrigation farms because, if there is an impact from the pesticides, we should pick it up there.

If that were to get marketed by someone, I could get millions of bucks for research in that overnight—not necessarily very responsibly. If I put it up as a longer-term thing now, I think that I would be lucky to get funding for it, but I could get funding if I beat it up. I reckon that is a pretty serious way to be setting science priorities. We are having trouble with longer-term, slightly more way-out issues.

The CRCs are an outstanding example of a linkage between the users of knowledge and the providers of knowledge. They are one way through a lot of this short-termism because the CRCs are seven-year contracts. That means there is an opportunity to have a mix of short-term and long-term research, and most of the CRCs do have that sort of a mix. They are a very interesting model because they are ongoing. So it is not a question of me turning up in front of industry people making a pitch for some money. I front up to the industry people every couple of months because they are on my board, they are getting an understanding of the research ethos and culture, and they are giving our researchers an

understanding of the industry culture. It is a long-term relationship and we are each getting to understand the other.

I regard it as a great success, but that is probably not a great surprise as I am a director of a CRC, so I should declare that. We have had a number of overseas people come through. We have had comments from people from the United States, including Gene Likens, who won the Australia Prize a few years ago—in this building, in fact, at a dinner that Robert Hill put on for him. We brought him out to evaluate some of our work and he said that he wished the United States had a program like the CRCs. More recently, we have had the presidents of the French and Belgian academies of science. They were both sent by the academies to look at our CRC, and they also said what a very interesting and exciting model it is. Most recently, we had a delegation from the New Zealand Crown Research Institutes, who said, ‘Hey, there are a lot of very exciting things here.’

I raise those issues because, as you are probably aware, the Expenditure Review Committee is looking at the CRC program in about 10 days time, and we think it is critically important that all parliamentarians understand the importance of this program and make sure that it is protected. It is one of the links that is getting us away from this very short termism. It is also a very exciting international model and I would urge you to give it whatever support you can. Support for it is a clear part of the FOSTS policy document.

Basic research is also critical. It is fine to have industry driven research but it is hard to see an industry or an industry committee that would turn around to a bunch of researchers and say, ‘Look fellas, go off and invent a laser or a transistor.’ It just does not work that way. Industries can exploit those developments from basic research but they cannot necessarily perceive them; in fact, it took many years for those applications to emerge.

I have mentioned the problems in the university departments. We are having trouble attracting the very best students because of the structure of the science community. You are aware of the infrastructure problems that universities are having, which have been reported on by various inquiries but are not being adequately addressed. Our submission identified a number of areas of market failure where we think it is desirable and appropriate for the government to intervene strategically. Particularly, they relate to long-term research, basic research and the idea of capacity building. As well as the fundamental problem that I have been addressing with the CRCs, there is the problem of how to broker knowledge between the users and the producers.

The only other small point I want to make is in relation to the ownership of data. We are starting to see, in some areas, corporatised bodies saying that they own data, it is not necessarily a public asset and they do not even necessarily have to make it available for a fee. We are battling that. I am arguing that, in the water area, all data collected should be publicly available. I am delighted to say that the ACT puts all the water quality data on the Web, so it is publicly available. That is not happening in all jurisdictions and,

again, it is a consequence of the commercialisation of government entities.

We are also seeing a bit of work coming through which is regarded as commercial in confidence. Scientific work that comes out as government, agency or organisation reports does not go through the normal quality controls of science which require fairly open refereeing to get something into the scientific literature. Some of those quality controls are dropping off under the guise of commercial in confidence, and it is of concern to me that we may get decisions based on science that is not of the highest standard. That is all I want to say.

CHAIR—You did not specifically home in on the R&D tax concessions element. How do you feel about them? Do you feel that they are open to abuse? Do you have any examples? Do you feel that it is working effectively? How might the recent changes announced by the government impact on R&D tax arrangements?

Prof. Cullen—We thought the 150 per cent tax deduction was working quite well, and we saw quite a marked lift in business expenditure on R&D because of it. Anecdotally, we believe that industry expenditure will drop when the next round of figures comes out because they certainly are not as attracted to 125 per cent; first, it is less money and, secondly, they argue that the cost of compliance almost takes over what they would get back from it. I have heard a number of statements to that effect and, in fact, an industry spokesman said that at the last Prime Minister's Science and Engineering Council. We would prefer that it went back to 150 per cent because we think we were getting quite a good lift in business investment.

You asked about abuses. Anecdotally, one hears that there were problems with definition and with how you audit it. I have not got any specific examples. There is currently an exercise on to tighten the definition of R&D. I am not sure how helpful that will be. Certainly, I am aware that there have been some difficulties in those areas but I am not really across them. I do not know if any of my colleagues are.

Mr BEDDALL—Just on timing, the CRCs' seven-year program—when did the first ones fall off?

Prof. Cullen—They have gone. They went through their re-bid opportunity the year before last. Some have been extended and some are closing in the middle of next year. There is another round this year where, I think, about 30 of them, including my own, are going up for re-bids. They will be considered in the context of any new bids that are off the floor and they will either get another seven-year life or—

Mr BEDDALL—Is there money in the forward estimates for it?

Prof. Cullen—Yes. I guess overall the forward estimates are a bit depressing for science because they show a steady run-down, but the CRC program is estimated to be

continuing and we are urging that that obviously be protected.

Mr BEDDALL—It is actually a matter of CRCs new and old competing for the funds?

Prof. Cullen—And we think that is a very healthy sign.

Ms GAMBARO—Professor Cullen, you mentioned the fact that Commonwealth agencies cannot set national priorities because state governments have ownership of a lot of the natural resources. Can you just expand on the role that you see for state governments in terms of encouraging further research and development?

Prof. Cullen—Yes. I am, personally, with my CRC working with a number of state resource agencies trying to help them develop what I call knowledge strategies. What knowledge do they need to do their business? The sorts of things that one looks for in a knowledge strategy are: what they need for their short-term day-to-day operational decisions; what they need for their longer-term planning decisions; what they need for their state of the resource or state of the environment type reporting obligations; and how they scan the world for emerging issues such as the endocrine disrupters. They are probably the four main elements. For each of those they have got to have a strategy for how they are going to make sure they are kept informed. Sometimes it will be just knowing who the key expert is and maybe having an arrangement whereby they get a review every year or so. In other cases, it will be commissioning research with a group like my own, in-house or in some other way.

We are urging that each of those organisations with a responsibility for managing land and water should, as part of their normal business plan, have a knowledge strategy identifying some of those issues. That will start to identify the critical linkages they do not really understand such as, 'Is planting trees in our current Landcare model going to improve salinity?' There are critical linkages and, if you try to develop a knowledge strategy, you start to say, 'We are pinning a hell of a lot on this one. Is it really true?'. That is where I am trying to help them to articulate their science needs.

Ms GAMBARO—Going back to the endocrine example that you mentioned, obviously there would have been some reported cases. Are you hoping to provide greater linkage with state governments so that they can work together to ensure that if there is available information it flows pretty quickly before the particular issues get out of control?

Prof. Cullen—At this stage, what I am trying to do is talk to constituencies that have an interest in that to make sure they are at least aware that this is a potential issue and they should be having a watching brief of some sort. Secondly, without going overboard on it, we might start doing some investigatory type research and that is why we have got some work under way with tortoises. I have talked to a group of cotton farmers about pesticide issues saying, 'We have done a lot of stuff on pesticides in cotton. This is

one that is going to come and, if it comes, we have not got good answers.'

The Academy of Science is having a one-day symposium shortly. They are bringing some international experts in. A number of us who have an interest will attend that and we will get better informed. That is one that I think is being handled quite adequately and responsibly. It is just that if someone wanted to run off and beat it up to get research funds, they could create a hell of a scare with it, which is not warranted at this stage. It is something on the horizon that we think I, as a water researcher, need to have an answer to should it come forward. I need to be able to reinforce my partners that, 'No, this is not an issue that you need to worry about'.

Ms GAMBARO—Thank you, Professor Cullen.

Mrs JOHNSTON—You talked about ownership of data. Can you talk a bit more about that and what impediments you see? I, for one, am of the opinion that for too long in this country private enterprise has not been encouraged to do scientific research and get involved in the sorts of areas that government has mainly been involved in. I would say that a lot of European countries have over many years spent a lot more time on encouraging private industry to take part in scientific development. Would you tell me where you see the problem might lie?

Prof. Cullen—I am keen that government strategies to encourage business expenditure in research and development be increased because we are not doing very well. For most of that work I would suspect it should be published in the normal scientific literature, undergoing the normal quality controls of science; I think the commercial advantage can be got quite early in the process and it should be published.

My particular concern was to do with data such as stream flow and water quality data, which has traditionally been collected by governments and is now being handed across to new corporatised or fully privatised entities. Those organisations are given that data. If they decided that it was not worth the storage capacity, they could take it to the tip; there is no guarantee that they would keep 100 years of water flow records. They are not likely to do that, but there is no assurance that that publicly collected data is even to be maintained. If it is maintained, whether they have to give it to anyone else, or even sell it to anyone else, is also unclear. They can, if that is in their commercial interests. But if they are also the organisation responsible for sewage discharge, it might not be in their interests to let that data out to others.

Where we require data to be collected, either through government contracts or as part of EPA type of monitoring requirements, I would like to see a clear assertion that that is publicly owned and should be publicly accessible. I think it can go onto the Web now, where there are virtually no retrieval costs for anyone. The earlier argument was: 'It costs us too much to have people burrowing around to find it.' I think that has gone. The Web is a good example and I hope other jurisdictions will follow the ACT example. So it was

specifically monitoring information I was worrying about.

Mrs JOHNSTON—In your science policy you talked about a cultural change being necessary. Would you expand a bit on what exactly you mean there? I do not mind who answers that.

Dr Baldwin—The problem is really one of education. It starts in the primary schools and goes through secondary schools to universities. It is one that has to be attacked at all levels. We now have the situation where there is a gulf, if you like, between the approach to research in universities and the approach to research in private enterprise. This is being bridged by the CRCs and by other initiatives. But what remains is an underlying attitude, in some companies at least, that the universities are there to do their research and why aren't they doing it? And there is an attitude in universities that the industries need to come to them with a much more specific plan that suits the universities' particular interests. So the interface needs to be made there.

A cultural change is needed to ensure that industry understands the need for in-house R&D and the effectiveness that that will add to their product. At the same time, the universities need a cultural change to an extent—it is becoming less of a need—to take their interests and actively interface with industry. We believe that this cultural change is something that needs to happen across a broad spectrum of activity, all the way from education through to what happens in the boardrooms and the university councils in Australia.

Mrs JOHNSTON—Would you see government taking the predominant role in that? I am following on from your quote earlier about one of the high schools having no chemistry and physics in year 11, which I find quite appalling. Do you think that the government can play a bigger role in promoting this cultural change or it is something that all parties have to get together and do?

Dr Baldwin—There is a clear role for government in this area. Government at present has a science awareness program that is funded to do that sort of thing at a different sort of level, but there is a clear need to provide indicators that encourage activity in R&D in the private sector. We had one in our policy document recently which was to encourage scientific and engineering expertise on the boards of companies. You could perhaps encourage it through government means by allowing that as a deduction, or some arrangement like that. But there should be indicators that make it clear that having expertise in these areas is important for the future of private enterprise.

Mr RICHARD EVANS—I thank my colleague for asking the questions that I was going to ask. I would like to expand on a couple of things you are saying about a reduction in R&D because of the funding—the 150 per cent down to 125 per cent. Why do they need money to get involved in R&D? What other incentives should there or could there be? You have spoken about the natural progression, to get right back and get into

primary school situations, changing our focus on R&D so we become an R&D country. What do we need?

Prof. Cullen—The Marceau report was very interesting on this issue. It basically said that we had a mix of industries that were not as highly dependent on R&D as perhaps some other sorts of industries and that was one of the reasons for the relatively low expenditure. One thing we should be looking at is how we can develop more high-tech types of industries. We should also recognise that both agriculture and the mining industries are very heavily based on high quality science and technology and we have a longstanding record in that area.

There is something that we need to do. I asked the question: why did Memtech, which was a very successful Australian development of membrane filtration of water and had gone up to a turnover of something like \$60 million, find it not possible to grow in this country and so was taken to the States? It is fine to talk about level playing fields and open competition, but there we had a world winner and it did not feel it could grow properly here. So there is something about our settings to do with capital gains and access to risk capital which is not giving us the optimal settings if firms like that are finding it perhaps better to grow elsewhere. I do not know enough about those settings and exactly what they are, but I would love us to look closely at them. It was tragic that we lost that firm. I would like to think we could grow firms like that in Australia.

Mr RICHARD EVANS—Are we thinking nationally rather than internationally when it comes to R&D? Are we saying that we should be trying to develop our own R&D on a national basis rather than consider that we should be supporting the international R&D program?

Prof. Cullen—Australia has a fairly proud record internationally. We are not heavily involved in all research areas, but in the ones we are involved in we have a fairly proud and good record. There are many areas though where, for our own strategic reasons, we need to have our own research capacity. We have developed that over land and water, for instance, because everyone can see they are fairly unique issues. Equally, you can argue that, say, with information technology it is better to be at the front end of developing things than at the bottom end buying things at whatever price the inventors want to set for you. There are strategic areas and Australia needs to look at which of those areas it needs to beef up. Traditionally, we are very strong in medical research, agricultural research, and land and water in general. We just need to look at those priorities and see whether they are still appropriate or whether we want to develop other strengths.

Mr RICHARD EVANS—Who is doing the push into IT? Is it industry or the universities?

Prof. Cullen—I think it is both. There are a lot of small IT start-up companies in Australia which are coming out of people from the universities. I am not quite sure as to

just what the barriers are there, so I really cannot go too much further. Have you anything to say on that?

Dr Baldwin—Not so much on IT but, as another example, we were talking about the way that corporatisation and the market can lead to a pull or a push for particular types of research and there is a lot of research in Australia on microelectronics. This is being done at a very high level. There are university activities that are producing things of world quality and yet there is no home based microelectronics industry. That does not mean that we should not be doing this research because, clearly, having this expertise taps us into other expertise around the world which then allows us to bring in knowledge in other areas. What we should be thinking about is whether these international linkages leverage our ability to gain knowledge over a broad spectrum of activity and also whether we should indeed have our own microelectronics industry—or whatever the particular situation is—that we can link these very high level research activities to.

Mr RICHARD EVANS—You spoke about the gulf between universities and private enterprise. Are you suggesting that the universities are heading in one direction and industries in another direction? How do you define the gulf that you are talking about?

Dr Baldwin—I think it is a gulf in attitudes rather than directions. It is a gulf in the appreciation of where research and development can benefit industry.

Mr RICHARD EVANS—Can you expand that a bit further? Is industry suggesting that R&D can or that the universities are or vice versa? What do you mean?

Dr Baldwin—In many instances, because the expertise does not reside within the company, they are unaware of opportunities in particular technologies or in particular areas where they can develop product. This expertise may well reside in the universities but it is not being tapped. Or perhaps the company should have its own employees who have been educated and trained in research organisations—not necessarily in Australia—so that at least these people are on tap to take advantage of these opportunities when they arise.

Mr RICHARD EVANS—So should there be some sort of centralised data sourcing place so that companies can tap into it and find out whether the technology is available?

Dr Baldwin—Or maybe they should have people within the company with the scientific or technical know-how who know where this knowledge can be gained. For example, BHP recently appointed a chief scientist whose job is simply to go out and determine what the needs of the company are and where the technical expertise that fulfils these needs resides in Australia.

Mr RICHARD EVANS—But if there are 11 employees in one company what do they do? Where do they go?

Dr Baldwin—Yes. It is always the problem with small to medium enterprises that they do not necessarily have the capacity to maintain full-time technical expertise on their staff. On the other hand, if they have people on the board who are aware of where to go looking for this type of advice then that is one way around it. I do not think we would ever suggest that small companies with 10 employees would have a full-time scientist on their staff, except in the case of maybe a spin-off company from a particular research activity.

Mr RICHARD EVANS—But they cannot go anywhere now unless they have some sort of scientific consulting with them.

Dr Baldwin—Yes, or else people who had some sort of scientific background before they went into management. This is part of our push to increase the cultural level of scientific literacy because it means that when people do science at school, or go to university and do science, and they then go off and become company directors they have a background in these areas that enables them to make these decisions on a rational basis.

Mr RICHARD EVANS—Or management courses should have R&D units?

Dr Baldwin—Perhaps so, yes.

Prof. Cullen—I would certainly support that. But, equally, I think it is interesting to look at what is happening in the states. Most of the Australian states have now developed science and technology policies and have some secretariat staff. The main role they appear to be trying to take is this brokerage role of bringing researchers and potential industry groups together. I think this is seen as a big problem but I think there are many opportunities. Universities are trying to reach out more to their communities and there are some interesting successes happening there. It is interesting to see that the states seem to be seeing S&T as an area they want to focus on to support their industries. I think we are going to see some very exciting things in this area in the next five years.

Mr RICHARD EVANS—I am sure we are.

Mr Gascoigne—It was suggested to me that one of the difficulties that the universities face at the moment is that their science departments are suffering from massive shortages of funding just at the time when they need support to establish these linkages with industry. I think Ken Baldwin mentioned this fact about a cultural change being needed, and part of that cultural change that is needed extends to science faculties and universities. Although there is a recognition within the science faculties that they have to change, they do have to establish better links with industry. It is hard for them to do this when universities in general are being cut back in funds and science, in particular, is

being squeezed for funds for internal reasons.

Mr BEDDALL—I want to take further something you touched on a little earlier about impediments. Memtech is a classic example. But if you are Memtech, or any other rapidly growing high-tech industry, why would you stay in Australia? The capital gains tax regime is not comparable with, say, the United States where everything you earn, because you have got this rapid expansion of wealth of the company, is subject to marginal tax rate.

That is one thing that nobody has addressed. Therefore, you would be mad not to locate, in a global sense, offshore, where you would get a better regime. When we are talking about tax debates in this country we are talking about the micky mouse stuff such as sales tax versus VAT or whatever. The real impediments to growth are in the capital gains tax area.

Secondly, you say there are all these public servants who are out there now in the science area. How much of an impediment to growth in science is the lack of teachers in schools? What are the states doing in order to encourage those people who have the expertise—maybe later in life—and the passion to go back into the schools?

Prof. Cullen—We would think there was room for considerable movement on the latter. We are concerned that a lot of the science teachers in our secondary system are not necessarily qualified specifically in science. They have often done a four-year BEd degree with a few science units but have never practised science and have never found the passion of science. As you say, if some people late in their career could be given a late career teacher training sort of program, I think they would make exceptionally good science teachers and could meet some of these problems. We are very concerned about the quality of science teachers.

HECS charging is one of the issues there in that science teachers pay a higher HECS but they do not get any higher salary in the school system. We see that as another one of those impediments. I do not have anything to say about your capital gains. I do not know enough about it to get into the detail.

Mr BEDDALL—Someone the other day said Microsoft would never grow in Australia, would never happen here.

Prof. Cullen—And yet the researchers that gave them their foundation technologies are Australian researchers. There was a lever to keep them here if we could have had those other economic levers suitable for them to grow.

Mr BEDDALL—We treat everything as if it is a house or property that has a capital gain but in fact it is a very different item if it is a high-tech company through rapid growth.

Mr ALLAN MORRIS—I have two lines of questioning. The first one is the question of universities. It seems to me the move towards casualisation, short-term contracts in the work force, is totally contradictory to any serious research capacity. I have watched the trend in universities in Australia. I suggest that up to half, or more, of the teaching staff in universities are now on one-, two- three- or four-year contracts.

Prof. Cullen—I agree with you that it is very difficult for anyone to build substantial teaching materials and programs or any sort of research programs with those sorts of lengths of contracts. Equally, I think it would be good if we could have more interchange between the universities, industry and other places. For a whole lot of reasons we seem to have got barriers, not least superannuation, where we are not getting the interchange that some other countries are having and it would be great if we could get more of that.

I can see that if I were a vice-chancellor, and I had to balance my teaching staff, I would want a reasonable proportion on contracts of some sort because you do not know where the students are going to want to go to. The growth areas in university are determined by year 12 students who do not have a clue what the full array of disciplines might be. They vote with their feet and sign into a course, and suddenly you have a 50 per cent increase in marketing, banking or something and you have to staff it. But you cannot really put people from chemistry or physics across into that. There are real difficulties for a vice-chancellor.

I think one- or two-year contracts are totally improper for everyone. Longer-term contracts, five- or seven-year type contracts, are a way of giving some flexibility, but I certainly would not want to see the proportion get up above about 40 per cent, and I think it is getting above that in some areas now.

CHAIR—I just want to pick up that particular point about the five- to seven-year contracts. If you do that, are you not locking them into remaining with that particular enterprise for that period of time? You just talked about the flexibility of interchange between industry and universities. How can you build that up so that there is the flexibility whilst still having some sort of contractual arrangement?

Prof. Cullen—I think it is interesting to see how CRCs have addressed this problem because they can only employ people for seven-year periods or less. So people come to us and we cannot offer them a career track. What we can offer them is the opportunity to build their CV and give them the ability to demonstrate some particular experiences that will stand them in good stead for their next one. The American model is much more flexible than ours. Ours seems to be that traditionally you get a job at the beginning and stay in it for a long time. That is of course changing. I think we would benefit by more interchange of staff in and out of universities, and any mechanisms we can use to encourage that would be better.

Mr Gascoigne—The Minerals Council of Australia released a report a couple of weeks ago entitled *Back from the brink* which was basically addressing the question of education in the geophysics area. They said that whereas before there used to be a ready interchange of people between government, university and industry, this has become impossible now because the imbalance in salary between universities and private industry is so great. In fact, young geophysics graduates just graduating are starting on salaries equivalent to a senior lecturer's salary and people of professorial rank would expect to get about double that salary as a matter of course within the industry itself. So this interchange has gone.

Peter Doherty, when he talked at the National Press Club last year, had an interesting solution to this question of contracts. His idea was that instead of putting younger people just starting out on short-term contracts—six-months, one-year or two-year contracts—you give the younger people a longer contract so they can get established and you put the senior people on the short-term contracts, which would set the cat among the pigeons, I guess.

CHAIR—It sure would.

Mr ALLAN MORRIS—Perhaps you have just hit the nail on the head with the fact that we value our academic staff so lowly that we pay them so poorly vis-a-vis the private sector. Perhaps that is what really is the problem. Perhaps that is the mind-set which we see manifested.

My second question relates to intellectual property. We now have R&D tax write-offs and we have been investing heavily as a society in developing intellectual property in the form of research. In a large number of cases we do that with international companies, and with companies such as Memtech. Memtech received a substantial amount of taxpayer support in terms of research and development but it is now in America.

Memtech highlights the difficulty of trying to keep Australian intellectual property, developed with Australian resources and Australian taxpayers' funds, in Australia so that it benefits the nation and it is not used against us. Memtech's technology could be used against Australian companies in the future. Memtech's technology developed in Australia will now be used to compete very successfully against other technology developers in Australia. Is there a way whereby we can encourage or create an environment in which intellectual property developed in Australia remains here, or is at least collocated here?

Prof. Cullen—That is a very interesting idea. The whole area of intellectual property is very important. I was reading a report from the New York Academy of Science the other day which was saying that the fundamental element in a lot of the contractual research in American universities is due to the fact that the universities can capture some of the intellectual property revenue streams, and some of them have got very large revenue streams. They were pointing to one particular amendment to the act which

they said had led to so much research and development in the universities in the United States.

I am not particularly familiar with that area. I think there are two elements. Firstly, we do need to make sure that our intellectual property law is as up to date as possible. Of course, things are changing so rapidly in terms of the sort of property to protect that it is hard to keep it up to date. Secondly, I think it is fundamental that we teach both our science students and our management MBA students a little bit more about intellectual property and its management than I think we have been doing. Whatever our current system is, I do not think a lot of the new graduates in either of those areas have a good understanding of it and that is something we need to remedy.

CHAIR—Thank you very much. We will have to conclude at this point. I take the opportunity to thank you for your evidence this morning and also for the manner in which you answered the questions from members of the committee. Thank you very much.

[10.15 a.m.]

BOTTERILL, Ms Linda Elizabeth, Senior Industry Policy Coordinator, Metal Trades Industry Association, 214 Northbourne Avenue, Canberra, Australian Capital Territory 2601

FORSTER, Mr Frank Robert, International Marketing Manager, Farley Cutting Systems Australia Pty Ltd, 7-9 Walter Street, Glenroy, Victoria 3046

CHAIR—Welcome. I remind you that the proceedings here today are legal proceedings of the parliament and 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. Would you like to make an opening statement?

Ms Botterill—Thank you, Mr Chairman. Australia's research and development record is a matter of great concern to MTIA. Private sector R&D performance and government support, in our view, are definitely linked. As indicated in our submission, we are of the view that there is a role for government to play in stimulating R&D and there are sound economic arguments for this position.

Public funding of industrial R&D is important to Australia's competitiveness, and as we pointed out in our *Make or break* report last year, public funding of R&D is also important to Australia's ability to attract investment. We were therefore reassured by the Prime Minister's *Investing for growth* statement and its strong support for R&D and innovation, albeit if the actual funding behind the words largely ensured the continuation of existing programs.

The present inquiry seeks an assessment of the impact of public policy reform on R&D efforts over the past decade. In preparing our submission we surveyed a cross-section of our membership to seek their views on the influences on their R&D efforts over the past decade and, overwhelmingly, the most cited change was the reduction in the 150 per cent tax concession. Australia's R&D performance is lacklustre by international standards, particularly at the level of business expenditure on R&D. The Industry Commission reported that the introduction of the 150 per cent tax concession had a marked impact on the R&D effort, proving it to be an effective mechanism for increasing industry's R&D performance.

MTIA strongly supports the tax concession as a means of stimulating industrial R&D. As noted in our submission, its simplicity makes it easy for R&D practitioners to sell to senior management. Its broad availability means that all eligible R&D receives support and, as the Prime Minister noted in his December 1997 statement, it is market driven and reduces distortions in economic decision making. MTIA was disappointed with

the reduction in the concession from 150 to 125 per cent, particularly as it occurred just as the industrial R&D effort was beginning to pick up.

MTIA supports generally available incentives which encourage genuine R&D activity. We do not condone rorting or abuses of government schemes, although we caution against throwing the baby out with the bathwater when problems are uncovered.

The R&D Start scheme was a good response to the ending of syndication, providing an incentive for tax loss companies unable to benefit from the tax concession. The enhanced R&D Start is a good supplement to the tax concession and will provide the opportunity for a broader range of companies to access the program. Since December 1996, we understand that nearly 50 companies have received funding under R&D Start. This compares with approximately 3,500 claimants per annum for the R&D tax concession.

Although the level of participation in R&D Start is likely to pick up with the enhancement of the program, these figures highlight the difference in coverage between generally available programs and competitive programs such as R&D Start. While there is a place for both approaches in the program mix, MTIA strongly supports the retention of a broadly available tax incentive.

As mentioned earlier, MTIA welcomed the strong emphasis in the Prime Minister's December statement on R&D. We were particularly pleased to see that the government had added to the forward estimates sufficient funding for R&D to ensure that programs such as R&D Start will continue at just above present levels until 2002. Following *Investing for growth*, support for industrial R&D will be around 10 per cent above 1997-98 levels to 2002.

This commitment to R&D funding was most welcome in light of the significant cuts which had occurred to industrial R&D funding as a result of the reduction in the tax concession. In real terms, funding for industrial R&D through the tax concession scheme was cut by approximately 20 per cent, from \$348 million in 1996-97 to \$286 million in 1997-98.

The Prime Minister also undertook in his statement to review the R&D tax concession to ensure that it operates more effectively and is more accessible to business. His commitment in this area was threefold: to introduce measures to streamline registration and lodgment requirements; to consult with industry and to clarify the definition of eligible R&D; and to review other provisions to ensure the integrity and efficacy of the concession.

MTIA has responded to the government's calls for comments on the definition of eligible R&D. Following consultation with our members we are strongly of the view that the definition should be left as it is. There is around a decade's experience with the

present definition, and a body of case law is available to assist applicants with respect to the interpretation of the present definition. Applicants have systems in place within their businesses to ensure that they meet the requirements of the definition. A new definition would not necessarily mean greater clarity, but would increase compliance costs for companies and introduce further questions of interpretation.

The discussion paper which was issued by DIST on this topic was framed in terms of amendments to the Income Tax Assessment Act 1936. As I said, MTIA does not believe that a change to the definition in legislation would necessarily improve the clarity of the concession. We are concerned that this clarification exercise might be used merely to tighten the eligibility for the scheme. The discussion paper did not make a good case for the need for change. No evidence was offered that the system was being rorted or that unintended benefits were being attained.

MTIA welcomes the commitment to a streamlining of the administrative process for the concession, and the Prime Minister's statement that the government wishes to make the tax concession more accessible to business. MTIA believes strongly that there are sound arguments for government involvement in stimulating industrial R&D. We believe there should be a mix of measures available, underpinned by a broad based general access program such as the tax concession. We believe also that policy changes should be minimised to enable industry to operate with certainty.

MTIA welcomed the increased funding in investing for growth for the innovation investment fund. This was a positive move, amounting to an increase of about 30 per cent. A number of reports have indicated that lack of access to venture capital is a major impediment to innovation in Australia, and this program has the potential to be very valuable.

Finally, MTIA members are very supportive of the cooperative research centres program. We have made a submission to the current review on the public funding of CRCs and urge the government to maintain funding at current levels. CRCs provide an important linkage between industry and publicly funded research institutions. Also they get competitors working together by creating a critical mass for the research effort. While readily acknowledging the importance of private sector funding to the success of CRCs, MTIA would like to emphasise the importance of public commitment to the centres.

I have with me today Frank Forster, from Farley Cutting Systems. Farley is a high-tech company which has above average levels of R&D. The company also participates in the CRC for intelligent manufacturing systems and technologies. With the committee's agreement I would like to ask Frank to make a few comments about his company's experience with R&D.

CHAIR—Would you prefer to take questions now on what you have had to say to the committee, or would you prefer Mr Forster to give his submission?

Ms Botterill—It might be useful for Frank to outline his experience, just to give a more specific focus.

CHAIR—Thank you. Would you like to proceed, then.

Mr Forster—Thank you very much. I am the international marketing manager for the company, and I never pass up an opportunity to distribute information about our products and technology.

CHAIR—Where would we be without a marketing fellow?

Mr Forster—I would like to distribute these, and people can have a look at the information in there about our product and our company's activities in due course.

However, just by way of introduction, Farley designs and manufactures CNC profile cutting equipment. In essence, that is computer controlled equipment for taking large flat plates of metal, say the size of this table, and cutting it into component parts or into profiles.

We supply that sort of equipment to key industry sectors, from general metal manufacturing and steel distribution right through to earthmoving equipment, mining equipment, shipbuilding, et cetera, and structural steel bridge builders. Our customer base is now nearly 500 customers worldwide, and this financial year our export ratio will be about 80 per cent of our business. We are exporting into all the major Asian, North American and European markets, and we are supplying key customers around the world like Caterpillar, British Steel, Swedish Steel, Hitachi in Japan—major manufacturers at the global level.

Apart from the export profile of our company, another key factor in our business focus and our business success has been innovation. That is where we have had some experience with the various research and development programs that exist in Australia. We certainly have an ongoing involvement in a number of those activities and programs.

Our innovation, or our engineering science intensity, if you like, is indicated by the fact that we have 100 employees in Australia and other parts of the world and 40 per cent of those are professional engineers, in mechanical, electrical, electronics, computer systems or software. That underscores the value which we place on technology and technical development in maintaining a competitive edge in the world market.

To talk specifically about our experience with R&D: we are, as 100 employees would indicate, a fairly small company, and we are competing in the international marketplace with major corporate competitors 10 to 20 times our size. It would be impossible for us, in isolation, to develop and maintain the level of science and technology that we require to remain competitive. We would not have the resource internally to be

able to do all of the science and technology that we require.

So we have developed a number of linkages over the years with various other bodies that we can interact with, share expertise with and gain input from in the R&D area. They include CSIRO, for example, and a number of our major universities, both in Melbourne and in New South Wales. We link with our suppliers and with some of our end users, or customers, to focus that effort. Since the cooperative research centres program has been established, we have been an active participant in one of the CRCs—as Linda mentioned, the CRC for intelligent manufacturing systems and technology.

At the same time, over the course of our history we have had various R&D grants, GIRD grants, and national teaching companies scheme assistance. We now are in the final stages of concluding a Start project with the department. Through our involvement in the CRC, we have also had a linkage into an international manufacturing systems research program called Globeman, which is being conducted under the IMS. That again is providing us with an opportunity to link what we are doing here in Australia with the needs and the activities of some of our suppliers, our customers—and, I should add, our prospective customers in key markets like Europe and North America.

We have certainly, over the years, had strong support from the 150 per cent, now 125 per cent, tax concession and have made strong use of that. We would certainly endorse the call that MTIA has made for the retention of that scheme. Just to give you an example, in the budget last year there were three decisions that affected our bottom line: the reduction of the R&D tax concession; the removal of a machine tool metalworking bounty; and changes to the export market development grants scheme. Combined, in one night's activity, those changes took about \$400,000 off our bottom line. We can survive and we will prosper in spite of those changes. The thing that we would certainly urge and provide strong support for is the fact that policy certainty is a highly desirable outcome from industry's point of view. That again reinforces some comments that Linda has made in her statement.

The other point about the various R&D support schemes is that, for small companies like us, there are high administrative overheads and high administrative costs of participation in things like CRCs and Start programs, et cetera. Having set up systems to manage that process, again policy certainty is a factor that we would argue very strongly for, because changes to the system mean changes inevitably in the way we administer and conduct that activity, with the flow-on overhead costs.

More broadly speaking, apart from our own activities and role, my personal view is that we have a great need in this country for people who can act as independent facilitators in the R&D area. I was listening to some of the comments from representatives from the previous groups who appeared at the committee, and they were talking about the interactions between universities and industry. Unfortunately, there are still a number of companies that I have encountered or had experience with in Australia that have a very

narrow view of competition. They think that, if in Australia there is another manufacturer or an industry body involved in the same industry that they are in, that is their enemy or their competitor. In actual fact, most of the competition is elsewhere in the world. There have been difficulties in getting industries in similar areas of endeavour to cooperate through programs like CRCs, et cetera.

There is certainly a role for independent or other groups, like MTIA and various industry associations, to play a more active role in facilitating some of those linkages and acting on behalf of broader industry groups or sectors of industry, to provide information and the sorts of facilitation services that can build some of those important linkages. Those are all the remarks I wish to make at this point.

CHAIR—Thank you very much, and thank you to Linda Botterill also. Firstly, Mr Forster, what percentage of your company's budget would be spent on R&D? Is it of an ongoing nature? What do you set as a five-year program for your R&D effort?

Mr Forster—Consistently around 10 per cent of our turnover is invested in R&D. It is certainly of an ongoing nature. The project that we have been running through the cooperative research centres has been a five-year project, and we are currently looking to extend that for another two years. The Start project will similarly be of a four-year time frame. In formulating product development activity today, we have a plan or a focus on developments for the next four or five years.

There have been two key benefits of both the CRC program and, through that, the linkages into such international research and development activities as Globeman. One is the provision of very current information about the state of technology in various other parts of the world, particularly Europe, and we have been able to take advantage of that. The second is really a broader cross-fertilisation activity, whereby we can obtain information from areas of activity that would be outside the normal bounds of our R&D and technical development, from areas of technology and industry that we would not normally have interaction with. But, the broader you cast the network of researchers and people involved in R&D activity—nationally and then internationally—the greater is the pool of talent, skill and expertise that can direct some of the longer-term research activities that we would be able to benefit from.

CHAIR—You mentioned that the changes in the EMDGs and R&D effort made a difference of about \$400,000 to your bottom line. What has actually happened within the company now with your R&D since that change?

Mr Forster—Obviously, one of the immediate consequences of that was that we started to look very actively at the Start program to provide another vehicle or avenue to continue to support the internal R&D activities that we wanted to undertake. Again, as I have mentioned, the costs of that in terms of administration and overheads are yet another change that we have had to accommodate and learn to work through.

CHAIR—Are you working leaner? Have you reduced your effort?

Mr Forster—No, we have not. Unfortunately, we do not have the luxury of modifying our R&D or our technical development. The competition we face in the global market is stronger than ever. There are more competitors, and they are all marching forward relentlessly, and so we have to maintain that leading edge of technical development and product development in order both to retain our existing market share and to look for increased market share. We do not have the luxury of winding back or scaling down what we do. We just have to find smarter ways of doing it.

Mr BEDDALL—Could I pick up a point there? Way back when you started, 150 per cent was in place.

Mr Forster—Correct.

Mr BEDDALL—Would you have considered not starting if it had been only 125 per cent?

Mr Forster—I do not believe that that would have been an absolutely critical factor. However, at the time we started there were other mechanisms in place—like the metal-working machine tool bounty—which were very important factors in giving us a kick-start in building the core technology of the business. The scheme was winding down, and so the decision in the last budget to terminate the scheme at that point was not really in itself a significant factor for our business. But certainly, in the early days of establishing the business, it was a very important factor of assistance.

In isolation, any of those mechanisms by themselves probably would not make the difference between starting or not starting, and certainly not between continuing or not continuing. But my point really is that, when you combine those sorts of industry support programs and take the whole package of activity there, changes to any one of them—or, as was the case of the budget last year, changes to three of them at one time—certainly do have a substantial impact on how companies go about restructuring or refocusing what their activities are and how their business will survive or prosper.

CHAIR—I come back to Ms Botterill's submission and your formal submission to the committee. You have not only advocated the restoration of the 150 per cent but also suggested that it go further, up to 200 per cent: is this the only option that MTIA offers as being a development of further R&D in Australia? What would be the risk of rorting of the system, if that were introduced?

Ms Botterill—Perhaps I could start with the rorting question. As I indicated, one of the reasons that the definition of the eligible R&D is being looked at is to clarify it, and the DIST discussion paper that was put out suggested that it was also to address the problem of unintended benefits. But we have not seen any evidence that the system is

actually being rorted. In fact, the government's own discussion paper, which stated that these things were happening, provided no evidence in support of this. Obviously we do not condone rorting but we would like to see some evidence that it is actually occurring.

The 200 per cent recommendation comes out of our *Make or break* report that came out last year, developed after consultation with leading CEOs of a range of companies. It is basically an industry based set of recommendations, and an extensive survey was undertaken of companies to get their views on a range of issues. For the first time in quite a while, the issue of R&D as a key indicator or a key attractor of investment was identified. One of the reasons the 200 per cent was suggested is that it matches the headline rates in some of our key competing countries, such as Singapore and Malaysia, which have headline rates of 200 per cent. We recognise that the conditions applying to those concessions are somewhat different in those markets, but still—in terms of the simplicity of the scheme and the ability to attract interest—those sorts of numbers are comparable with other areas and other countries in the region. That is the origin of the 200 per cent, from *Make or break*.

CHAIR—You have made a submission to the DIST R&D tax concession review.

Ms Botterill—Yes.

CHAIR—Is that a public document? Could we have a copy of that as well?

Ms Botterill—I could provide you with a copy of that; that is fine.

Ms GAMBARO—Can I look into the 200 per cent again? Maybe I am wrong here, but doesn't R&D Start-Premium provide for companies to have that sort of a concession in that policy? I thought it did—up to 200 per cent.

Ms Botterill—It does, and we welcome the enhancement of R&D Start; but, in terms of the sorts of numbers of companies that have access to that program, as I indicated, 50 companies have been supported in 18 months under R&D Start, whereas 3,500 companies per year are accessing the tax concession. So, yes, for those companies that get R&D Start, the effective tax concession is getting up to those sorts of levels, but it is only available on a competitive basis—which means that some worthy projects are likely to miss out on support, whereas the tax concession is generally available to all eligible projects.

Ms GAMBARO—When you say 'on a competitive basis', what suggestions do you have apart from that? How should they be assessed?

Ms Botterill—As I indicated, our preference is for broad based support like the tax concession, where projects receive support if they are eligible, rather than two worthy projects having to compete. One of them will miss out. So our preference is for the

generally available, broad based approach such as the tax concession.

Mr Forster—May I add a comment to that, please?

CHAIR—Yes, certainly.

Mr Forster—The fact is that in many ways our company is the exception and not the rule. For a company of 100 people to be in a position or have the capacity to involve itself in a four-year type Start project, with a budget of \$3 million, is fairly remarkable, I would suggest. The other impact of moving away from the publicly available or the broad based programs is that, effectively, you rule out of court many of the small and medium enterprises in Australia that would have access to things like the 150 per cent tax concession, or the tax concession broadly. In many ways, they are the people that you need to convert.

The big corporates have the capacity to employ chief scientists or whatever the case may be. In the small and medium enterprises that is very rarely the case, yet you still want to provide an incentive or a starting point to get them to think more strategically about their R&D requirements and how they can work with organisations outside of their own four walls. The problem with CRCs and Start programs is that they tend to be on the bigger scale, requiring multiple partners, requiring long-term research, but for the average—if there is such a thing—small to medium enterprise just does not have the wherewithal to get involved in a lot of that activity.

Ms GAMBARO—Leading on from that insight that you have given me: one of the problems I have in my electorate—and some of us do in our electorates throughout—is the risk capital that small enterprises need. Do you see a greater role for small enterprises to work with research companies like CSIRO, for example? I mention that example just off the top of my head. It has tended always to be the medium sized enterprises, but what can you see for smaller companies to link into there to get themselves established?

Mr Forster—This is where I believe that groups like MTIA can, and should, play a more active role. They can, basically, provide the funnel or the channel of both information and possibly even funding to assist some of the smaller enterprises to come together in some way and participate with the CSIROs or the universities or the CRCs. That is my suggestion.

It is an endemic problem, I guess, that we really do not have the sufficient leverage of the large groups or large businesses in Australia in the manufacturing area. I know we have automotive and we have major activities in those areas, but really, across the board, as compared with the Europeans, the Americans, the Japanese, et cetera, our manufacturing base largely comprises small and medium enterprises. It does not have the pull-through effect of the big supply chains that exist in Japan and Germany, et cetera.

So you really have to look at mechanisms whereby you can get some of the smaller manufacturing organisations who are not directly linked into the large supply chains to an automotive manufacturer, for example, and find ways of getting them together into smaller groups on either a regional or a sectoral basis. Obviously, there are state government, federal government and local government groups and activities under way that can try and network some of that activity, but groups like MTIA can certainly play a worthwhile role in doing that.

Mr ALLAN MORRIS—I have a question to each of you. Ms Botterill, you would have heard me asking about intellectual property rights and their being retained in Australia. What would your reaction be to the idea—I am brainstorming, I suppose—of access to R&D tax write-offs being conditional on any intellectual property being developed from such write-offs not being taken offshore? In other words, the royalties that may flow from that would have to remain in Australia. Would that be a compatible way, or is there some other way you might suggest that the investment in intellectual property that the country is making from the taxpayers' point of view is retained here?

Ms Botterill—That is an interesting idea. It is not one that I have given a lot of thought to, but certainly in terms of taxpayer investment, yes, there is an issue there if the intellectual property does go offshore, particularly in the example that you gave earlier in terms of their then becoming competitors with Australian industry. As I said, it is not an issue I have given a lot of thought to, but it is certainly one that would be worth looking into.

Mr ALLAN MORRIS—An example would be Memtech CSA. Mr Forster, I am delighted by your company. It demonstrates an ideal and I think we all would hope to see hundreds more such examples. How captive are you to your intellectual property inputs? I notice you are using Windows NT, for example. Do you have access to the beta copy, Windows NT 5, and how vulnerable are you to someone like Mr Gates saying to you that you cannot use Windows NT next year or the year after once your current contract expires?

Mr Forster—We have no access to a beta copy of the next development or the next version of NT, so we are vulnerable in that respect. However, I suppose we are protected to some extent in that 90 per cent of our customers are equally captive to the same technology and our competitors' customers are equally in the same boat. So if there were a major change in that area or some difficulty in that area, it would apply to us, to our competitors and to our customers. So it is more than just we that are at risk.

Mr ALLAN MORRIS—When Windows 95, for example, was released in Australia the commercial versions were not available until December, when the private versions were available in August. In America, however, companies had the beta versions earlier in that year. That put our companies at a disadvantage in terms of developing their products based on Windows 95. I presume the same is happening this time. Is it possible

that some of your competitors may now have Windows NT 5?

Mr Forster—It is fairly unlikely; it is possible. But in general terms our approach on our software development side, which is a smaller part of our business but an important part, has been to wait until these platforms are stable in the marketplace before we offer our own programs and applications on a platform. So we have not jumped into the Windows 95 or NT boat in advance of the market. We have waited until the market acceptance of that platform is sufficiently high to warrant, firstly, that it is high enough and, secondly, that there is a stability about the platform such that we are confident we can make our applications run on that type of operating system.

Mr BEDDALL—My question is a much broader one. It comes to the 150 per cent R&D, now 125. If you follow the history of this you see that Finance has opposed this from the day it was first introduced. It tried every minister until it found one, a new Treasurer, who accepted the arguments. I was part of the rearguard action for about five budgets. However you address that real problem, what you have got is a bunch of bean counters in Finance who would rather give millions of dollars in grants than hundreds of thousands of dollars in unlimited liability. What they are saying to government is, 'You don't know what the liability is because it is open ended,' which is the exact nature of why it should be there.

The real argument within the ERC process is about certainties of three-year forward estimates. It is nothing to do with research and development; it has got nothing to do with anything about research. It is just about how they get their forward estimates so they can get up in the parliament and say, 'We have got a budget surplus.' How have you addressed those in your submissions to date, and how are you fighting a rearguard action with the Department of Finance and Administration bureaucrats?

Ms Botterill—It is difficult in terms of the actual—

Mr BEDDALL—Do you agree with my synopsis?

Ms Botterill—The issue is not so much, I suppose, that you would never be able to get to the point where you would be able to predict with certainty what the dollar amount is going to be. It is like any entitlement based program. You cannot say with certainty what the outlays are going to be.

Some of the work that has been done in recent years by the Bureau of Industry Economics and also by the Industry Commission—both of which are probably fairly conservative in their thinking about these sorts of issues—has come to the conclusion that the tax concession delivers a net benefit to the Australian community. I think it needs to be examined at a slightly broader level than the dollars at the end of the day.

As we indicated in our submission, we have supported the government's deficit

reduction program, but do emphasise that R&D is an area that perhaps needs to be given some special consideration, in terms of the fact that it is an investment in the long term. The dollars, while they may be uncertain, do deliver a net benefit to the Australian community and there have been a number of sound economic studies over recent years that have held that to be true.

Mr BEDDALL—My point is, all of that being taken for granted, that the argument within the ERC process is about forward estimates. It is not about the benefit. Are you attacking those very fundamental issues in your submissions to DIST? The core problem is that, when you are talking about 150 per cent or 125 per cent tax concessions, it is about forward estimates and not about the benefit of the program, and you are going into the bureaucracy and fighting those arguments.

Ms Botterill—In terms of the workings of the ERC, it is a bit difficult for us to be in a position to do that, but certainly with the bureaucracy—

Mr BEDDALL—No. I am asking whether you talk to the Department of Finance and Administration and try to convince them of the benefits rather than the captive department, which is DIST.

Ms Botterill—It is difficult because we become, I suppose, just another voice. Where the work has been done that has indicated that there are benefits to this program, MTIA can add its voice to the list of sound economic work that has been done. I suppose you are right. The question becomes, once the deliberations are being undertaken in Finance, whether there is a cost benefit analysis of the expenditure or whether it is the actual funding at the end of the day that holds sway. We really cannot do much more than just reiterate the economic analysis that has already been done by others—and done thoroughly by others, such as the Industry Commission—so that this concession delivers a net benefit to the Australian community.

Mr RICHARD EVANS—With the deepest respect, Ms Botterill, it would be unusual for the MTIA to appear before a government committee or a parliamentary committee not suggesting more concessions to their industry. I have met with the MTIA times and, each time they have presented something, they have always asked for some concessions.

You have said that almost a billion dollars was spent on R&D, and it has dropped by 48 per cent or thereabouts. Mr Forster said that his company, Farley Cutting Systems, was an unusual company. The question is—and please confirm this—whether or not your members, if they needed R&D research, would require a tax concession to spend that money on R&D.

Ms Botterill—Yes, I think the answer is that they do, and I think the Industry Commission bore that out in the review that they did of the 150 per cent tax concession

that showed that the R&D picked up drastically amongst industrial R&D in the first two years. They did their study just at the end of that two-year period. In the first two years of the R&D tax concession, industrial R&D picked up considerably and, in fact, that has been trending upwards in recent years.

Mr RICHARD EVANS—I am sure it would if there is a concession there. Are you suggesting to me that your companies would prefer to go out of business rather than spend money on R&D?

Ms Botterill—I do not quite think that is the issue. The issue is to be encouraging these companies to perhaps be broadening their horizons by undertaking R&D. I think there is a problem with an R&D culture amongst, particularly, as Frank has indicated, some of our smaller businesses that have not been thinking in those terms or have not seen it as an area that they have been able to get into. In international terms, our R&D performance has been poor at the industry level, and I think there is a role for the government and the community to be encouraging that R&D level to pick up.

Mr RICHARD EVANS—So the only way you can see encouraging people is to give a tax concession of 200 per cent or up to 200 per cent?

Ms Botterill—As a start, we would like to see it returned to the 150 per cent level at which it started, and where there were some very obvious results. Certainly, a broad based incentive, like the tax concession, raises the profile of R&D. It does not interfere with the economic decision making process within businesses to the same extent as a competitive program can and it is broadly available to those small businesses that perhaps are not thinking as broadly or as internationally as they could be.

Mr RICHARD EVANS—And your members that are now no longer spending money in R&D are prepared to accept an uncompetitive loss of advantage by not doing the R&D?

Ms Botterill—That is not an issue that I would have any data on. At this stage, it is too soon to see what impact a reduction in the R&D tax concession from 150 to 125 has actually had on the overall R&D profit.

Mr RICHARD EVANS—Only in expenditure at the moment?

Ms Botterill—In expenditure terms, yes, but in terms of the actual R&D effort, it is too soon to actually get any statistics on the impact that has had.

CHAIR—Mr Forster would like to get in and make a final comment there, then we will have to close.

Mr Forster—The reality, of course, is that the opportunity to do R&D is not

defined by national boundaries. So if Australia does not provide the environment in which companies feel facilitated or encouraged to do R&D, they look elsewhere. We have looked elsewhere. I am certainly aware of a number of companies which, either wholly or in part, have taken their R&D activity to other parts of the world where those sorts of incentives are commonplace and are very—

Mr RICHARD EVANS—They are a good incentive?

Mr Forster—They are a very good incentive, yes. There is an issue of the competitiveness, and the international competitiveness of our R&D environment is one of the reasons—not the only reason, but certainly one of the issues—that you would need to consider in terms of the environment and the platform that you provide in Australia.

CHAIR—We will have to conclude on that note. I undertake the opportunity to thank you. Unfortunately, we have to move on.

Mr ALLAN MORRIS—Mr Chairman, I ask Ms Botterill, regarding my questions to her earlier, if she could take that on notice and perhaps consult with the organisation and respond back.

CHAIR—Thank you very much for your contribution. I thank you also for bringing in someone from industry, Mr Forster, to give an industry viewpoint. Thank you for the way you have answered our questions this morning.

[10.58 a.m.]

REEDER, Ms Lynne, Associate Director Public Policy, Institution of Engineers Australia, 11 National Circuit, Barton, Australian Capital Territory 2600

WEBSTER, Dr John, Chief Executive, Institution of Engineers Australia, 11 National Circuit, Barton, Australian Capital Territory 2600

CHAIR—Good to see you, Dr Webster and Ms Reeder. Thank you very much for your attendance here this morning. I welcome you to the committee's public hearings. I remind you that the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House of Representatives. 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. Would you like to make an opening statement before we proceed to questions?

Dr Webster—There are three main issues that I think our submission has concentrated on. We have taken the view that we really are talking about the totality of public policy reform over a significant period of years so we have not specifically focused on recent issues like the 150 per cent, 125 per cent one.

The major strand of public policy that we believe needs to be taken into account is the very substantial shift away from the environment of large public sector contributions to R&D through a variety of major utilities, government departments and the like, which has resulted from the outsourcing, privatisation and commercialisation of those entities.

In many respects this has had a positive impact on the economic life of Australia, but there are some negatives, actual and potential, and we think that it would be appropriate for this committee to consider some of those and to determine whether in fact some kind of policy response is warranted.

There are three principal outcomes that have given us some cause for concern. The first issue is that we believe that there has been a tendency to move from longer-term research, often pre-commercial or conducted primarily for the public good, by the large public utilities. Their privatised or corporatised successors are, generally speaking, very focused on the bottom line and have found it expedient to reduce the amount of effort that is going into those areas of research.

The second issue is one that has been bothering the institution for a while—we actually raised it quite early in the piece as these changes came about—and that is the issue of whose responsibility it is to collect the longer-term trend type data. It is not glamorous work but it is very important work. The issue first emerged in discussions of

our coastal and ocean experts who expressed the view that there were going to be discontinuities in the records we were maintaining of tidal flows, of pollution levels, of a whole heap of routine information about the coasts and the rivers that flow into it, because it fell between the stools; it was no longer anybody's responsibility. It had traditionally been seen as one of the responsibilities of government to collect that data and make it widely available for the benefit of all, including the private sector.

That issue of data collection has expanded since the point was originally raised. One of the underlying points of that was captured in the title of a small booklet we produced at the time called *At what price data?*, because it had always been seen as data that was collected at the expense of Australia as a whole, for the benefit of Australia as a whole, and mostly the data was available at a very nominal rate—sometimes free and on other occasions at no more than the actual cost of reproducing information. I am not sure that our public policy approaches to valuing and maintaining data collection have kept pace with the changes that are going on out there.

The third main issue that has concerned us is the impacts of the process on the skills and capacities of the work force. Any private body, or body operating in a primarily commercial sense, always wants to hire people who are ready to roll the moment they walk through the door—they are immediately a productive economic unit. It is increasingly the case that, under the intense competitive pressures in which engineering operations have to work, you do not hire a new graduate; you look for somebody who has had three or four years training. It is becoming a bit of a bat and ball activity. If you look at the salaries that are actually available to people three or four years after graduation, they are rising because there is a decreasing pool. I suppose in an ideal market it will eventually correct itself. However, the process has been a very slow one.

But it is a concern that the number of people turned out with research and development skills from the major laboratories operated by the large public utilities, and from the training grounds that they operated, are not available now, and that is causing trouble in a number of parts of engineering. There are shortages at this level of the experienced engineer.

Those are our three main issues. The shift from the long-term pre-commercial to the near-term commercial research is having some impact, most notably perhaps, just to cite one example, on the reduction in the proportion of our total power generated which is attributable to renewables. That significant measure is simply saying that people are making the quick and easy decisions and the commercially sensible decisions in the short term.

Still on the energy generation area, there is a noticeable diminution in the amount of work going on into the provision of energy to rural and remote communities where a number of the larger public sector entities had a long-term commitment to work in that area. I am not necessarily talking about just straightforwardly stringing cable across mile after mile of the outback. I am really talking about new and innovative ways of providing

electrical power and with it often access to clean water and proper sewerage facilities to remote communities by means that are less expensive and unreliable than the old diesel generator. Those efforts to a considerable extent have been reduced. In that respect, it is not so much an issue of the 150 per cent or 125 per cent but issues like the withdrawal of the Energy Research and Development Commission. That has been an issue because there you had a body which was capable of seeding this kind of pre-competitive work.

The above probably, plus the worries about data collection and the worries about training and skills are the three main points of our submission. I suppose that I cannot finish without commenting that we do have some evidence that the switch from 150 per cent to 125 per cent has had some negative impact on those organisations which are in a position to move their research offshore, and there are many in the field of engineering. But that has probably been canvassed by others more expert than we before this committee.

Ms Reeder—Can I just add that the institution has not argued one way or another about whether work should be done in the private or the public sector. We have just noted that these changes are occurring and any change that occurs will bring with it implications. We have focused on the implications, as we see them, that are negatively impacting on engineering. Particularly for engineers, the changes have been quite significant because in the past our membership used to be, say, 70 per cent in the public sector and it is now 27 per cent in the public sector. So those figures—

CHAIR—Have your numbers actually gone up or down or are they remaining about the same?

Dr Webster—They have actually tended to move up slightly, but it is relevant that the experience in other countries—notably, New Zealand, which embarked further and more vigorously on this process—was that there was initially some drop in membership because membership of a body like the institution had been seen as a required part of your career progress through the large public utilities and so on. But that rapidly corrected itself over a period of three or four years and they have returned to a normal growth pattern reflecting growth of population and economic growth. I do not believe we have dipped as far; in fact, I know we did not dip as far as was the experience in New Zealand. The evidence to date is that the same sort of recovery has occurred from the less dramatic downturn and we are seeing a—

CHAIR—Ms Reeder, sorry to interrupt your flow, but it was important to get that on the record.

Ms Reeder—That is all right. We are looking at the implications of the changes and that was the starting point for the publication and for the inquiry that we held. We will probably get to it later but we are about to hold another inquiry looking specifically at training opportunities for engineers.

CHAIR—Thank you very much for that. As you have alluded to in your submission to us, a lot of the changes in the public sector have occurred in industries like the electricity industry, the water industry, the roads and construction area. What role do you see the states playing in encouraging R&D? Have you looked at what their role in this particular field should be or where they should develop?

Dr Webster—It is a very good question, but it is not one that has a simple answer because the states have all approached the matter in radically different ways. We have got very different examples of privatisation and corporatisation to look at, with different implications for the states. One of the difficulties often is that, in the enthusiasm to capture the short-term economic benefits, there has been some tendency to overlook the necessity for governments themselves to remain expert purchasers of a service and to be able to identify what might be seen as longer-term public good needs. This may be something which is helpful for those state governments which are not so far down the track to consider when they go into their own processes of privatisation.

There is a real need to have expertise available to purchase services and to try to specify what might be community service obligations. Some of those community service obligations might very well include obligations to collect and make available data on the operation of the system which is of interest and value beyond the bounds of the commercial entity. This raises difficulties, of course, because you then run into the issues of commercial-in-confidence data or data that is thus regarded. There has to be some sort of process by which data of this kind is collected and made available in a way which is seen to be even-handed.

CHAIR—What should happen to that intellectual property, that, say, the water and the electricity industry had?

Dr Webster—I believe that the intellectual property and the data which will enable entities to function effectively in delivering clean water, reliable power supplies and so forth to the community has to somehow or other remain with the community. The data on things like rainfall and run-off patterns, pollution trends—that sort of thing—is data that the government has to have available to it if it is to make rational decisions for the long-term future of the country.

It is also data that has to be available through some process if you are to have a genuinely competitive long-term commercial environment. Otherwise you would simply create monopolies and duopolies, because if the property belongs to the people who are already in the field, there is no way that a new entrant can credibly become part of the game.

Ms Reeder—We also have examples, say, in South Australia where South Australia Water has built into the contract a requirement for technology transfer and training as part of the awarding of that contract. So there are examples of where state

governments have moved in that direction.

CHAIR—Thank you.

Mr RICHARD EVANS—I am interested in the education aspects. You were talking before about graduates moving into the work force. What is the long-term prognosis on this if we do not take some action? Have you considered that?

Dr Webster—Yes. It is a problem that concerns us quite a bit. There is a real risk that unless we find new mechanisms to ensure that training can be undertaken in some shared way by industry, an industry now composed typically of a number of private players, then it is going to be to the disbenefit of everybody and Australia will be forced to seek, as it has from time to time in the past, overseas input to maintain its overall level of expertise.

There is some evidence that suggests that if you turn out a new engineering graduate and within the first two years of graduation they have not found themselves work which is actually building on and developing their skills, then the public investment which remains considerable in their education is largely wasted—they find it very difficult to ever catch up. So it really is very important to have that first job that turns what we call the enabling competencies—it is a terrible term—that they have gained in their academic career into the real capacity to design and build.

Mr RICHARD EVANS—I am just trying to get my mind around what you could do. As doctors come out of a medical course they go into an internship in public hospitals and then move on from there. Are you suggesting that that is the sort of thing that we should be doing? When people come out of universities, should we put them into an internship where they are working for the public good somewhere, so that from there they could move on?

Dr Webster—I believe that that in effect has happened in the past in engineering, because the public utilities have provided the same role as the public hospitals. It is happening to a diminishing extent. There is some evidence too that those firms which are taking on new graduates are putting them in highly specialised roles because they can get them up to speed quickly in those roles. With sharp, bright minds and energy they quickly become productive, but they do not develop the breadth of experience and expertise that they would need to be fully-fledged professionals. We see this because we have a process by which, in the three or four years after graduation, we monitor the progress of graduates. We provide them with ongoing assessment of where they are going to and at the end of it we provide them with an assessment as to whether or not they are at the stage of becoming a chartered professional engineer. The evidence is out there that we have got increasing numbers of people in these highly specialised roles.

There are solutions. You do not have to re-create public utilities to find a solution,

of course; there are other ways of doing it. In other fields of endeavour, where there has not in the past been the same focus on the public utility as the training ground, ways have been found of dealing with this. Collaborative or cooperative ventures between companies, particularly the larger companies, have become established in some areas and we believe we are going to have to continue working to try to get models like that emerging in the engineering area to make good some of the deficit.

Mr RICHARD EVANS—Do you see a role for government in that?

Dr Webster—It is a facilitative role, I think. I do not believe it is a problem that can be resolved by governments pouring money in any particular direction, but I do think that governments can seed the activity, can remove legislative barriers. We have in the past run across one or two of those, which were created for good purpose but which actually operated against sensible action. Governments can certainly help in some ways. For example, a good way of ensuring that people get balanced training in industry is to try to get the industries directly involved with the universities and to make greater use of what is called cooperative education, where people spend time in industry in parallel with their university time. There are several universities doing that in engineering, and they have done so for a number of years.

Mr RICHARD EVANS—They are doing that at secondary school now, aren't they, with programs of combining work and school?

Dr Webster—Yes. It tends to be something which in the universities can be of very substantial benefit to all players. Industry players do not just get the benefit of bright young people, who they certainly have to train; they also get the benefit, if the thing is properly structured, of the input from the university department, which can be of considerable assistance and helps to build longer-term relationships. To some extent those are activities where there are issues of how the activity is treated by government. Areas like taxation, worker compensation, payroll tax—a whole range of those issues—can be barriers to doing that, so government can sometimes help by being prepared to remove or reduce the barriers. I think it is an area where we as a community just have to get our act together. We have to recognise that this major change has occurred and adapt to it.

Ms Reeder—Certainly we are doing that now that DEETYA has allocated some money for us to put together a workshop which will follow up on other data and survey material.

Mr RICHARD EVANS—When is that happening?

Ms Reeder—We are having the workshop on 8 April.

Mr RICHARD EVANS—Would we as a committee get a summary of what happened in that workshop?

Ms Reeder—Sure, yes. All these issues will be picked up. The original document that we did, *Engineering the transition to competitive utilities*, identified this as a major issue and so we have worked with government to say, ‘All right, how do we progress that?’ In some cases, because these things are happening on an ongoing basis we are not going to get a clear picture, but we certainly want a better picture than what is around at the moment. For example, one area we would like to try and identify is what percentage of each sector—we are actually doing it on three sectors, water, electricity and road—is under contract.

The WA Chamber of Mines and Energy recently did a study where they found that a third of mining is now under contract, but contractors do not see training as their responsibility. Contracts are for one or two years; training takes three or four years. So if you are already starting from two-thirds of an industry, you are back before you even start getting into what is happening with privatised SMEs, which is particularly relevant for engineering, because that is where the growth is occurring. We know there is a whole range of issues which makes training very difficult for SMEs. They are the sorts of things that we will be working on in producing this document.

Mr RICHARD EVANS—Just one last question: you mentioned before, in relation to the concessions, that companies are going offshore. Are they taking their people offshore?

Dr Webster—They tend to take the key people. They do not actually, physically, have to take key people either, but so long as they keep key people connected with the issue there is a whole lot of research now that can be done anywhere in the world. The results bounce back and forwards via the Internet. So, physically, they might not take the key people, but they would certainly reduce their total work force significantly in the process.

There are only a few examples of that that we can cite to date, but I think it is a long-term sort of thing. Research programs are not wound up or wound down. If you have got a research program that is already going here, the change in the concession may not make that a difference sufficient for you to say, ‘Okay, we are going to wind it up.’ But when it comes to deciding where you are going to fire up the next one, then it affects the decision. You take into account the total costs in all respects and the decision is taken to do it somewhere else.

I understand the sets of economic pressures that lead to things like that reduction in the level of concession, like the current attempt to define more tightly what research is. That probably is something not directly for discussion on this occasion, but I must admit that it reminds me a little bit of some of the disputations at Chartres in the 13th century about how many angels you can fit on the head of a pin. It is exceedingly difficult to put a definition on research which satisfies the requirements of a Treasury bureaucrat and which does not unduly impact on an activity which, by its very nature, deals with the

uncertain and the unknowable—or at least it deals with what you do not know now and you hope to know in the future.

I made the point before—I used to make it to Peter McGauran—that one of the biggest problems is the messages that government transmits about the level of its commitment. They have not been good messages in the last few years. No matter that there may well have been people in government who are deeply and seriously committed to improving Australia as a long-term economic force in the world and building on our expertise and human capital, the message has been that research is a low priority activity, that it is an economic cost and not a benefit, and that we should wind back. That is not a good message for government to transmit over a period of time. I notice that John Moore is trying hard now, in some of his public utterances, to assure us that that is not the case. All I can say is that it is not before time, and I am pleased to see the change in the public presentation.

Ms GAMBARO—Dr Webster, in your report you spoke about our spending on R&D as compared with that of other OECD countries. One thing that I found was quite interesting was that you said that the R&D expenditure in manufacturing was lower than the R&D expenditure in non-manufacturing industries. What are some of those non-manufacturing industries. Can you expand on that? I would have thought it would have been the other way around—that R&D in manufacturing would have been higher than in non-manufacturing industries.

Dr Webster—I suppose it depends on the areas, firstly, in which you think you have major commercial advantages and, secondly, where it is actually possible to leverage off what you have done. Also, I suppose it depends on your definition of manufacturing.

Australia probably does about two per cent of the world's research, so the other 98 per cent is out there. For a great deal of our manufacturing industry, it fundamentally runs on that 98 per cent. A great deal of our manufacturing is to a greater or lesser extent derivative. Certainly, in terms of developing production skills, quality maintenance skills and so on, there is immense value in having a motor car plant in this country, and the institution has generally supported the directions the government has been taking in that area. But in the past, most of the advanced design work and research that goes along with that has been done offshore. Whether that will change in the future under the new directions for the motor vehicle industry remains to be seen, and I hope it does.

In areas like service delivery, software engineering and so on, there is a very high level of R&D by the very nature of the industry, and they are areas in which Australian commitment is good. It is up to OECD levels.

Ms Reeder—Michael Rice actually gave us that information. He is doing a PhD exactly on this issue at the moment, so I can get him to give some more information on where he is getting that information from.

CHAIR—Thank you.

Mr ALLAN MORRIS—Perhaps I should ask you to take these questions on notice and provide some considered comment. They go to questions of intellectual property rights and their use and access. I want to suggest to you that to date we have invested heavily as a country in intellectual property development only to see such developments go offshore. For example, the example of Memtech has been raised this morning. Computer Science of Australia is another company, and there is another one which I am trying to recall but I will get to that later. Whilst ever we invest heavily in that form, Australian taxpayers are entitled to say, firstly, that the revenue streams and royalties that may flow should stay here and, secondly, that our companies should not have competition from things that were actually designed and developed with Australian taxpayers' involvement.

I want to put to you three propositions that you might think about. One is that access to R&D write-offs would only be accessible if companies were prepared to sign a contract that any property developed would not be taken offshore in terms of licence agreements or its licence ownership or, if it does, that the company is entitled to recoup any moneys that taxpayers put towards it.

A second one would be the potential for the Australian government to be prepared to defend patents developed in Australia. In other words, patent breaches in Australia could be defended by the Australian government if they are challenged.

The third one would be that any sense of enforcement of our intellectual property rights in Australia would require companies that own those rights to provide Australian companies with fair and equal access to such property. For example, if Bill Gates decides that Farley Engineering no longer can use Windows NT and then wipes them out as a producer or as a manufacturer, that would be quite unfair but very legal and the Australian police force would close them down if they tried to use it.

They are the three points. One is a contractual agreement that requires the ownership or the licensing or whatever, that arises from R&D tax write-off incentives, to stay in Australia. The second one is the ability to defend patents that are registered in Australia. And the third one is that fair and equal access to intellectual property of overseas companies be available to Australian companies if we are to respect and enforce the intellectual property rights for those companies.

CHAIR—Do you feel as though you will be able to respond to those questions? On notice is probably more appropriate.

Dr Webster—It would be better for the most part to respond on notice, but I would just make a couple of comments designed more to elicit the background so we respond correctly. A great deal of the information we develop in this country is of value

to us mainly because it can be leveraged offshore. We produce maybe two per cent of the world's research, or something of that sort. I do not have the figures at hand but we probably produce 0.5 per cent of the world's economic product, or one per cent or something. It would be smaller—we punch above our weight in R&D.

Certainly, companies that work at the advanced development end in this country, utilising our commercial advantages in terms of a highly skilled populace, routinely expect to get most of the returns from licensing for offshore manufacture. It is only rarely that they would expect to be able to manufacture in Australia and export. I guess what you mean is the guarantee of a long-term revenue stream from that licensing rather than precluding overseas licences.

Mr ALLAN MORRIS—I mean, for example, Memtech. Memtech is now an American company. Its property rights are now located in America. It is not helping Australia at all. It is actually very likely to hurt Australia from now on, and the shareholders made a squillion out of it. The taxpayers put in a lot of money, the shareholders made a fortune, and it is now offshore competing with other technology in Australia for water purification. I am not trying to control the ownership as such; I am talking about the location of the intellectual property. It seems to me that the taxpayers are entitled to say, 'Well, this whole thing is a shonk if we help you develop intellectual property which you then make a personal fortune out of and it then goes offshore.'

CHAIR—One would hope that some of these shareholders may have been Australian people and derived some benefit from it.

Mr ALLAN MORRIS—They are. But they probably all have family trusts as well.

Dr Webster—I do not think I can comment on that. We will do our best to provide a considered response.

Mr ALLAN MORRIS—Thank you, John.

CHAIR—I have a final question. We visited the Telstra research laboratories, and I note in your submission you said that you felt that they had cut back their testbed research capability, as you described it, and that was having a flow-on effect to industry. I found that their research and development had moved to another area; they perhaps were not doing the hardware R&D that they were some years ago. Even the managers suggested to us that they had cut back on their budget, but mainly in the administrative areas rather than the R&D area. It was interesting to note their transition into a whole range of other software applications which seemed to be getting some pretty good results. I do not know whether you have had any further contact with those laboratories and whether you had any comment on that aspect of it.

Dr Webster—I think the comments were made about the fairly specific issue, and that was that one of the roles that Telstra, as a monopoly, performed was to provide access to facilities for testing devices and applications in an even-handed and credible manner. That is very important to any small company which wants to manufacture new telecommunication devices and so on. It was the reducing access to that sort of service that I think was behind the submission, rather than any particular comment about the R&D being undertaken by Telstra which, undoubtedly in an organisation of that size, will continue to be undertaken.

This issue of having access to reliable facilities for testing devices is by no means restricted to this area. Any interoperable devices of any sort have the same problem and we have gone to great effort over the years in Australia, through the National Association of Testing Authorities and bodies like that, to ensure that if you have results obtained in Australia then they are valid anywhere in the world and accepted anywhere. That is very important for this area of industry.

CHAIR—Thank you very much for your attendance and your willingness to answer the questions. It was good to see you.

Resolved (on motion by **Ms Gambaro**):

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 11.35 a.m.