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STANDING COMMITTEE ON SCIENCE AND INNOVATION

Reference: Business commitment to research and development in Australia

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SYDNEY

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**HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON SCIENCE AND INNOVATION**

Monday, 28 October 2002

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

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

Terms of reference for the inquiry:

To inquire into and report on:

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

With particular consideration of:

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

the needs of fast-growing companies; and

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

the committee seeks to address three questions.

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

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

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

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Committee met at 9.07 a.m.**DAVIES, Mr Richard Anthony Hartley, Chief Executive, AMIRA International Ltd****VANDERMARK, Ms Sarah Elisabeth, Consultant, AMIRA International Ltd**

CHAIR—I declare open this public hearing for the inquiry by the House of Representatives Standing Committee on Science and Innovation into the commitment by business to research and development spending in Australia. I welcome the representatives from AMIRA International. Do you have any comments to make about the capacity in which you appear?

Mr Davies—I am Dick Davies, CEO of AMIRA International. Formerly, I was the executive director of the Grains R&D Corporation and had a lot of experience in developing and marketing R&D in the chemical industry. I would also like to introduce Sarah Vandermark, who is a consultant to the industry, a company director of SciWorks Pty Ltd and a PhD student at the National Graduate School of Management. She specialised in doing a study of the minerals industry. Her background is actually in molecular biology, so it is an interesting combination.

CHAIR—I welcome you here this morning. I would like to point out to you that, while this committee does not swear in witnesses, 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 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 the request. Would you like to make an opening statement before we proceed to questions?

Mr Davies—Yes, thank you. First of all, I would like to talk a little bit about AMIRA International and then about one or two points about the submission that we have put in. AMIRA International is an industry association which develops and manages collaborative, or jointly funded, research projects on a fee-for-service basis. That is on behalf of our members in the global mineral industry. AMIRA is, and will probably remain, entirely funded by the private sector, and it has become a model for other organisations internationally.

The members of AMIRA enhance their competitive position by taking a collaborative, or partnership, approach to research and development, and this is managed by AMIRA acting as their agent. Collaboration in this way reduces the exposure to risk associated with investment in R&D. It has the potential to increase the range and the number of research projects undertaken by members, and it develops a culture that values investment in R&D, creates linkages between the research providers and the mineral industry and ensures that research is directed towards industry needs.

As a result of this, members gain access to leading edge technology and sources of knowledge. It is a great source of networking for the industry as well. The knowledge contributes to the industry's increased productivity and global competitiveness. This is derived from the application of all the new knowledge and the technologies which come out of it. These include things like the ICTs, real-time computation or simulation, modelling, even biotechnology, environmental work and so on. AMIRA projects very often serve as precompetitive seed corn for subsequent in-house research or for direct research. So the amount

spent with AMIRA might not be a lot, but it is very much at the front end; it is usually with a public research institution.

AMIRA was originally the Australian Mineral Industries Research Association Limited but we became AMIRA International Limited in 2001. This is a reflection of the global realities of the membership at the moment. In a nutshell, AMIRA is a not-for-profit, private sector company, established in 1959. We have developed over 550 projects, involving a quarter of a billion dollars of industry investment in that period. We have members from 69 companies in the minerals industry in Australasia, Asia, Europe, Africa and North and South America. We provide a forum for the mineral industry to meet, network and cooperate in areas of common interest. We encourage local research institutions in several countries to collaborate in these international consortia. This provides core funding to allow the growth of the infrastructure in these institutions.

Our main office is in Melbourne. We have offices in Perth, Cape Town, Johannesburg and Toronto, and we have affiliations with similar bodies in North America and also in Europe. There are about 24 full-time, part-time or consultant professionals involved. AMIRA is governed by a council which is comprised entirely of senior executives from the international industry. At the moment, AMIRA is managing about 60 projects, attracting about \$40 million to \$50 million worth of industry funding. We manage about \$12 million worth of new funding every year. At the moment, 47 per cent of these revenues are received from outside Australia, but over 95 per cent of the work is still conducted in Australia, with CSIRO, universities, cooperative research centres, ANSTO and so on. The other point is that this work underpins basic research in a lot of other disciplines which spill over widely into other sectors of the economy. That is a point you may wish to follow up on a bit more. AMIRA is a member of Austmine and, as such, we contribute to the export earnings of the mining services industry.

I will briefly outline the main points we make in our submission. We feel that BERD is a poor measure of the contribution of the minerals industry to the Australian economy. We emphasise that mining and minerals are still of major importance in the economy, especially in exports and in the absolute expenditure on R&D. We also emphasise that incremental R&D is a significant contributor to mineral export performance and, indeed, to the knowledge economy and this is not picked up in the ABS statistics.

To expand slightly on BERD being a poor measure of the contribution of the minerals industry to the economy, it is clearly an input measure and it is a poor indicator of the value that accrues to productivity and export performance in the commercialisation of R&D. Incremental or continuous improvements in equipment process technology, methodology, analysis et cetera have all significantly contributed to productivity. Over the past 20 years, the resources industry—that is, minerals including oil and gas—has improved exports by over 25 per cent per annum. Part of that improvement has been to extract maximum value from R&D. Consequently, the emphasis in the industry has been on business output from R&D rather than on increasing expenditure. So we suggest that 'BORD', rather than BERD, would be an appropriate measure.

On the issue of mining and minerals being of major importance in the economy, the ABS statistics undervalue the total contribution of the industry because they adopt a narrow definition which excludes much of manufacturing services. I have presented you with two brochures and a pamphlet. One of them is by the Allen Consulting Group and was prepared for the Minerals Council of Australia. It details information on the narrow definition of the ABS

statistics. Further information on wealth creation in the industry is given in the booklet produced by the Centre for International Economics called *Minerals: our wealth down under*, which is available from them and from the Minerals Council.

Finally, in terms of incremental R&D being a significant contributor, I think that the emphasis on elaborately transformed manufactures in recent years has tended to mask and marginalise the contribution from incremental research. I am in no way suggesting that the emphasis on ETMs is misplaced, but continuous innovation is very important to mineral exports. Mineral exports are not regarded out in the marketplace as being terribly sexy. They are not thought of as being important to the knowledge economy, but these exports are very much dependent on the application of new knowledge and technology.

We would like to make the point that natural resources are not exploited. The wealth is created; it is not a gift from nature. The mineral technology is world-class and recognised as such. We would like to present minerals research as a platform for new sectors of the economy. We see this as a continuous improvement process which makes a large contribution to the mining technology service exports as well as to overall exports. Our concern is that, if research priorities are directed elsewhere, the competitive advantage that Australia gets from this will decline.

Reading through some of the earlier transcripts, I noted that there were some questions about the issue of repayment of tax incentives or payments for R&D or whatever. I would like to make one point which we mentioned in the submission: the key that unlocked the wealth in the eastern goldfields in Western Australia in the 1980s was the introduction of carbon-in-pulp technology, which allowed the exploitation of low-grade ore. If that had not happened, all the other things would not have occurred. That led to a \$5½ billion export industry, so you could say that Australia has gained \$80 billion worth of exports since the mid-1980s on the basis of the introduction of a single piece of technology. I rest my case with that.

CHAIR—Before I go to some questions in relation to your submission, Mr Davies, you mentioned that you were with the Grains Research and Development Corporation. Out of the rural research and development structures that are there for a lot of rural industries, are there any lessons that could be applied in similar sorts of ways to other industries particularly to encourage small or medium sized businesses to invest in R&D?

Mr Davies—It is perhaps not appreciated that the farming community to a large extent is comprised of small businesses. Although agriculture is now amalgamating into larger conglomerates, this is very much the case. When I was with the Grains R&D Corporation there were about 80,000 grain growers. The important thing that they do is to organise a levy on production. The R&D corporations actually administer this levy. The mineral industry does this in coal, but in the metalliferous industry we have stayed with AMIRA on a fee-for-service basis. I can assure you that administering a fee-for-service organisation is much more difficult than administering an investment from a levy situation. It is something which could be encouraged. However, it is important that this initiative comes from the industry itself. I do not think it is something that can be imposed by government dictate; perhaps other sectors of the economy could be encouraged to engage in that sort of exercise.

CHAIR—Really, it is a form of clustering, isn't it?

Mr Davies—Absolutely. It is a tremendous way of underpinning research if the levy can be directed sensibly towards sensible projects. The Australian Coal Association Research Program does this in the coal industry. I think that is a good model to look at, as well as at the R&D corporations.

CHAIR—In your submission, you talk about a decline in the quality of students coming into engineering and science disciplines. Where has that comment progressed from? Is it from particular studies that have been done? If that is the case, is there any reasoning that you see behind it?

Mr Davies—I think Sarah would like to comment on this.

Ms Vandermark—The Minerals Council of Australia sponsored a study in, I think, 1999. They produced a discussion paper called ‘Back from the brink’, which reviewed minerals education in Australia. The minerals industry are currently involved in a consultation process based upon the recommendations in the ‘Back from the brink’ paper, and they donated \$15 million, I think, to the process of trying to rationalise minerals education and work on initiatives to try and make a career in this industry more appealing. It is an ongoing process. I read something recently about how far they got down the track. But this was certainly an industry-led initiative because they were so concerned about the lack of interest in this as a career. It seemed that law and medicine were the more favoured choices.

CHAIR—Anecdotally, I have noticed over the years that the TERs that you need to get into certain degrees—particularly in the engineering area, which is something I personally had an interest in—have diminished. That is very anecdotal, but it seems to back that up.

Mr Davies—Absolutely. The Minerals Council has taken the initiative of establishing the Minerals Tertiary Education Council, which is headed up by Dr Kevin Tuckwell. Kevin was hoping to come here today. It is unfortunate that he was not able to make it. I apologise on his behalf.

Mr LINDSAY—Why do your members use you?

Mr Davies—There is a benefit in having an external agent to pool together collaborative research. Firstly, this pools together the work and focuses it on the outcomes. Researchers traditionally—but less so these days—tended to take a research view rather than a business outcome view. The other thing is that we have an average of 10 different companies sponsoring any project. If any one of those companies took the lead in organising it, it would be seen as having an unfair advantage. So there is a great benefit in having an industry association to do this on their behalf.

Mr LINDSAY—So you are saying that competing companies collaborate?

Mr Davies—Absolutely.

Ms Vandermark—Yes.

Mr LINDSAY—We will be taking evidence later today from witnesses who say the opposite, that there is a barrier to R&D investment because companies do not want to collaborate and

share the intellectual property that is produced. Are you saying that you do not see that in your industry?

Mr Davies—You are looking at two different levels in the industry. As I said in my opening statement, AMIRA is the seed corn at the front end of precompetitive work. Companies will very often collaborate with us in a collaborative project. The biggest one we have is with the Julius Kruttschnitt Centre—presented to you by Tim Napier-Munn a few weeks ago—which has about 40 different companies. The structure of that program allows all of those companies to support a core program. They will then individually support a one-on-one program with the institution in areas which are commercial-in-confidence to that particular company. A lot of the companies will also have parallel work going on in-house. It is not an either/or situation; it is a facilitation to enable—

Ms Vandermark—You need to look at the reasons why companies are choosing to do R&D. At the end of the day, if you have a group of competing minerals companies, for example, working on a particular technology or the improvement of a process, the competitive advantage will come down to how well you can use that technology in your processing plant or at your particular site. Companies also know that, even though the available knowledge, experience and results of a particular project are open and available to everybody who participated in that collaborative research, there is no guarantee that they will be able to use it. Technology transfer and uptake is extremely difficult.

Mr LINDSAY—You talked about the dollars that get invested through your operation. How does that compare with the money that companies in your industry invest privately within their own organisations?

Mr Davies—The best take that we could have on the total expenditure on R&D globally in the minerals industry is that two years ago it was about \$US1.5 billion.

Mr LINDSAY—So you are expending only about \$40 million, a very small—

Mr Davies—We are expending a very small fraction, as I said, with seed corn at the front end of that. That includes major in-house developments. Once you get into the development stage of a pilot plant and so on, you are talking about much greater expenditure.

Mr LINDSAY—Other evidence we have says that Australia is a poor place to invest—and there are all sorts of reasons—but you spend 95 per cent of your money in Australia.

Mr Davies—Yes.

Mr LINDSAY—Why do you think you are different?

Mr Davies—Because the Australian mineral industry research is clearly the best in the world.

Mr LINDSAY—That is a great statement.

Mr Davies—It is a great statement. It was one that a number of our overseas board members made to the science minister at a dinner we had a few weeks ago. That is why they come here—because it is unequivocally the best.

Mr LINDSAY—Your evidence to this committee suggests that one of our recommendations should be that we should be the best in the chosen fields where we want to excel.

Ms Vandermark—Our history too is part of the explanation as to why minerals research is so big in Australia. If you look at Australia versus other resource based nations, you see that the United States cut back their public research facilities and base for minerals research. They closed the US Bureau of Mines. A lot of renowned mineral schools, such as the London School of Mines, are still there, but they do not have the reputation of places like the JK Centre. The difficulty for the industry at the moment is whether it will be in this position in 10 years time. That is where having good students and companies who will base their research programs here is critical.

Mr Davies—I would also emphasise that these people are not only the best in the world in mining or mineral research—it is not a narrow sector—but the best in the world in things like computational fluid dynamics and so on, which are disciplines which spin out into other areas. That is the important point.

Mr LINDSAY—In the mining industry, do you also include exploration and exploration techniques?

Ms Vandermark—Absolutely.

Mr Davies—Yes. We cover mineral exploration, all aspects of mining and engineering, mineral processing, hydrometallurgy, pyrometallurgy, environmental work. We are beginning to become more involved in the social and governance aspects of sustainability.

Mr LINDSAY—Mount Isa Mines have a new technology for refining zinc. They propose to close their zinc refineries in Europe and come back and refine in Australia. When they were developing that technology—which is world-leading technology—would they have incorporated your organisation, or would they have done that close to their chest, in-house?

Mr Davies—It would have been a combination of both. MIM was a founding member of AMIRA and has always supported us. It is very difficult to say in these situations what the contribution is from any individual bit of research, but MIM is involved in a number of our programs.

Mr LINDSAY—You mentioned BERD and BORD. Is it possible for the ABS to report BORD? Is it practical?

Mr Davies—It may be difficult. It is obviously a problem with statistics if you have to draw the line somewhere.

Mr LINDSAY—How can we recommend what you are telling us to recommend if it is not possible to do?

Mr Davies—I guess there are two things. One is to disregard the statistic as being a meaningful statistic as far as the industry is concerned—

Mr LINDSAY—Therefore, why produce it?

Mr Davies—That is the question for you.

Mr LINDSAY—Thanks.

Mr Davies—We posed that question; however, there is information that would be useful. For example, we do not know what the contribution of the mineral industry is to the service economy. Hopefully, the Mining Technology Services Action Agenda is going some way towards researching this. But these figures just get lost.

Mr LINDSAY—You are avoiding the question.

Ms Vandermark—How do you measure BORD?

Mr LINDSAY—Yes. How would you measure it? Do you think it is not possible?

Mr Davies—Part of the way of measuring it is to actually go back to companies and ask them what they are doing and to put a specific figure.

Ms Vandermark—I think that what Dick is trying to say is that you need to have the quantitative as well as qualitative data. BERD really does not tell you very much at all. It does not note, for example, the way that knowledge changes—what knowledge might be important for the minerals industry yesterday and might have cost a lot of research dollars becomes routine. But there is always something new on the horizon that is more important. That is actually interesting if you are developing innovation policy. You want to know where these changes are taking place. I should also add that the ABS collects figures on socioeconomic objective as well as field of research. There is more that could be done in correlating what industry sectors are doing with their field of research and with their socioeconomic objective, and then you can start to see some interesting crossovers, such as that the minerals industry spends more on environmental R&D than any other industry sector in the country.

Mr LINDSAY—Say, then, that it was possible to produce the kind of information you are suggesting. How would it be used? What is the benefit? Is it to pat you on the back and say, ‘We’re a good industry’? How does it help the government in proper public policy?

Ms Vandermark—I think it would start some long-term thinking and not this short-term reaction. For example, I have heard a lot made of the 47 per cent increase in BERD in the minerals industry. For me that just does not mean anything. It means probably that somebody in Western Australia is building a very large plant.

Mr LINDSAY—Great answer.

Ms Vandermark—When you look at what is happening over a 10-year period, that amount of money has been in decline. The answer really is that if you have quality information you are

much more likely to make quality policy. I think a problem for the minerals industry has been that it is largely misunderstood. It has been thought of as low tech and stagnant. The fact that Australia now has what seems to be a vibrant mining and technology services sector, which means it is using information communication technology, does not surprise me, because you have a mature industry who are sophisticated users of new research. If you had information on the mining technology services sector, you could be thinking about, for example, how we could help this sector become more global so that they can improve their market share and compete in the marketplace. While they may have a niche in mining, because they have sophisticated users in Australia that they may have developed their technology with, you could be thinking about how they can be supported to perhaps use this technology in other industry sectors and for other purposes where the returns may be even greater.

Mr LINDSAY—I am going to finish there, but I would observe the BHP Billiton effort to work out a new way of developing the Ravensthorpe nickel project in Western Australia. That has all come about through Australian R&D. It is a great outcome.

CHAIR—It was an interesting comment you made about the new piece of technology in gold that enabled all those improvements. One of the witnesses in Darwin on the native title submission commented that the mineral resources in Australia were infinite. I said, ‘How could we have infinite mineral resources?’ His answer was, ‘As technology improves you could actually go back over the leftovers—the tailings—from previous mining and reprocess them.’

Mr Davies—Minerals are certainly more recyclable than any other material.

Mr TICEHURST—In your submission you described competitive government leverage funding schemes available to researchers in South Africa and Canada which resulted in the offer of \$1 funding for every dollar provided to the industry. Is there anything comparable to that in Australia?

Mr Davies—The 150 per cent or 125 per cent taxation concession would be the closest as far as our industry is concerned.

Mr TICEHURST—Can we do better than that?

Mr Davies—There are specific grants through the ARC which our researchers are often successful in gaining, but these are specific research grants which go to the individual research institution.

CHAIR—Dollar for dollar is probably the equivalent of a 200 per cent tax concession, isn't it?

Mr Davies—Yes. I think that since I wrote that I have received a copy of an analysis by Tim Napier-Munn of the THRIP scheme in South Africa. I believe that that has now been reduced to 50 cents to the dollar, but the principle is the same.

Mr TICEHURST—You say in your submission that business investment needs a range of government incentives and programs to reflect the diversity of new and existing business needs. Isn't that what we have in Australia now with a number of these other government schemes?

Mr Davies—Yes, and I would encourage you to increase that sort of activity. AMIRA did a study for BHERT—the Business-Higher Education Roundtable—a couple of years ago, and it came out very strongly that the scheme that was most supported was the 150 per cent tax concession, but that a range of other schemes were clearly necessary to cover the range of industries. We had done our own survey of the minerals industry of AMIRA members and BHERT asked us to go outside and do a similar thing for manufacturing, so that included a wide range of other industries, including people like Cochlear and some of the health care people and so on.

CHAIR—Could I just come back to a couple of points that Mr Lindsay made and expand on them a bit further. On the 95 per cent that you spend in Australia: we had evidence in Melbourne that one of the concerns in the minerals industry is the takeovers that are occurring with companies from the UK and South Africa sort of taking over a number of our companies here. As a result, R&D is going offshore because those larger companies already have existing R&D establishments and therefore they do not need the R&D set-ups that exist in Australia. We subsequently had other evidence that sort of pooh-poohed that—for want of better terminology. Do you have a comment about that circumstance?

Mr Davies—If you are the best in the world, they come to you. I think if you are afraid of losing research overseas, it is saying that you are not as good as you should be. Certainly the industry is globalising and this is the reason why AMIRA is now AMIRA International and not the Australian Mineral Industries Research Association. Despite the fact that we have had an active program of recruiting international members, our membership is now half what it was 10 years ago. If you take some of the largest companies involved with AMIRA, five years ago with one company, for example, we had the potential for 22 members or sponsors for any one project. That is now encompassed in one company. That is obviously an extreme, but that is going on all the time. That example you mentioned with Aurion Gold and with Acacia and Anglo and so on is just something that we are dealing with by becoming part of the global economy. You are either in the global economy or you are not, and if you are in the global economy, if you are the best, people will come to you. That is why the members of AMIRA have come to Australia.

Ms Vandermark—I think it is a concern that a lot of the companies that are disappearing in the mineral sector in Australia are the middle tier companies that may not have had large internal research laboratories, but they did actually do a lot of research through AMIRA and so forth. It seems that a lot of companies are now looking at their investments in R&D in a very short-term manner, and I think it is still too early to see the full impact of those types of cuts. I also think that, because of the way these international mergers have been looked at—from the perspective of what is good for Australia—it is often thought that these companies are not competing, because they are all producing the same product, some mineral commodity. But the fact is that, if you have more companies producing that commodity, you will presumably have a bit more competition, which means that they might do some more research.

I am also concerned that for large companies such as BHP—I have only looked at their annual reports—figures for R&D spend over a year have dropped from the order of \$200 million per annum in 1999 to \$35 million per annum in 2001. That might be a one-off from what happened during the merger, I do not know, but they are the sorts of things that represent significant change. I do think that mineral companies are changing their technology strategy as

they globalise, but there is a real opportunity for Australia to maintain, as Dick said, that excellence to ensure that what research capabilities are maintained are actually based here.

CHAIR—Do you think that is an aspect that the Foreign Investment Review Board ought to take into consideration when decisions are made to allow certain takeovers?

Ms Vandermark—I would, but then I am probably not qualified to answer that question.

Mr Davies—I do not know that I can comment on that. I would just repeat the comment that, if you are comfortable that your work is excellent and can compete, people will come to you, and the base will move to Australia. Certainly, in the UK, for example, a lot of work has been run down; people like the National Coal Board laboratories have disappeared. In Canada, work has been run down to some extent with places like Canmet and so on. In the United States, the Colorado School of Mines has been reduced. It is difficult to see where else this competition might come from, apart from South Africa, which obviously has difficulties in sustaining the economic drive. The example that I mentioned, about carbon in pulp from gold—the technology originally came from Mintek in South Africa and was adapted by CSIRO for Australian conditions.

Ms Vandermark—When the merger between RTZ and CRA—which became Rio Tinto—went ahead, one of the conditions was that the research facilities had to be based in Australia. Of course, CRA has a history of innovation here, so perhaps that was an easier thing to do. I have not read that about some of the other mergers.

CHAIR—Having the Chief Scientist in that organisation can only have helped as well!

Ms Vandermark—Yes.

CHAIR—Another point: you mentioned that the collaborative research was not a problem from a competitive point of view. I think Peter Lindsay asked you about exploration. Is it the same with exploration? Because that is where the real competition is in the mining industry. The real competition occurs in getting the ground; that is where the really strong competition takes place in the mining industry. If you have the ground, you then have the potential to find the minerals et cetera. Therefore, do you find that with projects related to mineral exploration et cetera there is not the same collaboration—or is there no difference?

Mr Davies—There is a lot of collaboration. A lot of the major discoveries that were made were done through collaborative projects or at least had their origin in work that was done through collaborative projects. People are exploring common techniques, instrumentation and methodologies. As I said, the collaborative bit is the seed corn at the front. People will collaborate at that level, but the bulk of the work will still be done either on a one-on-one basis with the same researchers or in-house.

Ms Vandermark—I will add something about the role of exploration. Exploration is indeed very important, but I think the industry itself is changing in that exploration is not the only means by which you can increase your mineral reserves; you can increase your mineral reserves by implementing new processing technology or making improvements to current workings. Many of the large companies are no longer spending a lot of money on their exploration programs because it is very high risk. They rely on smaller companies to take on the risk to

develop these new technologies, and then perhaps later down the line large companies will acquire that technology. It is a bit like small drug companies; the industry structure is similar in that way. Large companies want to increase their mineral reserves by any possible means, which includes processing innovation and extraction innovation.

CHAIR—One of the ways to reduce risk at the exploration level is to increase the quality of data available. The federal government last year, as a result of the action agenda on spatial information, made a decision to allow data held by Commonwealth agencies to be made available at the cost of transfer rather than the cost of acquisition. Do you have a comment about the usefulness of that for the industry and whether, if the states followed suit, that would assist?

Ms Vandermark—That is a very positive thing to do, and it has to be kept in context all the time that Australia is just one part of the world that is releasing data that is useful. There is a very good example where that approach has been successful; the Broken Hill Exploration Initiative. That involved three state governments, I believe, and a number of CRCs. That rejuvenated the Broken Hill area and the town of Broken Hill. I think Dick wanted me to mention that this kind of approach was very well done by the Americans in the late 1800s and early 1900s. They worked out very early the importance of having a US geological survey and then making that available, either at a cost or even for free, to people in the industry to encourage not just the mining industry but all the downstream industries that would grow. So I would endorse that approach, yes.

CHAIR—You need to put some pressure on the states to follow suit.

Mr LINDSAY—I have a question which is related to the geological survey aspect. There is a pool of PhD students out there who could be encouraged to look at regional geology with a view to better understanding how mineral ore bodies form and so on, which then can be shared among companies who have an interest in that particular patch. What would be your advice to the government in relation to whether the government should encourage PhD students to be doing that sort of thing? Does that contribute to the research body of knowledge in the country? Try to apply that to the wider areas where PhD students might be useful. What comments do you have about that?

Mr Davies—There are some excellent groupings at the moment. One of them is the CODES grouping, which is a key research centre in Tasmania. It is a centre for ore body discovery. There is a recently formed cooperative research centre, the Predictive Mineral Discovery CRC. We are a core member of that. I have some views on CRCs but I think this is an important one for bringing the industry together. There are some other important geological groupings in the universities in Western Australia and Townsville and so on.

I think that the best way is to invest more in those sorts of centres, to develop them and encourage them to become bigger and merge and collaborate with the other organisations, because the strength is in size. These people have clearly demonstrated their world-class capability. They are world class; they are the best. There is absolutely no question about that. If they are supported adequately, they can continue to develop this sort of work. If investment goes in on a more piecemeal basis, you will lose the value of it.

Mr LINDSAY—Do you see a role for PhD students in research and development?

Mr Davies—Absolutely. PhD students are the seed corn for the industry. They work in research for a while and then go into the industry, and that is a most important way of doing it. The JKMRC in particular—that is Tim Napier-Munn’s organisation—uses PhD students to work in situ with the companies. That is how the technology is transferred. Those people will do their PhD on a project and very often go on to work for the company, taking the technology with them.

Ms Vandermark—I have talked to smaller minerals companies who have seen the encouragement of PhD students working on projects at their mine as a very positive way for them to be involved in research and development in a way that benefits them. They might not have the funding for their own large research program but they will invite students to do work experience at their mine site.

Mr LINDSAY—PhD students are traditionally poorly paid. What government policy should we recommend?

Mr Davies—I would agree with that.

Ms Vandermark—Yes.

Mr LINDSAY—To spend three or four years of your life getting next to nothing is quite a disincentive. Should the country be considering that aspect and doing something about it—and, if so, what?

Mr Davies—I think education and supporting science education, particularly in chemistry, physics and maths—the supporting sciences—is absolutely essential. This goes right across the board—you do not get biotechnology without good chemistry and physics. That should be one of the major thrusts of government policy. How that is done—whether it is done by direct grants or special scholarships or in some other way—is a matter for discussion. Perhaps the universities themselves would comment more on that, but the principle is sound.

Mr LINDSAY—You gave evidence that not enough consideration was being given to capturing the 98 per cent of R&D that occurs offshore. If we are the best in the world, why is 98 per cent being done offshore? The evidence we have got from others is that only about one per cent of R&D occurs in Australia in their particular fields, so you are not out of kilter. What can we do about getting more of that?

Mr Davies—The 98 per cent figure refers to Australia generally. The minerals industry is the exception that proves the rule. Clearly, in an industry which is dominant in the country and is clearly world class—30 per cent of the world industry is in Australia—there is nowhere else to go, so the minerals industry here has to develop its own R&D.

Mr LINDSAY—I misunderstood.

Mr Davies—I think it would be very difficult to get manufacturing industries like the furniture industry, which is not famous for doing R&D, to go straight into supporting R&D programs. There needs to be a transition program to culturally accustom them to the benefits of technology. The sensible thing to do, if you are in that situation, is not to reinvent the wheel but to buy in or have some mechanism for buying in what is available internationally and, having

done that, perhaps decide that you need to start to tailor things to your particular circumstances. Making the leap from no research to supporting start-ups or CRCs or whatever is very difficult.

When I worked for the chemical industry, I was at the high-tech end of a company running a synthetic chemistry lab and a biotech bit and so on. But the guys that were selling chlorine were lean and mean and did not spend anything on anything—they thought \$10,000 was an enormous amount of money when they came to us with a problem. In the event, we were able to solve that problem and, because we were able to solve a problem for them at a very low level of expenditure, they eventually changed their attitude. After I left the company, I was interested that that particular division was supporting a CRC application. They certainly would never have considered doing that straight off. So I think we have to have a program for easing companies in, and there has to be some sort of linkage to be able to identify what is available generally before you start ramping up the R&D in Australia.

Ms GRIERSON—Please stop me if this has already been answered, because I was late. You made the point that perhaps the economic contribution of mining and minerals is underestimated in our data and that mining technology services in particular are not included when we look at that. Mining technology services could be value adding to the industry or they could be just maintaining and sustaining the industry. I would like your viewpoint on that. Are we value adding enough to the mining industry and, if not or if so, what is making that work or what is needed to make that work better, particularly in terms of commercialisation? If you have answered that already, I am happy to leave it at that.

Mr Davies—I think we have probably covered the first bit on the statistics. In terms of the value adding, there is a whole range of different inputs that go into mining services. I would certainly say that the sort of work that we are involved with as an R&D facilitation organisation is value adding. Perhaps consultancy or something like that might not be value adding as such. I believe that there is a whole range of different organisations and companies involved in the mineral services area. Whether that is being fully exploited, we do not really know, because, as we mentioned earlier, this area has not really been clearly articulated—mining services is lost in the rest of the whole lump of services, so it is very difficult to extract that information. Sarah, you might have a comment on that.

Ms Vandermark—As to whether or not it is value adding or adding enough, I think it does all of those things. I do not know whether we can say it is enough or not because, as Dick said, we do not have enough information about it. I would say that it is not surprising that services sector has developed for the minerals industry, because the minerals industry is mature, so it creates demand conditions where it is always looking for proven, new technologies. That is very useful if you are a start-up company, because you need to develop your technology—usually with a user. I would like to wait and see what the mining technology services sector's Action Agenda actually reports as far as that sector is concerned.

Ms GRIERSON—Thank you.

Mr LINDSAY—I move:

That the document titled *Minerals: our wealth down under* by the Centre for International Economics, presented by Mr Dick Davies of AMIRA, be received as evidence to the committee's inquiry into business commitment to research and development in Australia.

CHAIR—There being no objection, it is so ordered. Thank you for your evidence this morning.

[10.06 a.m.]

BEAUMONT, Mr Peter, Manager, Financial Services, S. Hudson and Associates Pty Ltd

HUDSON, Mrs Suzanne, Director and Marketing Manager, S. Hudson and Associates Pty Ltd

CHAIR—I welcome the witnesses to the table. I would like to point out to you that, while this committee does not swear in witnesses, 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 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—that is, if you have any confidential information that you think would be useful but which you would not like to see on the public record. Would you like to make an opening statement before we proceed to questions?

Mrs Hudson—Yes. I would like to introduce our role and explain why we, as a small company, felt that we should respond to this inquiry. Our role has been predominantly with small and medium sized businesses in New South Wales, through the Department of State and Regional Development, in Queensland and in a little bit of Victoria for the past 17 years. We have lived with those companies and the frustrations and limitations that they have had in getting their products to market for various reasons. We believe there are three areas which are the most crucial for small to medium sized businesses across a platform.

There is a definite need for small to medium sized businesses to access information better than they do, especially information such as funding options and market research, and to have a wider perspective of how they commercialise their technology. As you could appreciate, most small and medium sized businesses are usually family run and, as I think thousands of studies that the government has put together have shown, they are very strong product-wise; they know their product. They are very good at coming up with ways and means. They are very innovative and strong companies in that way. They lack in the marketing area, the knowledge area and, overall, that new product development process—from the time that they come up with this wonderful concept through to getting it to market in a timely process that is funded and does not have a sense of panic always surrounding it as they go through the program to market.

What hit me most was that late last year I had the benefit of working with, and learning more about, the Council of Great Lakes Governors in the United States. The Great Lakes area consists of 13 states, and all the governors meet in a body. They have put a lot of time and effort into programs to help with research and development, because a lot of their states were locked into car manufacture and iron and steel manufacture, which were having difficulties on the world market, as was agriculture. They were from areas such as Pennsylvania, Wisconsin and Indiana. I am sure that you are all familiar with that. They have put a lot of effort into developing mentoring programs. Small businesses can latch onto these mentoring programs to help them through, to open up the concepts of funding strategic alliances and to broaden perceptions of what R&D is all about. It is from looking at the successful results of that, plus

knowing what the small and medium businesses here like, that we developed the platform we have spoken about and come to you today with.

CHAIR—Do you have anything to add at this point, Mr Beaumont?

Mr Beaumont—My background is primarily banking, finance, equities and venture capital. Looking at it from the perspective of financial services towards anything which is new, anything which is potentially different creates a problem in terms of funding. The issues revolve around the attitudes of financial institutions in this country. At present—and I do not need to tell you this; you all have experience of this or you know somebody who has had experience of this—if you do not have a real estate security then you have no funding options available to you. I come to the issues that then flow from that. Up until mid-August I was a director of a listed venture capital company called SME Growth Pty Ltd. We looked at a number of opportunities which required debt funding. In all cases these were subsidiaries of multinational companies where there was a management buy-out—proven market, proven technology and proven income streams—but they could not raise the debt finance to supplement the equity which we were prepared to put in to take those businesses forward. A lot of those opportunities are lost. I do not want to bore you with it, but the issue really comes down to this: either there is a complete lack of regard for the way businesses fund themselves and the support they require from their financial funds or the financial institutions are so cynical about their profit base that they do not care about it.

I will put my former banking hat on. I used to be at the Commonwealth Bank in a project finance team. We looked at putting a venture capital type arrangement together with the Stock Exchange under the name of the Enterprise Market, where the Stock Exchange would guarantee growth equity for private but growth orientated companies of up to 66 per cent of their growth funds, provided the Commonwealth Bank or others would put in one third. These companies were not start-ups. They had the desire to grow, they needed the requirement to take the growth way forward.

Following back from that, yes, there is a whole range of disciplines and procedures that need to be put in place to manage that growth. Sue has already mentioned the mentoring program, which a lot of businesses do not have. Not only do they lack the financial base to help them take the growth forward that is good for them, good for their customers and good for their suppliers; they lack the discipline that is required by an outside party to mentor them through that growth phase. Do they have the systems available to take advantage of the growth? Are they looking at the numbers? These are family businesses. They know their product. For them taking a growth issue is just working another hour in the business per night. The issue that I am coming back to is that these businesses know what they are about. Provided that the red tape is cut out of the way and they are supported—and we are not talking about fly-by-night businesses; we are talking about solid businesses that have a growth record and a good path—they just need access to the growth funding, and they do not have that now. That then stifles growth in the economy. Also, opportunities are lost because other large corporations can come in and take their markets.

CHAIR—The problem that you talk about concerning venture capital and bank finance is almost a cultural problem—the difference in attitude between Australia and some other countries. How do governments legislate to fix up culture?

Mr Beaumont—I knew you were going to ask that! From the financial sector's point of view, there is no need for competition in this country. Each of the major banks—and I do not want this to get into a bank-bashing session—makes \$2 billion every day before it opens its doors. Because of government policy, they are immune from takeover. Nobody is going to take shopfront from them, because that is just too expensive. There is no risk return. I read an article on Saturday, I think, in the *Sydney Morning Herald*; where you have that, what do the banks really want to do? If you take a cynical approach to it, the banks give back six per cent of their profit by way of dividend to their shareholders, so 94 per cent is played with by the executive management. They already know they will make their money from their retail base before they open their doors. How can they minimise their risk?

Coming back to what I originally stated, if you have real estate, that is fine—sort of. If you have real estate on the coast, that is better. But, if you have a growth-orientated business in Dubbo and you do not have an escalating real estate market, you have no access to growth funding. That is why. You have the analytical pressure on the uneven bank structure: they do not compete internationally; they are a protected species here; they do not have to open their business or do things in the bush or support regional Australia; and they basically do not have to help small business. Why? They are quite content with their domestic loan portfolio. They are quite happy to lend in an escalating real estate market in the capital cities.

From a cynical point of view—and I do not propose to do the exercise—it would be interesting to see how much new business is done outside residential Sydney, Melbourne or Brisbane. That is wrong. These banks make \$2 billion plus—it does not matter how much they make. They are cash rich. They are not competing for world market capital because they are in a protected market, but their chief executives or boards impose on them the requirements that are imposed on, say, Citibank—an international conglomerate which is global. It has many markets. Even in its own domestic market it competes with another 1,400 lending institutions in the States. That is in its domestic market. What you have is perhaps a lack of trust as to what the customer requires on the management part of the banks. I think there is a fair degree of that, because they do not have the power, they are not really interested in the business; all they want to do is cut down the costs and put them into a warehouse to manage them separately.

The adage of going the extra step does not exist in this country. How do you change that culture? I do not think you want me to tell you. I am not suggesting that you get back to bank regulation, but there has to be at least some power so that either their educational place is improved or they get a wake-up call about their responsibilities to the people who own them. You cannot drive an economy without a viable financial sector, and all we have seen of the financial sector in the last 10 years is a reduction in competition.

CHAIR—We will not have a debate about banking—

Mr Beaumont—I did not want to get into a banking inquiry.

CHAIR—because I think I could show you some pretty stark evidence that there actually has been a substantial increase in competition in particular parts of the market. For example, there is a difference in the marginal rate within interest rates.

Mr Beaumont—I can only tell you how I see it.

CHAIR—A one to two per cent shift has happened purely and simply because of competition. But that is another issue.

Ms GRIERSON—You are saying financial institutions could give a bit back by supporting this sort of investment of venture capital. Do you think they perceive the risk as being too high? Is that a cultural problem? Is that a reality because of seeing it always as an expenditure and not as an investment?

Mrs Hudson—I think you can look at it two ways. From our point of view, the answer is yes. Most small businesses come under the small business banking area, which has progressively been shut down throughout most of the banking sector. What happens is that the small business person goes to the retail banker who now looks after companies that do not have more than \$1 million worth of borrowings. The retail banker has no way of evaluating R&D. When we have gone there to discuss research and development projects, we have found that you can show them the markets, the opportunities, the growth, the profitability and the overwhelming range of benefits that this can provide to the company but they will always ask you what assets you have. The form we had was no different from the one provided if the owner of the company was going to buy a house. So that is your first area.

The second area is that most banks have a credit area. These people have been there for 120 years—from the draconian ways they come back with some of the answers. The first thing they say is, ‘Can you get any money from the government?’—which has got to be the wrong way for a bank to approach it. It is the absolute first thing they say. They say, ‘Isn’t there that R&D thing?’ and you answer, ‘Yes, but the R&D thing is competitive.’ They then say, ‘Doesn’t the government give away a lot of money; can’t you go to them?’—it is like ‘please, please’. In the United States there are quite a few calculations that are used to make R&D look more like a value asset for business. They do not use them at all here in Australia. We have noted that in our submission, so I will not bore you with the details.

Education is a point, yes. But, if I were sitting here speaking to a bank lender, and I was dealing with a retail manager for Maroubra, for example, the bank lender would just go back to the people in the credit department, who have not been educated and are absolutely insulated from anything. They have a strict set of guidelines. There is an asset to expenditure ratio. There are certain ratios and there are certain areas, which R&D does not fit into.

Mr Beaumont—To start with, they just do not like technology. They make enough money doing housing loans, where they are safe and secure enough in their own jobs, that it is not worth it to take the risk because they are supposedly accountable for it. It is a cultural issue and, amongst other things, it is an education issue. The issue with respect to the people Sue was talking about—and we have all stereotyped them, which is probably not right; there are some good ones—is that, if you take them out of their existing environment, they do not know anything else. They are so limited now in what they know within their existing environment that, if they were retrenched and they lost their job, they could not do anything. They are not even qualified to run a fruit shop; yet they have the power and the influence to dictate the future financial strengths and benefits that attract from things like technology.

Mr Chairman, you asked what the problem was. The problem is that there has been a cultural change and they have lost focus on what their role is. Their role is to analyse what is good for a particular company, not what is good for the bank they work for. It used to be a partnership;

now it is only one way. The real issue is that they will not go the extra step. They do not take seriously enough the decisions that they make and how those decisions affect the size of the bowl of cornflakes that the family running that business put on the table for their kids in the morning. They are not responsible enough and they are not held accountable for the decisions that they make.

There was a time when the local bank manager used to eat and drink either at the pub or at the golf club—he was known to the community. He was the catalyst that dictated a lot of the business dealings within a local community or town: you might be a supplier looking for a new market and you know there is a carrier. Here is the local bank manager who sits in the middle and says, ‘Why don’t you ring this bloke?’ That does not happen now because they do not have any interest in their customer base. That sounds a bit harsh and, as I said, I do not want to bash them, but the issue is that they do not feel the need to go outside the box. Outside the box is outside their security blanket: yes, we are cash flow lenders provided you have the real estate to support it.

CHAIR—I think we can all agree that there is an issue of education and that there are a number of ways in which that can be addressed. The simple selling of the benefits of research and development, which has come up in numerous evidence before this committee, is probably a very strong way to help change that particular culture. Somebody gave evidence that it is easier to get an advertising budget through the board of a company than it is to get an R&D budget through.

Mr Beaumont—That is right.

Mrs Hudson—Without a doubt.

CHAIR—You could apply that directly to the banks in that it is probably easier for a bank board to get an advertising budget through than it is to get the bank to concentrate on investment in R&D and some of their customers. But I think we should get back to a couple of the other issues. While that is an aspect of investment, the ultimate investment in R&D is the access to funding. We could probably get bogged down on the banking issue. You talked about a pilot program for a marketability fund in Pennsylvania. Could you tell us a bit more about that concept and how it might fit within programs that exist at the moment?

Mrs Hudson—In the United States they have better access to funding than we do. We will not go back into that but even at the government level there are a lot of small business loans and a whole range of other things. Taking the funding issue out of it, Pennsylvania still found that there was a loss of funds and issues that correlated with small businesses doing R&D, and they noted that, pre this study, something like only seven per cent of small businesses in the United States actually undertook R&D.

They then looked at how they could stimulate that. They did three things. Firstly, they developed an R&D park called an ‘e-park’, for want of a better word. It is not a physical building that everybody sits in, as in Redfern; it is an Internet network that small businesses can link into and is like a total information site. They link in and can ask questions about certain things and do research. They can organise for a mentor. They may have a manufacturing business and may say, ‘We’ve got this great product and we’ve got to get to market, and we believe the best market is Korea as opposed to the United States.’ So they may need

commercialisation in the global sense rather than just in a domestic market sense. It could be in a technology area or in a range of other areas. It is equivalent to our high-growth program or the department of state and regional programs here in New South Wales, Queensland and Victoria. They ran this program under that banner for companies in that state—theirs is broken up into particular size, state and people geographic areas—and qualified people were attached to the e-park. They ran a program called the Kazmarski's new product innovation program. Kazmarski is a well-recognised new product person who has developed this whole program that companies can go through to help them think about their new product technology. So instead of just saying, 'Hey, I've got this great idea and my supplier says that it would work; let's go. I'll sell my house on it,' there is actually a process to go through.

For a couple of industries, in the areas of biotechnology and aeronautic technology in particular, they physically set up the e-park in a building within a giant industrial area. They had it so that the small business owner could walk across and literally grab access to that—grab access to libraries and all sorts of things—and know how to use them and be supported in that way. They got market research; they got financial help. They had someone like Peter, for instance, sitting there going, 'Let me have a look at your figures.' And we did this for a company only last week. There is a major dairy value adder company looking to go into R&D for new processes et cetera. We had to go right through all their figures and have a look because they did not have a clue. They can make award-winning cheeses but they did not have a clue about the other side of things.

So I believe it can be fitted into the current state and regional development programs. I believe that companies have to be, as Pennsylvania found, dedicated to it. They paid an annual fee to be part of this process. But the return, as I quoted in the report, for the first year has been phenomenal—companies actually taking things to market, the level of R&D, the level of increase. It has encouraged small and medium sized businesses—and I am talking about businesses under \$30 million in Australia—and given them the courage and the expertise to be able to go ahead without that fear of, 'I'm going to lose my house,' or 'What happens if this doesn't work?' For most small and medium sized businesses, the 'What happens if it doesn't work syndrome?' means they can lose their family home, they can lose their business, they can be taken over by administrators and pulled apart. That is a pretty scary activity.

CHAIR—It is aimed very much at the development aspect of R&D.

Mrs Hudson—No, it is aimed very much at right through.

Ms GRIERSON—Is it start-ups?

Mrs Hudson—It goes from the start right through past launch, and it is the last part that they really get involved in. As I said, most small and medium sized businesses are pretty good with knowing the start-up thing. They know the product, they know the market, they know what they have to do. As they go through, most companies can get an R&D project to prototype stage. One of the best programs that R&D Start ever had, and probably the most underutilised, was the R&D postgraduate program. The companies that I put that program into benefit so much from having that university and that extra pair of hands to help them.

Ms GRIERSON—Is it government funded or fee for service?

Mrs Hudson—It is a bit of both. It is varied. You become a member and you can get a certain level and then you pay a fee for service. But they take it right through and give support past commercialisation, and that is where the government funding stopped. The biggest issue we used to get was that we would have companies who could take it to prototype, which is wonderful, but with commercialisation you had to be very careful: you were not allowed to build, do or apply for anything that could be used in manufacture. They were all small. It could be used for only 20 uses or less. The biggest cost companies have is tooling up to get it to market, to get the marketing in place, to get the advertising in place, to get the extra people on board, before you start getting the sales back on your R&D.

Mr TICEHURST—Your tooling costs are capital so you are not getting any tax rebates.

Mrs Hudson—You are not getting any tax rebates; that is right.

Mr Beaumont—That is if they can get the capital.

Mrs Hudson—Yes, let us leave the funding aside. Let us assume they can. But the commercialisation loan stopped there. The commercialisation loan was a great program but it needs to be extended. I do not have a problem with small and medium businesses—and neither do they, let me tell you—paying back. They do have an issue with the concept of a loan. The R&D commercialisation loan was great because you had that little bit of a break before you had to start, but it was 18 months from commercialisation. Most small and medium sized businesses would hardly get to launch in that time. But you could not do anything that could fund production, which seemed inane to me. Why go to this stage and cut when the real benefits occur here?

CHAIR—And you would be confident that businesses would be interested in a loan situation from that point on?

Mrs Hudson—Without a doubt. I can verify it from record. I have put through over 150 R&D grants in 10 years. I have put 10 R&D postgraduate programs in place, whether it is through me or through accountants or whomever for their clients. I can guarantee you 100 per cent that they do not have a problem with loans. Regional businesses do not; no businesses do. They do not want handouts, because a handout usually means a level of paperwork you cannot jump over and a lot of restrictions. They do not want that. They want the access to skills and the access to resources and the funding to put it in place.

Mr Beaumont—They want to make it work. They already have the skill in house to produce it. They need the mentoring to put the disciplines in place to accommodate the growth. They do not have those internally but they can be supplied to them. But, at the end of the day, they still need access to the growth capital. That growth will then have a spin-off or multiplier effect in a local or a regional area, through more jobs, more supply or whatever. Sue alluded a little earlier to a cheese manufacturer. This is a small business. It has \$7½ million worth of turnover. It is run by three people. It is run in one shift. It wants to go to two shifts. It has not exported. It owns factory lands on the Manning River. That is \$100,000 worth of land and it is a \$2½ million facility that we are building there. They have issues and the issues are: they can supply the market—they know the market is there—but they cannot physically get from where they are now to supply that market. They cannot tool up; they cannot stock up. As Sue was saying, they are not asking for handouts. Will they take the money? They will take the money, provided the

deal is structured appropriately. They do not get that now. It is that 'one box fits all' approach, and one box does not fit any of them.

Mr TICEHURST—I concur with what you are saying about banks, having gone through an exercise with 'Which bank?' running for five years. Doing a presentation, the bloke had had a long lunch and was going to sleep. Needless to say—

Mr Beaumont—It is the same with venture capital. It is cultural.

Mr TICEHURST—Maybe we ought to look at ways that we can make the banks respond. We could have a scheme where they have some benefit out of providing money for R&D. If you are a manufacturer and you are making a profit, you can get your 150 or 125 per cent R&D tax rebate. We could have a scheme like that for the banks: if they lend money for those sorts of purposes specifically, they get some sort of tax incentive to do it. I understand what you are saying about them being comfortable in lending for housing and if you do not have real estate you can forget it. That is a fact. What can we do to change the banks?

Mr Beaumont—I think that helps. What you are suggesting is a start, but you have an educational blockage in the big four. You need to bring them along with you so that they give you access to good people who are not constrained within their existing boxes, so that they have the ability to understand and to make a decision to go with you.

Mr TICEHURST—Certainly the local bank manager has disappeared. There is no doubt that that has happened. Unfortunately that is the case.

Mr Beaumont—There are good people out there, but a lot of them do not work in the banks anymore, because—without being too hard—it is a stifling experience. At the end of the day, what we have been suggesting is: once it becomes a moneymaker, then they will lend them the money. How do you bring them along? You bring them along by taking a customer or supporting one of their customers through this process and then having them take the fund out, because it works and it has got to the position—or you rearrange it. They are never going to be in a position to say, 'We are hurting in this particular part of the market,' because they do not play in that market now. Tax incentives is one aspect of it, but it is an educational thing. As private individuals, we certainly would not get the same recognition as a government edict. I am not suggesting you make it—

Mr TICEHURST—You cannot regulate everything.

Mrs Hudson—No.

Mr Beaumont—And you do not want to, but at the end of the day it needs to have some support. There has to be a reason for them to change. In the current market, the only reason is going to be if they lose customers or they see that there is an opportunity to make a huge killing.

Mrs Hudson—The way we have structured is that we thought of a fund that would coincide with a bank or something. As you will note from the flow, there is a lot of information that goes from the business back to a fund or the bank. We found, when we spoke to a few bank people—because Peter has been very much involved in them and I have worked with the banks quite a bit over the last 10 years—that they really became nervous about small business because they

never felt they got good information from small to medium sized businesses. Let us put things in a fair perspective. As soon as the small to medium sized business goes over their overdraft, they do not answer the bank manager's telephone calls—or, now that there are no calls from bank managers, call centres' telephone calls and their electronic logon Internet message saying, 'Oops, you're over.' They do not respond; they do not do as they should. For banks, it is all too hard. They really do not want small business—that is the bottom line. So, with small business and R&D, boy are you looking at risk city.

What we have designed is an information process that has its first part into the business and the second part out to interested stakeholders, such as the fund we have suggested here that is part government initiative and part private, where each bank puts in a certain percentage of their profits as a way of giving something back or for which they get tax incentives. It also disciplines the business to make that leap forward as well—to start dealing with things more professionally. We felt that both sides of the coin had to be addressed. You cannot just give money to a business. That was done with AIDC and a whole range of the NIES programs. I remember the first inquiry into the R&D program back in 1995 found that 96 per cent of the funds led to research that never got commercialised. It was horrendous. That is where just giving money does not work. It needs to be a case of, 'Hey guys, you are being guided through this process. You must give information back to the stakeholders, which may be a government fund overview, very similar to that innovation investment type fund concept or a pooled development fund. But the fund itself must also open its mind to commercialisation because that is where you get your money back.

Mr Beaumont—That is where the pay-off is.

Mrs Hudson—And they get cut at that point. We have got a waste water company that had a deal with McDonald's that would take it worldwide. Do you know that they could not get the funding for tooling and lost a \$50 million contract with McDonald's? To get there, they had all invested—they had bought the technology and their houses were up to 90 per cent secured and they were in rented premises but the bank could not see it.

Mr Beaumont—What we are advocating is controlled growth so that it is planned beforehand and then it is monitored. Part of the information flow is a budget variance statement. That could be once a month or, depending on the accounting period, done by their professional independent financial advisers. That may be an accounting firm or it may be a major firm, and they would be accountable for making that information work. If there is a problem, they have got to tell the fund what the issues are so you get the information early and are able to do something about it as opposed to waiting and then—we all know what happens down the track—finding that there is 10 per cent behind this month and another 10 per cent behind the last month.

Mr TICEHURST—Mentoring could be a way of doing that. The problem now is that accountants' fees are shooting upwards—

Mrs Hudson—That is right.

Mr TICEHURST—The BAS is a bit of a bonanza for a lot of accountants. Mentoring is probably a way around that. In your submission, much of what you have said is related to manufacturing.

Mr Beaumont—That was by way of example.

Mr TICEHURST—Would you see the same things applying within a service business?

Mrs Hudson—Yes. The only difference is that service businesses do not tend to look at R&D at all; they often just wait for somebody, except when you are looking at IT services. But if you look at accountants, legal firms and financial advisers, the investment in R&D is literally limited to processes and product structures that they may be putting forward or the way they utilise what they do.

The reason I point to manufacture is that they tend to have the hardest time. They have had very low margins and other issues for a long time. It is an area where increasingly a lot of the products and services are sent overseas. It has therefore been hit the hardest with the banking legislation. If you are an accountant, a medical person or a physio or whatever, you can go to NAB and get a professional services business package. If you are a manufacturer with a \$10 million manufacturing company, you cannot. You cannot get anything special. That is why we have used them.

The issues are the same for service as they are for manufacture, but manufacture has a lot more tangible expense in the tooling and equipment, especially for a new product. For example, our cheese company may develop a new soft cheese which is very much in demand on the world market. To deliver that, they will often have to buy new technology or new packaging equipment or develop a new process. So in the end it is often more complex in its delivery than what I have experienced with service businesses. That is why I utilise that.

Ms GRIERSON—I am trying to marry some of the things you have said, so I will put a scenario and I would like your comment on it. I am trying to marry the financial services and investment opportunity being made available to R&D ventures with the support of government and the services that are needed. From what you are saying this morning, would a model such as the one I am going to put forward work, what would be the limits on it and what suggestions would you have about it? You talked about an e-technology services park or something like that. If that were government supported—and if there was an aggregation in place of all of the sorts of services that you have, with links to organisations, associations, support groups, professional groups et cetera and with some assurances that, if it gets past stage 1, a small company has to take on management support services, training, financial advice or strategic planning assistance—I would think that something like that would give banks more comfort that risk was being managed in some way. Then, of course, obviously there would need to be some support for banks to take on those sorts of ventures. Could you see that being a possibility?

Mrs Hudson—Yes, that is a very strong possibility as long as, at the end of the day, there is still a real person that a small business can ring at the e-park and talk to.

Ms GRIERSON—I see that, if you did that well, there has to be a local factor that caters for the local market dimensions, because for exporting you might be talking very much about the best value adding we can do. Then there may also need to be a specialisation by industry sector as a component of that as well.

Mrs Hudson—That is right. We are currently putting a similar little concept like this to the meat and livestock association for meat and livestock companies after our research. That was one sort of research that we did that made us respond to this—there were so many issues.

Ms GRIERSON—I think that from listening today we can do a lot—we can suggest to government that they do a lot to assist R&D and ventures in small companies—but the key to it is still some financial investment, so you perhaps need to marry both of them so it is supported.

Mrs Hudson—Yes, that is right. It has two sides. There must be the access to the funding. No-one is asking governments—and the companies do not either—to just throw it away. The other side is that business has to be mentored through that change. You have technology, development, the way they look at their funding, the way they look at issues and the marketing. Often, the biggest problem when they get through is their marketing. They should have producer-user strategies coming in at commercialisation stage, where they bring some users in instead of just keeping that group-think type of process. That is what a mentor from the outside can do. They can organise these things. It is much stronger. If you are helping a client and if they have three particular companies that may be able to use this technology, you can go to them and say: ‘I am working with the government and looking at this technology—it is government supported; can you come along and give your opinion?’ We just did this with a COMET program for an underwater technology. The company had never considered doing that. It gave them such a different perspective on the issues to do with their technology. So it is little things like that. Not only has there got to be access to the funding; the R&D has to be right. They are very good from there to prototype stage, but that is from the concept to a play toy, to start with.

Ms GRIERSON—Do you think industry and research institutions would cooperate with such an organisational body?

Mrs Hudson—I think they would. It does not impact on them negatively. When you look at CRCs, they are totally underutilised.

Mr TICEHURST—It is like the business mentor system, I suppose.

Mrs Hudson—Yes.

Mr Beaumont—A good example of it is the Australian Technology Park. How did it ever leave Redfern? Are you familiar with that?

Ms GRIERSON—They are usually on the site, aren’t they, and it is confined to whoever is there.

Mrs Hudson—That is right.

Mr Beaumont—But the majority of the businesses that are there originally came out of Sydney university’s research areas. So they were locked away in some dark, damp, cobwebbed cupboard in the cloisters of Sydney university—it is all right, I went there too—and they have come out. I will mention one in particular—I will not mention the name—where the technology deals with putting an electric charge through an emulsion to measure the particle size and the electric charge on the particles. To give you an example, in the production of paint, if the

particles are too big, it is lumpy. If they are too small and negatively charged—they repel—it is a whitewash. The way they currently get that technology is to grind it down using two grinding wheels. They take a small parcel of it, do a microanalysis of it through a microscope and then do the multiplication factor: ‘If we have got 300 million tonnes of this stuff, et cetera.’ It works for things like the concrete industry—anything that has an emulsion type mix in it.

That business came out of the School of Physics at Sydney uni. They put their technology together, they were supported through the Technology Park—and they could not get funding. They sold the marketing rights to America for this machine, which was then stuck on building sites, where it was measuring the consistency of the concrete as it was being poured as opposed to taking a sample, taking it away and, in three days, coming back and saying, ‘That floor’s got to come down because it’s not consistent.’ That was a problem for them. When I was at the Commonwealth Bank, I was involved in setting up the Technology Park. We funded that particular business so they bought back their marketing rights. But that was only done in the unit that I was in, and which I ran, because we had that authority.

To answer your question of whether the supporters will go there, they will flock to it. They will bring what they know is available. Some of it may not be good, and that is why the fund will have directors. We have not put anybody down in the document you have in front of you, but we know the people we have spoken to are commercially astute—this thing has to be run without any red tape—and have access to both private funding and old Australian money. They also, without being too hard, have some clout. That is what this thing needs. It needs some clout to go and talk to the chief executive officer of the bank or the chief executive officer of a venture capital company and say, ‘This is what it is’—not talking to the local bank manager or the local credit bloke. It is unfortunate that it has come to this, where you need to do it on a face-to-face level at the most senior level. It might be board to board—one of the many boards that the directors sit on—where you sit there and say, ‘Look, there might be some spin-off for you from the particular technology.’

Ms GRIERSON—I would like your comment on whether you think AusIndustry and Austrade, as separate bodies, is a good model or whether there is a need for those two organisations to be more complementary.

Mrs Hudson—I worked with NIES since 1986. I was there when AusIndustry changed over. I believe they need to be more complementary. The new TradeStart program brought out by Austrade is absolutely fantastic. I have already got three companies for the St George area. I am on the board of the BEC—the Business Enterprise Centre—just helping them. I developed the Women in Business Mentor Program, so that is why I am a little bit of a nut in that area.

AusIndustry is not a good model—bottom line. It has to be more small to medium sized business oriented. A lot of small to medium sized businesses do not go on the Internet and know how to get around the more complex sites. People need to be able to easily access directly their specific information.

Mr Beaumont—They need to be more commercially astute.

Mrs Hudson—That is exactly right. They have to be able to talk to businesspeople on a business level—not read out the policy document or the pamphlet that is already on the Internet, which is what happens. AusIndustry needs to be out with the businesses. It needs to have

smaller units out there. State and regional New South Wales have cut their numbers dramatically. We actually had a person specialising in the food industry. When we had specialists in each industry looking after those industries, it ran 10 times better than it does now.

CHAIR—That is a state.

Mrs Hudson—That is a state. It was an AusIndustry initiative. Fifty per cent of the funding comes from AusIndustry. Other AusIndustry programs, like the book program, the shipbuilding program and the R&D tax concession, are too far back from the small to medium sized business. The accountant runs it and charges them a fortune for the R&D tax concession. It is criminal.

Mr Beaumont—Do not say that. You are on the record.

Mrs Hudson—We love accountants.

Mr Beaumont—They are really good people.

Mrs Hudson—AusIndustry needs to be back where it was. There were active offices which were set up in local areas. We had one at Burwood and we had one at Parramatta, and they were proactive and companies were encouraged to go to them. Companies do not. It is frustrating. You have to go at lunchtime and pick up the phone to the AusIndustry helpline. If you can get through to some really good people, then Austrade is a brilliant concept. I know. I am dealing with a mushroom company—the things I deal with!—and they accessed Austrade in Korea, and they were absolutely fantastic.

Mr Beaumont—And yet we have had experiences of Austrade in Malaysia, as recently as last week, where it was an absolute disaster. They had three months to arrange a health seminar and they had not even bothered to read the submission we provided to them about helping with prevention of diabetes. It is a serious problem: 10 per cent of their population have it. They did not even read it. Then, three days before we were due to fly out, they had not got any appointments. I am sure that there are good and bad in all parts of the world, but if these are the people who are representing Australian business, we have got a problem, because they do not help us.

Ms GRIERSON—So you suggest there is inconsistent quality.

Mr Beaumont—They are supposed to be experts in what they do, but the Austrade officer had no idea about health care and thought we were coming up to talk to pharmacies. It was a very serious discussion we had on the phone, but we had to ring them because they were not coming back to us to tell us who we were seeing. The upshot of the whole thing was that, when Bali happened and DFAT issued a statement that said ‘don’t go’, these people were still telling us that it was all right to come. From a financial and business perspective, that client’s experience of Austrade in that particular location—a client that we were helping and advising to increase the export of their services—was not very good.

Mrs Hudson—One of the positive initiatives that is happening in Sutherland is, I believe—looking at your model—very practical. You are talking about AusIndustry and Austrade coming together. Sutherland council have actually funded an area in Sutherland in New South Wales

where the Austrade person, the DSRD person, the Business Enterprise Centre person and some facilities are all located on the one floor. They all talk to each other.

Mr Beaumont—You have to have that cross-interaction.

Mrs Hudson—It is very important that they are all located together. The DSRD people who represent AusIndustry at the coalface in New South Wales or Queensland will cut you at export—they say, ‘That is Austrade and here is their number,’ and they give you the EMDG book. These guys need more; they need to work through things.

Mr LINDSAY—I want the answer to two quick questions. You talk about opportunities for product development that were lost. Where did they go? Did they go overseas or did they just not get developed?

Mrs Hudson—If I had to put a percentage on 100 different programs I have seen over 10 years, I would say 70 per cent do not go anywhere and 30 per cent are picked up overseas.

Mr LINDSAY—In your view, in a marketing operation how important is it for the businesses that are innovating to understand that they should look at world markets and not just at the market in Australia?

Mrs Hudson—I think it is critical. If you look at some of the issues I have put here about the funding, one point the funders always come back to is that the domestic market is too small, there is no competition, and others get all this funding and Australian companies cannot compete. From a marketing point of view, my belief is that it is critical to have a good strong domestic market, because you need that. It is your bread and butter. You have easy access and you can manage it better. But when you are doing R&D you must look at the global market today because it is getting so much smaller.

Mr LINDSAY—Should the government be looking at incentives for bringing products onto the world market rather than just the Australian market?

Mrs Hudson—No, because a lot of Australian businesses start with an Australian market and then turn to the world market, and that is not a bad or limited management decision. It is quite a well-structured management decision to do your domestic market and then go globally. You can often fix up any problems—

Mr Beaumont—In your own market before you put it out to the world. Taking it a bit further, most R&D and research based technology here does have a global aspect to it but then, if you are planning for growth to take a larger slice of the domestic market, planning for growth to take a slice of the international market is equally important. From our experience it is better to fix up your own backyard first before attempting to fix your neighbour’s backyard. You can move to that, and in R&D it will move to that. That is the only way it can go.

CHAIR—We have unfortunately run out of time. In closing, is the 2002 University of New South Wales study you referred to available? What does it cover beyond the 87 per cent figure of R&D roll-out underfunded you mentioned? What else does it cover and is it worth our while getting a copy of it?

Mrs Hudson—It covered basically R&D activities that had gone through their commercial area.

CHAIR—Through Unisearch?

Mrs Hudson—Through Unisearch. They often work through to the prototype stage and they reviewed it. I do not think it would be relevant to you. It mainly looked at services they should include or what they should be doing as an organisation. I picked that out as a random sample in the total market for R&D and I thought it was interesting to note that. I do not think the rest of it would be of benefit to you because it was more to do with how Unisearch would gear up, where the benefits came and how many repeat customers they had.

CHAIR—Thank you for your time this morning and your submission.

[11.12 a.m.]

KENNEDY, Ms Narelle Anne, Chief Executive, Australian Business Foundation Ltd

LIVINGSTONE, Ms Catherine, Chairman, Australian Business Foundation Ltd

CHAIR—Welcome to this inquiry. I would like to point out to you that while this committee does not swear in witnesses, 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 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 with respect to any confidential issues, 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?

Ms Livingstone—I would like to start by giving the background of the Australian Business Foundation. It is a not-for-profit, apolitical, private sector, research think tank formed in 1997 by Australian Business Ltd. It is independent of ABL in terms of its activities. The research that ABF undertakes is focused on innovation, new business models and opportunities from the knowledge economy. It is intended to be a rigorous and fresh analysis. The end goal is to advance the knowledge and debate about Australia's overall prospects for growth, competitive advantage and, generally, prosperity and jobs in the Australian economy. Our submission today is based on the intelligence and learning from our research work. I would like to make some comments on Australia's performance generally in terms of business R&D and then pass to Narelle, who will talk specifically about the learnings from our study entitled *Friend or foe? Leveraging foreign multinationals in the Australian economy*, and then close with some comments on the link between R&D and innovation.

I will start by making some comments about Australia's R&D performance. I think it is really important that we look at Australia's industry structure and look at where the R&D is carried out. The business sector in 2000-01 contributed approximately 47 per cent of Australia's gross business R&D. Looking at that, you have a bipolar situation: the larger corporations, which represent 0.2 per cent of Australia's total businesses—a very small number of businesses—undertook 63 per cent of the business R&D. If you drill down a bit further, the top 10 corporations account for 17 per cent of the business R&D. When you look at those top 10, you see some multinationals, some dual listed companies and some Australian companies. The intensity of R&D conducted by those top 10 means that the R&D base in Australia is very vulnerable to private sector decisions that are taken for good reasons but which then have a negative impact on the national interest to the extent that the R&D is reduced—and we have a recent example in terms of Ericsson's decision. If you look at the top 10 companies in 2001, over half of them have actually been subject to circumstances that have caused them to reduce their R&D in 2002. These are sectoral issues. We have a vulnerability to the extent that the business R&D relies on large corporations. Narelle will talk about possible strategies there.

If you look at the other side, which is the predominance of SMEs in the Australian industry structure, SMEs are notoriously difficult to deal with. They are, in a sense, very resource constrained, operating on a smaller scale. So exhorting SMEs to undertake more R&D is just

not possible. They do not have the financial capacity and they cannot take those long-term risks. I think this represents a real opportunity for Australia because we do have excellent public sector R&D. If we could find a better way of linking the public sector R&D with the SMEs, we could have a very effective and very distributed transmission mechanism for the outcome of the public sector R&D. I think it is a particularly important dynamic to look at and to understand the benefits of partnering between the public sector R&D and the business R&D through that industry structure that is represented by the SMEs. To take an example, we look at the ICT sector in Australia and we say that we do not have enough ICT research and so on. Of the 20,000 companies involved in ICT in Australia, 19,000 have four or fewer employees. This really illustrates the bipolar relationship of the large companies and the not so large ones.

I think, too, the relationship and the continuum between the public sector R&D and the business R&D is something that we could explore more, and the benefit and the importance of the long-term decision should be supported by government. Even large companies are becoming somewhat reluctant on the long-term decisions. SMEs cannot afford to take long-term decisions but government can. If you look at the robust nature of the biotech industry in Australia—and it is—and medical devices, you can trace that robustness back to investment decisions made by the government and the universities up to 50 years ago.

Increasingly, we are going to be looking at long time frames in R&D with the new platform technologies coming in and higher sums of money. If you take that dynamic with the predominance of SMEs in the Australian economy, the capacity of companies to undertake more R&D in the face of the scale of resources and the time frames is being diminished effectively by the day. The link between the public and private sector R&D is something that, if we focus on it, we could really take advantage of in our industry structure, rather than the industry structure acting to our detriment. I will finish there and Narelle can talk about the multinational corporations and *Friend or foe?*

Ms Kennedy—We will table the study *Friend or foe? Leveraging foreign multinationals in the Australian economy*. This is also available online and readily summarised. This study was released earlier this year. It was commissioned by the Australian Business Foundation and done by Dr Lyndal Thorburn and her colleagues out of the ACT. The *Friend or foe?* title is a quick shorthand way of trying to work out whether multinationals give more than they take into the Australian economy. The short answer is yes: they are more friends than foes. However, the relationships are quite fragile and tenuous. Most of the multinationals operating in Australia are operating as sales and marketing outlets, essentially. So there is room to capitalise much more effectively on the presence of those local subsidiaries of foreign owned multinationals in Australia to undertake more R&D in Australia and to deepen their innovation, product development and research base in this nation, which can then attract more room for suppliers to those multinationals to lift their game.

This study was not looking so much at the economic multipliers—there have been many studies that have looked at that—but it was actually looking at the more intangible relationships and flows of knowledge between multinationals and their local subsidiaries and the supply chain in Australia. The positive elements of the role of multinationals in Australia were very much about a drive to quality on products and service development, a transfer of knowledge and information, and new management practices that emerged. Those kinds of tendencies were certainly seen. Some good strategic alliances allowed local suppliers to piggyback and to access global markets as a result of their relationship with the multinational, and there was some

evidence of skills and knowledge transfer—of being able to access otherwise inaccessible knowledge about new product and market development and intelligence about marketing systems and market preferences because you had an association with the multinational.

As I said, these were not ingrained and in depth because most of the multinationals in Australia were sales and marketing outlets, so the actions that were recommended in that *Friend or foe?* study were very much about trying to deepen that relationship. It suggested that Australia's investment attraction programs needed to go beyond a recognition of regional headquarters into setting up what this study called 'global centres of excellence' whereby products and services for the global firm would actually be developed in Australia or contributed to in Australia. There was also the idea of strengthening the arm of the CEOs of foreign owned multinationals in Australia to become a larger part of the inner circle of the global firm and therefore access technology, knowledge, research, training and so on.

The idea of multinationals being standard setters and being able to pull through innovation and new skills in their suppliers—the idea of a 'demanding customer'—was central to the recommendations that Lyndal Thorburn and her colleagues made. If I had to summarise the strategies that come out of that, I would say that it is a real plea for a much more engaged partnership by governments with multinationals—you actually have to get up close and personal. There has been an understandable tendency in Australian public life to have a sort of competitive neutrality, a more laissez faire approach, because often it is seen to be favouritism, either by way of financial incentive—a bidding war—or engaging in something that is not quite proper for governments to do on the basis of allowing private sector decisions to be made and to stand or fall in terms of their marketplace effectiveness.

I suppose what we are saying is a departure from that in the sense that, because the concentration, as Catherine has outlined, of multinationals in Australia is so strong and their decisions, while they are made as private decisions, can have such an impact on the national profile and the industry structure of Australia, there is an argument that says that we have to know much more about the strategic imperatives of individual multinationals, that we have to understand something of their self-interested decisions and just where Australia's distinctive capabilities might be able to come into play. So the idea of just having dispassionate, generalised decisions is not good enough anymore. So the idea is one of needing to understand the dynamics of how multinationals work and then trying to look at more deft ways in which public sector action can assist to build up the environment whereby multinationals will see it being in their own interests to invest more in Australia. So things like the nature of the investment attraction effort and the nature of the programs that support that are relevant.

CHAIR—Thank you for those introductory statements. Do you think one of the problems we have in attracting more investment and more research and development by multinationals to Australia is due to the fact that one of the great Australian pastimes is bashing multinationals?

Ms Kennedy—Yes, there is an element of that. I do not think that makes a lot of difference. It is the idea of trying to have business specific benefits argued by multinationals. The idea that there is a public opinion problem—I would not diagnose that as the main message coming out of our *Friend or foe?* study. Being able to say that there are benefits that we are not capitalising on enough is a much more important element. You actually have to argue in the self-interest of the multinational. They are not going to make a decision to stay here out of the goodness of their heart; it has to make business sense to them. We think that perhaps there are more

opportunities. For example, Australia is seen as a great place for product testing of innovative products and services. We are cheaper in terms of research and we have good, skilled people. I do not think this is just a self-serving issue, but the skilled people are seen to be more open, inventive and engaging in the way that they go about doing the work, and there is a lot of anecdotal evidence surrounding that. So being able to capitalise on that in some way and help the CEOs of those multinational subsidiaries in Australia to argue their case offshore seems to me to be an important element.

CHAIR—Very much so, but I think that the attitude of the public towards multinationals probably does not help. We have had evidence in this inquiry that shows that in some circumstances companies have made decisions about where to locate research and development ultimately very much based on their perception of how they will be received in Australia, even though those perceptions are probably flawed in some sense. Anybody who has been in business and has ultimately had to make some decisions knows a certain amount of gut feeling comes into that. What I am getting at is that this almost cultural attitude probably does not help us get past square one, and then we get into the other issues.

Ms Livingstone—Maybe I can add to that. There is no doubt that research is a global business now. There are fewer and fewer companies, even multinationals, saying, ‘All of our research must be carried out in our domestic base.’ Even if you look at the Australian companies—the Cochlears, the CSLs—a lot of the research is carried on outside Australia, even though the IP returns are to the Australian company. Leaving aside the public perception issue, if Australia can establish strong credentials, then we will be attractive to multinationals. Those credentials will be enhanced by the centre of excellence concept, where you do not have a multinational coming in and having to go it alone in a particular area but accessing and contributing to research in a centre of excellence framework with other partners. This concern about multinationals is heightened when a multinational is out there setting up a greenfields site on its own and is seen to be accessing government incentives that are dedicated—all of those do trigger negative sentiment. But to the extent that the multinational can access, contribute to and participate in the R&D through a centre of excellence cluster, it is more anonymous in that sense, and Australia gets the benefit. That concept of critical mass, centres of excellence clusters, is a really important one in terms of attracting both local and multinational R&D.

CHAIR—The clustering aspect: do you see some way in which small or medium businesses can be encouraged to work together a bit more in research and development? It happens well in the agricultural area because of the nature of that particular sector. Do you think that there are ways in which we can overcome this attitude of, ‘I do not want to work with a competitor on some R&D, because I have to compete with that person,’ which tends to happen in other sectors? Is there some way we can work on that?

Ms Livingstone—I think there is a critical mass threshold. When companies are really on the ‘s’ rather than the ‘m’ end of the spectrum, they do not actually have the time to look out and see with whom they can partner. It is just staggering that this is the case with a number of very small companies. Very small companies have a lack of awareness of industry bodies and other industry participants. They are so focused on their particular activity—and they have to be. I think there is a sort of gravitational pull effect that can work. If you get a larger company, then that company attracts—through the suppliers mechanism that Narelle referred to—a number of SMEs. Through being connected to that larger company or centre, the SMEs come to know each other and then you will find more partnering. I think that to get SME to SME partnering is

difficult because they do not have the time, they do not have the size and they are not looking out for partners.

CHAIR—You talked about companies in the ICT area. Of those 20,000 companies, 19,000 have less than four employees. There must be heaps of those that could work together in some way and, while they might be competitors, they could benefit from some R&D.

Ms Livingstone—They could be complementary.

CHAIR—Yes.

Ms Livingstone—You will often find the complementarity coming through their work with other companies—for example, working with Telstra. You find that quite a large number of the smaller ICT SMEs will work through the Telstra environment and achieve complementarity that way.

Ms Kennedy—Most of the examples of industry clustering which are engaging SMEs may not be in the form of R&D; they may get together—and there are a number of examples of this—to share other kinds of knowledge about market preferences or about ways of sharing risks. So they may be pre R&D or associated with R&D; they are not quite R&D specific. I think we do see quite a bit of that going on, informally or otherwise. The old Partnerships for the Development program and similar modern incarnations of that have been efforts to try to help larger corporations twin with SMEs. I realise that the SPIDA program—whose initials I can never quite remember—the latest version of the Partnerships for Development program, has ceased. It seems to me that the reasoning behind that may need to be re-examined.

The argument is that large corporations will make their corporate decisions about who they trade with and who they deal with in their own interests and that really governments do not have a lot of clout in how they do that. I think there is a lever which has been given away and we need to re-examine having something like that, whether it is the SPIDA program or something else. If large corporations are engaging with governments in some way, then perhaps a national interest objective is to try to bring our smaller and medium sized companies along with that. So it is not conditional but the idea is that governments be facilitators in the programs and say, ‘We want you to have a look at giving first shot to some local SMEs in the course of this.’ So we have the idea of using civic clout and being a facilitator for those relationships.

Ms Livingstone—A corollary to that is not to underestimate the impact of government purchasing policies. If you are looking at investing in software and systems in the ICT sector, you want reliability, back-up service and so on. There are many SMEs in the ICT sector for whom participation in a government contract is life or death, and innovation will not progress without that stepping stone, without that credentialling. They cannot access overseas markets unless they have a reasonable base in Australia. Often it is the government, through government contracts, that can take the risk on giving them that chance, because of the scale—not of the total contract but of being part of the consortium. That gives them the credentials as well as additional financial resources to then take the next step and invest in the next generation, which is the R&D related to their product. Very small decisions for multinationals, large corporations or government are very large decisions when they are translated down to SMEs. There is churning and constant waste of resources with these companies dying and new ones starting. It

is like retaining your customer: it is much less expensive to retain a customer and nurture it than to lose it and have to find the next one.

Ms GRIERSON—How do the benefits of your organisation's own research and think tank processes filter down to SMEs?

Ms Kennedy—One of the advantages we have is that our founder and patron is the Australian Business Limited, which is the old Chamber of Manufactures of New South Wales. It has been around since 15 years before Federation. With that pedigree, it has a strong individual business base. The bulk of those businesses that are members of our parent organisation are small and medium sized enterprises, and we use the infrastructure of that business body to get the message out. We workshop our research. For example, we have come up with a study that is looking at new competitive strategies where products and services are being linked together in diverse and innovative ways. Rather than just having a briefing, we have—in Western Sydney, for example—workshopped those.

Ms GRIERSON—I will go back now and test my own Hunter business chamber against that, because I think that is important.

Ms Kennedy—Indeed. That would be quite good.

Ms GRIERSON—The Ericsson example—and you have touched on this in your submission and in your words with us today—is interesting to study. We really should put a bit of energy into that, because my perception is that a lot of resources go into attracting and assisting set-up of these major multinational corporations but the process of engaging them and sustaining them here is perhaps hands off. What are the limits to value adding to that experience without being commercially restrictive? Do you have advice to government on how they could do that better?

Ms Kennedy—The example I will start with, and it is highlighted in the *Friend or foe?* study, is that the model for the investment attraction effort was seen to be in the Axiss program—a program out of federal Treasury, of all places. The idea is that there is a group of people within the federal Treasury who actually understand the financial services sector. They are engaged with it, they are talking to the people in it, they understand some of the competitive dynamics of that sector. So they are well tooled up to be able to know that not all investment attraction into that sector in Australia is equal, and they will try to go for those things that will have a stronger and longer lasting legacy. So it is a bit more engaged. The normal commercial decisions are still maintained, so you are not intruding. But, because you know much more, there are more relationships. I guess this fits the theoretical things that we do know from our research about what makes for competitiveness—it is not so much just products and services these days; it is the way in which knowledge and information flows, it is know-how. That is just an example of it being translated into the public sector.

Ms GRIERSON—Does that sort of program buy out once a multinational corporation establishes here?

Ms Kennedy—In one sense it does, because the job is done. But, because they are engaged with the sector on an ongoing basis, you hear things, there are opportunities to meet and talk. Some community of interest is built up, so you know what is going on. As to how much that would change, or save, an Ericsson situation, who knows?

Ms GRIERSON—You said they assess what Australia needs or what benefits we are looking for. Do we specialise enough? Are there dangers in specialising—trying to pick the areas we need to focus on—or is that a good way to go?

Ms Kennedy—The authors of the *Friend or foe?* study suggested that we should specialise much more. I do not know that the Australian Business Foundation would necessarily agree with that 100 per cent. The idea is not to pick winners in the sense of picking sectors but to ask, at any particular time: ‘Where are our biggest knowledge gaps? Where could we get the most bang for our buck in terms of the presence of multinationals and the capability here?’ Certain areas for our immediate attention may highlight themselves at certain times.

Ms GRIERSON—Can you give any more advice about linking the multinational corporations with the public sector? You suggested that if we linked them better with the public sector, where we are very good at research and development, we could better generate spin-offs for small and medium enterprises. Do you want to give us some suggestions regarding a process for that? It is probably easy to link public sector research with the major centres that come here, but we are probably not getting the spin-offs for small and medium enterprises. Perhaps we are doing it a bit haphazardly.

Ms Livingstone—I can speak for CSIRO, for example. There is now a concerted and strategic effort to engage with SMEs in providing research—mostly research services, as distinct from collaborative R&D, because of financial capacity—and also to engage SMEs in the process of transmitting IP into the commercial environment. That is a longer term program and is very much easier said than done, but it has to be a strategic imperative or it will not happen. If it is left to serendipity it certainly will not happen.

Coming back to the Ericsson example—and picking up on Narelle’s point about Australia having a strategic awareness of who is doing what in R&D—if you look at the top 10 R&D contributors in Australia in 2001, you will see that Ericsson was No. 3 and, I think, Alcatel was No. 6, and between them they were conducting \$150 million worth of R&D. It is very clear in the public domain that the industry in which both are operating is under severe pressure. If you were in a company context and two of your top 10 customers were having financial pressures, you would be right in there talking to them to see what you could do to carry over the situation and find a way of working through it. You cannot do that once it is at crisis point.

One could say that Australia, knowing the pressure they were under, could perhaps have engaged with these companies earlier at government level to, as Narelle suggested, understand a bit more about their strategic imperatives and what could be done to help them work through things. I understand that the issue in relation to Ericsson was not capability or competence. It is probably easier—I am speculating—to cut off Australia than to cut off other countries.

Ms GRIERSON—In your downturn.

Ms Livingstone—That is totally speculative, but—

CHAIR—Slightly simplistic, I think.

Ms Livingstone—It is very simplistic. But I am suggesting that if there is a stronger relationship between Australia—and Australia's national interest—and these companies it will be harder for the companies to make that decision.

Ms GRIERSON—I would agree with you.

Ms Livingstone—But you need to build that relationship in the good times—

Ms GRIERSON—From the very beginning.

Ms Livingstone—and you need to know how the times are tracking.

CHAIR—I think that was one of the reasons that Ericsson stayed as long as it did. It got to another point, but that certainly stood Australia in great stead when some other difficult decisions were made by Ericsson previously, and Australia survived where others did not.

Ms Livingstone—I am speculating about Ericsson, but there are generic lessons to learn about having that longer term relationship.

CHAIR—Absolutely.

Ms Kennedy—Another company in a totally different sector—Eli Lilly, the pharmaceutical company, in North Ryde in Sydney—has quite a strong research and development presence. It has a research institute. I know about this because it has just won an Australian Business Ltd prize for innovation because of this research centre, where it is fast-tracking its preclinical trialling. It is using Australian researchers. It is investing quite a lot of money in it. The company is doing that based on its own corporate interest, but it builds a cluster of capability in Australia that anchors other investment. The idea is that where governments have levers to encourage that development, we should be doing so. With things like the Partnerships for Development program or even industry development programs where taxpayers' money is being deployed, we should be a little tougher about where our taxpayers' money goes—where it does have a multiplier effect, where it can encourage SMEs to grow, where it can be a magnet to attract others—rather than having an attitude of 'If you get through this hoop, then you are entitled.' The idea should be to deploy our industry development moneys in order to embed those legacies more in Australia.

Ms GRIERSON—That complements the point you made particularly well that we are over-reliant on those top 10 for R&D and we are not embedding a foundation of R&D in all our companies in Australia. That is something we need to pursue fairly avidly in this inquiry.

Mr LINDSAY—You make a point in your submission that corporations—multinational companies—tend to focus only on product modification, with the IP registered offshore, yet later today we will be receiving evidence from a multinational company who say the opposite. They say that Australia has an operating environment that is conducive to innovation through effective IP protection. They are happy because they can protect their IP; you are saying that multinationals think Australia cannot protect its IP. Where is the inconsistency?

Ms Kennedy—To clarify, I do not think that point was about Australia not being able to protect its IP; it was merely an observation from the study that said most of the multinationals in

Australia are operating as sales and marketing outlets. In terms of research and development, a lot of them intended to do only product modification here. They imported their research from the offshore parent and the IP was owned by that offshore parent. It was not intended to make a comment about the intellectual property protection regime in Australia; it was merely reflecting the experience that our researchers came up with about most multinationals. It is not always the case, as you point out. The Eli Lilly example I gave was another example of a multinational doing some research and development work in Australia.

Mr LINDSAY—In the last decade of the last century—and that sounds a long while ago, doesn't it?—the far Right in Australia developed an ongoing mantra that multinationals were the enemy and they were not recognising the global village and so on. How significant, in your view, has been that development of right wing thinking been in working against research, innovation and development in relation to multinational companies?

Ms Kennedy—I am not sure that the Right is the only one with claims to that internal, inward-looking focus; I have seen it elsewhere. It is a little view: you have to do it all yourself. It is an antiglobalisation view. Beyond the point that Gary was making earlier about a general worry about more extremist points of view, I do not think that that has influenced too many particular business decisions about whether they locate their R&D efforts in Australia. To counter that—and this is all anecdotal stuff—the experience of Australian researchers and Australian research has been that you tend always to get a very positive assessment about the openness of the research, about the innovative nature of the work that is done and about being able to cross disciplines quite easily, perhaps because we had been thinly populated in all the sciences. We tend to have chewing gum and tar strategies. While I do not disagree with the fact that we have seen that societal phenomenon, I think there are multinationals who are engaging with their communities of interest and who are understanding that they have social and environmental obligations as well as economic ones and are doing things in those arenas. It is part of the business environment they have to deal with. It is an ugly part, and I think most of the clever companies are actually engaging in that.

Ms Livingstone—It is not only an Australian phenomenon; in many jurisdictions the companies have to deal with that particular dimension.

Mr LINDSAY—I am interested in your views on CRCs, because previous witnesses said that CRCs are underutilised. You have said to us in your written evidence in relation to multinational companies that they do not seem to be using, or that there is not a strong linkage with, CRCs. Why is it important that there should be, and what do you recommend that we recommend to try to facilitate that happening more?

Ms Kennedy—The CRCs are an important program because they have been one of the headline programs for trying to commercialise research and development and to engage industry with the academic research community. I think they have probably been variable in success, but, on balance, they have been a very good vehicle to do more of that. I think they are one of the vehicles that you do need to invest more in. But, once again, I think there are also the issues that Catherine raised earlier—about the scale of the research, what is needed to be done, maybe some of the issues that are now being dealt with about tax treatment of intellectual property and being able to capitalise on that and maybe having researchers being able to earn more directly from that. I am not an expert in the CRC program per se, but we need tools to encourage greater mobility and movement between the academic community, the research community and the

business community, because all the research talks about knowledge flows and the way people move—they are a mobile asset. Perhaps we can open up the tribes a bit more. The CRC program has been one attempt to do that. So I would not be negative about the CRC program and about looking for opportunities for doing more with it.

Mr LINDSAY—But you are supportive of multinationals getting involved in the CRC program?

Ms Kennedy—Absolutely.

Ms Livingstone—We are probably at about the right time: CRCs have been going for about 10 years, so there are some which have delivered IP which has now gone into the commercialisation phase. We need to understand to what extent in that commercialisation phase we are reinventing the wheel in how you commercialise through setting up company structures and to what extent we are leveraging the capabilities of larger companies in Australia as well as MNCs in the transmission of that IP into the commercial domain. Because of the low number of large Australian corporations, there is a risk that the commercialisation from CRCs is being done through spin-offs, to a large extent. Again, we need to study this and get the facts but, anecdotally, there are a large number of spin-offs which are having to learn from scratch every time. The advantage of having larger corporations—including MNCs—involved in the commercialisation process as partners is that they bring all their existing commercialisation skills to the party and accelerate the commercialisation of the IP and hence the returns back to the CRC.

Mr TICEHURST—Governments are probably the largest purchaser of goods and services across the country. Included in some of the observations I have made is the observation that some of the government departments tend to put a higher value on foreign companies than on Australian companies. Some of this can be related to the fact that an SME in Australia, for example, can be very easily checked to see what its size is, what the business is and what its history is, whereas a lot of overseas companies are taken on face value and the governments do not do thorough probity checks. Do you think there is a role for the government to take a more long-term view to encourage the SMEs rather than just take a straight cost view of a tender process and eliminate them on cost?

Ms Livingstone—Absolutely.

Ms Kennedy—Too right!

Ms Livingstone—That is a strategic purchasing decision—strategic in a national interest sense. Without in any way compromising quality, delivery of service et cetera, rather than always taking the percentage game option, which is the larger known name with the global credentials, managing the risk of taking on an SME without those global credentials would be a strategic mechanism for encouraging them.

Mr TICEHURST—In some cases the overseas company does not actually have that global name—they might have the power of the big mouth rather than the actual points on the board.

Ms Livingstone—They may.

Ms Kennedy—That again is an argument for understanding the industry, the dynamics and what is going on in the industry to see where our capabilities really can add value, leading to championing those in some way.

Mr TICEHURST—There was a case brought to me quite recently related to insurance loss adjusters. A major government insurance interface did a deal with an American multinational and, as a result, a lot of the smaller loss adjusters who used to do much of the individual, specialist work were forced out of business and have left the industry. The multinational was relying on employing these people, and they have suddenly discovered that they have more work than they can handle and they do not have the capability to handle it. The particular department that took the view has certainly had a lot to answer for in that they have not done what they thought they could do.

Ms Livingstone—Having that industry structure perspective at all times is so important.

Mr TICEHURST—You mention in your submission that Singapore and Ireland have been very successful with their R&D programs because of government assistance. Is there a lesson there for Australia? Could we take some of the ideas that they have used and incorporate them here?

Ms Kennedy—I do not think we can mirror them. Every circumstance has a different set of conditions and climates and so on, but there are some lessons we can learn about the degree of engagement—that is, not taking a laissez-faire approach that the market will always adjust to the right level optimally but being able to put the Australian government in the driver's seat in terms of understanding what the national interests are and, where the market is not working well enough, being able to deliver. The example that you just gave in terms of purchasing ability is one.

I think there are lessons that we can learn from other nations, without having to parrot exactly the same circumstances—because they are not the same. Australia's economic performance is quite strong. We are working from a position of strength. We have lots of examples of nimble, agile, competitive small and medium size companies that are strutting the global stage and are doing very well. But we have far too few exporters, we have a research and development brain drain, we have a relatively poor record of commercialising new ideas. So there are interventions that can be done but they are needing to be done in a deft way rather than just throwing money at something.

Mr TICEHURST—A previous witness said that a major impediment to small business going forward is the fact that most of the R&D funding is up to the point of manufacture and does not include any of the capital expenses for setting up and that there is a reluctance by banks to provide finance. Have you found that?

Ms Livingstone—R&D is one phase in the innovation continuum. It is not the most expensive phase when you are talking about some of the more sophisticated products—the whole prototype, pilot plans, clinical trials and market development take longer and are as expensive if not more expensive than the R&D. Again, the ability of smaller companies to fund those activities to get to a point of critical mass, where they are self-sustaining, is enough of an impediment. So policy initiatives need to focus on all of the points of that innovation chain not just on R&D. R&D is very important but it is not the only critical phase.

Mr TICEHURST—When looking at cost, car manufacturers might spend several hundred million dollars in bringing out new models. Does much of that money figure in the R&D component of the top companies that you are looking at?

Ms Livingstone—I cannot speak specifically for the car industry. Ford is in the top 10 in Australia in 2001, with \$67 million of R&D.

Ms Kennedy—Most of that money comes into R&D. I want to add to the point Catherine just made about R&D being part of the innovation continuum which also looks at market development, clinical trialling, prototyping and so on. A related point that we want to make as an end note to this is that business and R&D do not equate with innovation. There is a lot of innovative activity going on where R&D investment is not central to it. One of the most recent pieces of research that we have undertaken, with the help of Professor Jane Marceau of the University of Western Sydney, is a study called Selling Solutions. It is uncovering new competitive strategies going on in Australia where both manufacturing and service firms are linking and selling products and services together in innovative ways. It is widespread across the industry, from pharmaceuticals to metal manufacturers to IT companies. They are doing things like prototyping, help desks, maintenance services, training, technical upgrades and even putting together packages of sutures and surgical instruments for any given surgical procedure and for a number of surgical supply companies. This has been found to be widespread.

A new competitive dynamism will be going on in that respect. New skills, new alliances and new capabilities are being fostered as a result of that, in response to tough, crowded and saturated markets, low-cost competition and so on. Mostly this does not involve business R&D investment—it does in some cases but not always. There is a new dynamic going on and a new competitiveness is happening because companies see the need to do so—to retain customers, to share risks, to add new value to customers. In making an inquiry into business research and development, perhaps there is an end note there that, while it is quite crucial to Australia's innovation, it is not necessarily the full story.

CHAIR—That is a very good point. I was going to ask you whether you thought that a lot of research and development expenditure is actually in small and medium businesses but not recorded as such because it is probably more innovation than research and development. Is that an aspect that ought to be reported in some way?

Ms Livingstone—The concept of innovation expenditure versus R&D expenditure is something that it would be very helpful to try to—

Ms Kennedy—capture.

Ms Livingstone—get better visibility for.

Ms GRIERSON—There is a lesson there for government, too, because we focus on R&D expenditure and support and not on innovation. What you are talking about with new models of packaging or value adding to products is perhaps the most exciting dimension, yet we do not reward that.

CHAIR—I see a lot of those innovations as research and development. I think the definitions ought to be looked at in that respect.

Ms Livingstone—On the Singapore and the Ireland issue, there are three generic lessons. I absolutely agree with Narelle: you cannot just apply one model to another; you have to customise it. The first lesson is that market forces, if left to themselves, will probably act to the detriment of smaller economies in a global environment. So intervening to direct market forces in favour of your economy is not only valid but necessary. The second lesson is the time frames involved and the recognition that the time frames are long. You have to be committed in a policy sense to executing and supporting a policy over long time frames. In Ireland's case, it is leveraging its education system and then targeting particular industries and supporting tax concessions over 10 or 20 years. The third lesson is the scale of investment that is required. If we come to, for example, the biotechnology area, which we say has potential—huge strength to strength—the scale of investment required is huge. If you look at Singapore, it recently committed \$4 billion, signalling its intent over longer time frames to support that particular area and that was a government initiative—and Ireland has made similar large-scale decisions. So they are the three generic lessons that Australia might look at in terms of its policy going forward.

CHAIR—Our previous witnesses were somewhat critical of AusIndustry and the structure of AusIndustry. They also made some comments about Austrade. Do you have any particular comments to make about how AusIndustry works and the sorts of packages that they administer, how they get that information out and also Invest Australia's role in encouraging more investment in Australia, particularly by multinationals in research and development?

Ms Kennedy—Starting with Invest Australia first, I think that they are learning. I think the critical ingredient would be that not all foreign inwards investment is equal. We should be giving our attention to that which could have a much longer-lasting legacy here and which will add to those ideas of centres of excellence. For example, the idea of a regional headquarters—which could ultimately be a footloose administrative convenience rather than something that adds to our capabilities in Australia—locks into something that we already have, extends it, and extends our capability and reach. It is a game of opportunism, too, so I would not get too purist about it—the idea of having your antennae out, prancing on the balls of your feet and looking for stuff. So I would not be too critical of Invest Australia on that score, but underlying this matter there has to be a strong strategic imperative about what will do most to add to the capability of Australia's industrial base in this investment.

Ms Livingstone—I would echo that for AusIndustry and the real importance of that strategic perspective first and the cross-sectoral perspective. In terms of innovation, we are dealing with a complex system in its technical sense—AusIndustry working with a perspective of dealing with a complex system rather than perhaps a somewhat one-dimensional sector view—and helping the interaction between sectors I think would be beneficial. Coming back to the SMEs issue, and just to use the Start program as an example, research decisions are made—again, with longer time frames. When you have programs such as the Start program—

Ms GRIERSON—Stop and start!

Ms Livingstone—companies cannot adjust in those time frames to change their R&D program to address that lower funding where they expected funding or where they expected the potential of funding. So you put a volatility—and potentially a life-threatening volatility—into an SME strategy where you have programs that stop, start, go up and go down. It is very important that the programs there be predictable. So if there is going to be an end to a program,

it ought to be signalled well enough in advance for companies to adjust strategically. Our SMEs cannot deal with things such as reducing the R&D concession from 150 to 125 overnight without warning and suspending the Start program at relatively short notice. The larger companies at the end of the day can cope. We do not have enough larger companies. SMEs just cannot cope with that, so there is a real detriment to industry.

CHAIR—I take your point on the taxation and things. Probably having governments in for only three-year terms is part of that problem.

Ms Livingstone—That is an issue.

CHAIR—With the R&D Start program, one of the biggest problems was the unpredictability of business itself.

Ms Livingstone—In terms of demand?

CHAIR—If you look at it in a non-political way, there is no doubting that there was an extraordinary take-up that, when you look back over previous years, could never have been predicted.

Ms Livingstone—I suppose that when you start a policy initiative it is looking at the possible and unintended consequences and having that buffering in place, and then to start managing expectations very early on. The moment that that ramp-up was seen—signals were coming out very early on—and so to manage expectations down is—

CHAIR—Should we have acted then?

Ms Livingstone—Yes.

CHAIR—That is good criticism. Thank you for your time this morning and for your evidence.

Ms GRIERSON—I move:

That the document, *Friend or foe? Leveraging foreign multinationals in the Australian economy*, presented by the Australian Business Foundation, be received as evidence in the committee's inquiry into business commitment to research and development in Australia.

CHAIR—There being no objections, it is so ordered.

Proceedings suspended from 12.12 p.m. to 1.27 p.m.

CLARK, Mr Richard, Managing Director, Ericsson AsiaPacificLab Australia Pty Ltd

CHAIR—Welcome. I would like to point out to you that, while this committee does not swear in witnesses, 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 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 on any confidential matters that you think that could help the committee, but which you would not like to be on the public record, you may ask to do so and the committee will give consideration to the request. Would you like to make an opening statement before we proceed to questions?

Mr Clark—I would, thank you. I have prepared a written statement, and I can provide copies to the secretariat. Since making our written submission to the Standing Committee on Science and Innovation, Ericsson has announced the closure of AsiaPacificLab, Australia's largest private ICT R&D organisation. I would like to take this opportunity to provide the committee with some background for this decision. In the face of the telecom industry downturn, Ericsson plans to reduce its R&D spend by over 40 per cent globally and the number of its R&D centres from 80 to fewer than 30, while still maintaining R&D spend at in excess of 15 per cent of revenue—an indication of the depth of the nuclear winter in which the industry finds itself. In the core network areas addressed by AsiaPacificLab, this reduction is in fact closer to 60 per cent. After loading our central design groups in Europe, maintaining centres required for market access, such as China and Brazil, and fulfilling our contractual commitments with partner organisations, there was simply no funding left for our Australian organisation, despite its acknowledged competency and price competitiveness. In fact, the ultimate choice came between us and further reductions in the central groups. Given our Swedish origins and their coordination responsibilities, it was counterintuitive to decide otherwise. Ironically, our submission foretold this potential outcome and, rather than being superseded by recent events, is regrettably only validated. It postulates part of a long-term solution that may avert such an outcome in the future, but I will return to our submission later.

The announcement has created much unanticipated attention in the media, industry and political circles. I would like to take this opportunity to clarify some of the comment on behalf of our 450 talented engineers, scientists and support staff. I will respond to three themes that have emerged as if to negate the impact of the closure and its implications on the health of our local industry. Theme one: AsiaPacificLab has existed since only the beginning of the year. It is true that it is just under 12 months since we have consolidated our Melbourne operations under one roof in Melbourne Central. Ericsson has, however, conducted R&D in Australia since 1968. The origins of our global digital telephone network can be traced back as directly to our collaboration with Telecom Australia as it can be to Ericsson Sweden and their relationship with their local telecom administration. We take pride in these developments over the years, such as the world's first commercial computer controlled rural exchange, the world's first call queuing system, input into over 70 patents, and our contribution to global signalling standards that make features such as international subscriber dialling possible, which we take for granted today.

Theme two: it is contended that this is another example of footloose investment by multinationals. One such event over 30 years can hardly be described as footloose. Ericsson Australia remains committed to the local market and has only recently taken on additional

business responsibilities for wire line activities in the region. Ericsson also continues to employ over 600 engineers locally in our regional services organisation. Theme three: it is only development that is impacted, not the more important research. It is true that AsiaPacificLab is what I would describe as small 'r', big 'd'. Our contribution to public research, however, via CRCs and research fellowships is unparalleled and it is hoped that this can be maintained. Our commitment to sponsor local incubators and local application developers through our mobility world initiative also continues. Unfortunately, the potentially more valuable opportunity to liaise directly with local R&D staff and have direct access into our global organisation will also diminish with AsiaPacificLab, along with our contribution to undergraduate syllabus development and in-house student project sponsorship.

Returning to our submission, we identified the following key areas for policy attention: significantly increased support for competency and skills development and for the encouragement of increased specialisation in the pursuit of excellence; increased support for universities for pure research; increased linkages between industry and universities in curriculum development and in handling intellectual property; persons retraining from one industry sector to another to become eligible for taxation concessions, as is the case for retraining within one sector; support for the facilitation of improved links between multinational companies and small to medium sized enterprises; development of a strong and focused investment attraction and retention strategy, especially in the short term; liberalised regulatory environment which encourages the take-up of new services, such as broadband, and is technology neutral; resolution of employee share option schemes and share remuneration issues. All the above must be wrapped up in a branding effort that demonstrates that the government, industry and the broader community values our ICT capability and is prepared to invest the time and energy into a coordinated promotional marketing activity that grabs share of mind. We must demonstrate that Australia is the place to make and retain ICT investments. Most of the above are not short-term fixes but, if addressed, may make closures such as ours less frequent and the choice of local centres over overseas central multinational groups less counterintuitive.

Returning to the present, it will take up to nine months to conclude our current projects at AsiaPacificLab and transfer our responsibilities. Our public research colleagues are helping mount a campaign to retain some parts of our work where it logically aligns with their applied research, but this will amount to only a maximum of 10 per cent to 15 per cent of our current activity. Once wound up it is unlikely that a lab of this scale or depth of responsibility can be rebuilt as the local market preconditions of 20 to 30 years ago no longer exist in the global economy of this most global of industries.

As a passionate Australian technologist, I can only hope that this disappointing event may provide a wake-up call to our industry and legislators. There is no doubt that Australia has world-class researchers and developers. ICT, however, as a global industry is made up of a few key global players. Further disconnection between our local talent and these players may eventually render future areas of focus and derived knowledge capital to be so niche as to become irrelevant, regardless of the calibre of our people and their local institutions. I welcome the opportunity to discuss this statement and the content of our submission.

CHAIR—Thank you very much for that opening statement. You mentioned that operations in China and Brazil were maintained, and you used the terminology 'to maintain market access'. Could you explain what the difference is between their operations and the need to maintain market access as opposed to the Australian situation?

Mr Clark—There are a number of markets in the world where specific local adaptations are required, and China is obviously one of those because of language issues and the topology of their networks. In addition, in some instances such developing nations provide additional incentives in terms of more rigorous industry development schemes than would be appropriate in Australia. For example, in Brazil, contractors to the Brazilian government are actively encouraged to have R&D onshore, in-country, through various incentives that make their commercial bids to that government more attractive. It is virtually impossible, therefore, to successfully conduct business with the Brazilian government without onshore development activities.

CHAIR—So, from Ericsson's point of view, it got down to a choice between closing your operation in Australia or closing part of the operation in the home country.

Mr Clark—Correct. As I mentioned in the statement, the history of digital switching as we know it today—which is the basis of the development work that we do in Australia—parallels very closely the work that was done by Ericsson in Sweden together with the telecom authority, now known as Telia. We were very much in the driving seat 20 years ago in terms of implementation of digital switching as we know it today.

CHAIR—Moving away from the closure of Ericsson AsiaPacific to the broader sense of R&D, one of the things that has come out in evidence is the need to get much better collaboration between universities and industry and also movement of personnel between industry and universities doing research. The aim is to help improve the culture within universities to pick up some of the business culture and also to help industry understand universities. Various things have been put forward as barriers to that with regard to superannuation and things like that. As somebody coming from an industry point of view, and probably having had to grapple with this issue, are there some suggestions you could provide where government could influence a yet better collaboration between industry and universities?

Mr Clark—I think we have tried a number of different models to get collaboration between our people and especially the researchers that we sponsor through CRCs and other specific fellowships. It is almost the nature of the beast that these guys are very proud people—they are very proud of their research and their intellectual property. Quite often that forms a barrier in terms of communication and free exchange and interchange of staff. Probably the best model that we have been involved in was where for quite a number of years—in excess of five years—we actually had a joint development group based on the Melbourne University campus. That was probably the best example of collaboration that we had between our group and, in that case, Melbourne University, in that we were able to sponsor final year projects in the undergraduate area of computer science, our senior engineers were able to supervise a number of those projects, we were able to help guide and influence the syllabus of the undergraduate program directly and also we were then able to encourage some of the undergraduates to take on postgraduate work where appropriate and/or offer them jobs in the Ericsson organisation. That was a very nice symbiotic relationship.

Although we cannot tell, we had aspirations at the time to perhaps embrace that model more completely. In fact, as part of our consolidation of all of our R&D under one roof, effectively, in Melbourne, at one stage we were in negotiations to actually make that one roof on the Melbourne University campus. I suspect that that could have created another point of difference for us in the current environment, although at the end of the day what has really killed us off at

this juncture is the fact that there is just not enough money left in the pot. But I know that what was effectively our joint venture on the campus was very highly regarded and was probably the best instance we have had of interplay and interchange between the university sector and us.

CHAIR—Who owned the IP that might have come out of that sort of collaboration?

Mr Clark—It was covered by specific IP agreements on a case-by-case basis, but the work that was being done specifically for Ericsson development was purely Ericsson IP. We also jointly contributed to effectively an internal R&D fund, where the IP was shared. That has typically been our arrangement in some of the other labs that we have cooperated with, both at RMIT and Melbourne, and also at the University of New South Wales at the moment, where we generally jointly own the IP that comes out of those exercises and encourage each other as appropriate to exploit that IP.

Mr TICEHURST—I can certainly attest that your R&D lab was there in the seventies, as I visited there a few times in Melbourne. At that time, though, there were a lot of incentives for Australian manufacturers. We used to have a local manufacturing preference, then there were state preferences that came along. So in China now, is that part of the deal there? Even back in those days, a lot of the Chinese deals that were done were part of a joint venture, so you were obligated to put in a fair bit of local content.

Mr Clark—I can only assume so. I do not have any direct knowledge of the Chinese arrangement. But I know that it is actually a little bit like Australia was some 20 years ago—there is a lot of local adaptation required for the systems, simply to deal with the different market dynamic and of course the different language. So I am sure we do a lot of that work in China.

Mr TICEHURST—In your opening statement you made a comment about government and legislation. Do you think the government or legislation could have done something to prevent closing the R&D?

Mr Clark—As I have said when I have been asked the same question, I do not think there is any short-term initiative that could have actually changed the decision in the face of the huge cuts globally. As we have said in the submission, I guess I am more aiming at some of these key issues that would help brand Australia as the place to do ICT R&D, so that it would not become so counterintuitive to close down more of what is going on in Europe and relocate more of it here.

Mr TICEHURST—I was involved in the House of Representatives Standing Committee on Communications, Information Technology and the Arts inquiry into wireless broadband technologies, which Ericsson made submissions to. Are you still carrying out some sort of R&D on wireless broadband?

Mr Clark—One of the ironies is that my organisation does no wireless work as such. We do no air interface or wireless bearer R&D. Our R&D is purely around core switching technology and some of the features and interoperability signalling standards associated with that—effectively, all of the stuff that resides in the exchanges.

Mr TICEHURST—So it is more or less the exchange side of wireless broadband. You would have fixed stations at both ends, wouldn't you?

Mr Clark—That is right. Once upon a time those networks were quite separate but nowadays they use a common core network. In fact, some of our signalling standardisation work is around being able to use a common core network regardless of what the access technique is—whether it be wireless, wire line, PABX, cable TV et cetera.

Mr TICEHURST—In your submission you talk about the need for Australia to put more into education of young people. Do you see a way in which Ericsson could still get involved in some of these VET programs, whereby they can employ apprentices in year 10 and carry them through?

Mr Clark—It is possible, but the structure of the sales and marketing organisation does not necessarily lend itself to those programs. There are some opportunities in our ongoing services organisation, which will be the largest part of Ericsson Australia once we subside. Through our market development work we also host for Ericsson globally a local node of the initiative called Mobility World, which is about providing would-be developers or existing software houses with the tools, techniques and guidance for developing applications in the wireless broadband environment. There is no reason why secondary schools could not get involved in that.

Mr TICEHURST—So those projects will continue?

Mr Clark—As well as possible. Inevitably, with all of those things, something that might come through a marketing channel will quite often require validation by some of my experts. That validation will now have to go offshore, because we will not be available to assist.

Mr LINDSAY—Your submission talks about Ericsson as a multinational company, looking at what causes it to make investment decisions and decisions about where to locate for long-term growth and investment, but in all of the points you make there is nothing about the cost-effectiveness of the country where you are going to invest. Is there some reason for that?

Mr Clark—The first priority is competence. Productivity is an interesting topic. I come from a manufacturing background, where your best operator in a fairly manual process can perhaps be up to 25 or 30 per cent more productive than your average operator. In an R&D environment your best architects, your best senior engineers, can sometimes be 20 to 30 times more effective because of the fact that they just get it—they understand the broad base that they are working on. So we see competence as being more important than simple cost-effectiveness. Having said that, I think the submission says somewhere that we hope our cost-effectiveness at least offsets the tyranny of distance issue that we were dealing with on a day-to-day basis.

Mr LINDSAY—How would you rate the competency of Australians compared to the rest of the world?

Mr Clark—Absolutely second to none. I have empirical evidence suggesting that our guys are as good as any of the other groups within the Ericsson world.

Mr LINDSAY—Why does Australia only get perhaps one per cent of the R&D spend of the world if our people are second to none?

Mr Clark—I cannot comment on the broad base, but until this announcement we actually got more than our fair share of Ericsson R&D, remembering that around 50 per cent of the Ericsson R&D is done in country whereas 95 per cent of our market is outside Sweden. Of that 50 per cent done outside Sweden, we got more on a pro rata basis than the actual average of our sales in Australia.

Mr LINDSAY—How real is the problem of the tyranny of distance these days, when I can sit here and be connected to Sweden instantaneously?

Mr Clark—It is a sociological issue, I guess. I know one of the chief architects of our current constellation of allocations of design centres had a vision that he wanted all of his design centres within two hours of the central group. One of the reasons for that is that our systems are so complex that any one centre can only be responsible for one piece of them, and they always have to be consolidated in one group. Having said that, there are lots of examples that suggest having design centres in different time zones can be advantageous. We have some examples that show we are far more independent and that we take on more accountability and responsibility because we cannot pick up the phone and talk to our betters in Sweden on a real-time basis; we know we have to operate out of their hours.

Similarly, in a services environment—and this is one of the reasons why the services group still remains—you clearly need to be in the same time zone. We have had any number of issues where, if there is a problem, our service process goes through a number of layers of review and correction. Ultimately, it is escalated back to the design centres if it is a very technical problem. There are any number of examples where we have been able to resolve critical issues before the Swedes have gotten to work in the morning, and they have found the answer in their email and been able to address the resolution of those problems and any commercial issues that may be the cause.

Mr LINDSAY—Some companies, probably including your own, say that the size of the Australian market is a factor that militates against R&D in Australia. How real is that problem?

Mr Clark—There is no doubt. In the context of where our origins are, Telecom Australia was one of the absolute world leaders in pushing the technology envelope in our network. Australia is obviously an environment that relies heavily on telecommunications. As a result of that, Australia became a key customer of Ericsson in the 1980s and 1990s and Australia and Telecom, or Telstra as it became, in particular were in the top 10 customers globally.

With the consolidation of the markets around the world and these large global carriers starting to have a presence, and with Telstra having to back off the leading edge of technology a bit to become more focused on being a market driven organisation optimising shareholder value, they are not driving technology as much as they were. But, again, people are demanding global standards nowadays. People do not want the local telco to come up with a whizzbang system, no matter how good it is, if it means they cannot roam to the next state or to the next country. The GSM standard of mobile telephony has really meant that the major administrations simply have to fall in line with those global standards.

Mr LINDSAY—Why do you have to have a big local market to sustain R&D? If somebody develops something here, why can't it be marketed worldwide but not necessarily from here?

Mr Clark—It is fairly well held nowadays that the best innovators in the world really require a key customer to take their product ideas across the chasm, as Geoffrey Moore would record. There is any amount of literature which suggests that developers and innovators who are close to their customers really understand what the needs are and, ultimately, can even use their customers as one of the key distribution channels, not only as a reference point but quite often in deploying those solutions and ideas throughout their own corporations.

Mr LINDSAY—Are you pessimistic about Australia's prospects, then?

Mr Clark—It is difficult for me to be terribly joyous at the moment.

Mr LINDSAY—Do you think Australia does not beat its drum enough overseas?

Mr Clark—There is absolutely no doubt about that. I know there is some discussion that perhaps our tourism and sports image overseas actually gets in the way of us having a technological image. I would like to say that that should not be the case, because I do not see the two as being mutually exclusive. I quite often use the example of our own organisation in the days when we were recruiting and bringing in expats. Our best developers are well-rounded individuals who may in fact be great sportsmen as well. We were running an incredibly competitive basketball competition in our own organisation. I was a little worried about some of the expats we were bringing in from Croatia. They all seemed to be six foot seven. I am not sure what their credentials were, but they were all good basketballers.

Mr LINDSAY—In your submission, you referred to MNC bashing. Do you want to offer the committee a comment on that?

Mr Clark—There were some comments. Unfortunately, through nobody's fault, some of this really stemmed from the competitive tendering process for the ICT centre of excellence. Some of the groups—and I know very well all of the people involved; it was not their intent—perhaps misled somewhat by some of their market positioning, created a point of difference by either having multinationals in or not having multinationals in, and that created a divide. We have, for the last 12 months at least, been talking about the difficulties that our industry is in. In the face of a very buoyant Australian economy, people felt that we were just crying poor and looking for handouts, which was not the intention at all. As a result, this is where some of the comments like 'Well, their investment is footloose; it doesn't really matter' came from.

Mr LINDSAY—Is there anything you could suggest that the government might be able to do in relation to the way that the general public views multinational companies?

Mr Clark—That is difficult because—

CHAIR—It is part of our Australian sport, isn't it?

Mr Clark—Yes, I guess it could be, and perhaps people need to understand why there are no multinationals in Telecom's equipment in Australia. It is not through lack of competence and great innovation in those areas; it is more to do with the capital markets and the way Australian companies have invested their money historically. The great telco equipment designers and manufacturers—like the Ericssons, the Lucent's and the Nokias—have really come because of different types of market conditions, where large conglomerate companies in those countries

decided they wanted a telecommunications arm. For whatever reason in the Australian environment, the large media and mining players have never really felt that they needed a large telecommunication arm. Lucent is a spin-off from the operator in the United States. Again, arguably, there were opportunities for Telecom to do the same but that never came to pass.

Mr LINDSAY—Did your company ever consider using CRCs?

Mr Clark—We continue to use CRCs, and it is my intention to do whatever I can to make sure that we honour those commitments.

Mr LINDSAY—Are they efficient or are they underperforming?

Mr Clark—There are lots of good things about CRCs and lots of confusion surrounding them as well. The governance structure of some of them is somewhat cluttered, which makes it very difficult to influence the direction and gain access to the IP. In some instances they have been forced to try to spin out some of their technology earlier than they otherwise should have, simply because the market was demanding it and the dot com boom was enticing them to do so. We have some experience in Europe of perhaps a slightly better model. In the fifth and sixth framework arrangements in the European Union, they operate what are basically CRCs but the industrial partners actually become real participants in the research work. There is good evidence to suggest that some of the precompetitive research that has made the European scene so dominant in generating some of the very ubiquitous standards and technologies has come about because a number of competitive companies and the cream of their research organisations have been involved jointly in cooperative research in a precompetitive way.

Mr LINDSAY—Are you saying that is not happening in Australia?

Mr Clark—Generally, for all sorts of reasons, the industry players tend to be somewhat at arm's length to the operations on a day-to-day basis.

Mr LINDSAY—Yet they are putting money in?

Mr Clark—Yes.

Mr LINDSAY—But they are at arm's length?

Mr Clark—Yes. Some of that is because of the quite complex governance structures associated with the CRCs.

Mr LINDSAY—Finally, have you employed PhD students?

Mr Clark—Yes, regularly. I am not sure how many we have on staff at the moment.

CHAIR—You said you would be working to meet Ericsson's current commitments with the CRCs. Was Ericsson part of any of the bids for the next round, which I think will be announced later this year?

Mr Clark—I am not quite sure where our CRC partners are, but I believe so. I know we have been sponsoring and supporting some other specific bids out of the University of Melbourne, for example, and it is our intention to honour those.

CHAIR—Even the ones that have not actually been announced?

Mr Clark—We have not been involved in any new ones.

CHAIR—That was what I was getting at. There are currently bids in for continuing ones plus new ones.

Mr Clark—Clearly, we have the mechanism to keep providing that support and sponsorship. I will hand that work over to the remaining Ericsson Australia organisation. As I said in the statement, although that is good in terms of funding and interplay between the multinationals and the local research environment, it does not really mean that we can share face-to-face and have the same sort of interplay that we have at the moment between our guys and those in the research institutes.

Ms GRIERSON—Firstly, let me express my regret that Ericsson has had this experience. The loss to this country will be amazing and almost inestimable. It will certainly be a great loss to us and I think it is highly regrettable. Some of the submissions have dealt with how much the government's programs assist the setting up of these sorts of partnerships rather than the maintaining of those sorts of partnerships. How closely did the government work with Ericsson throughout this particular program?

Mr Clark—Most state and federal programs are based on attracting investment. There are very few specific retention programs, apart from the ongoing grants that you can apply for and the 125 per cent R&D tax concession. Our view is that that does not make a lot of sense in a declining market. Be that as it may, our focus and our stated policy for the better part of three years has been that, if that is the way it is, fine, but we should be focusing on education and competence, because at the end of the day it is really the competence and capability that give you a foothold, all other things being equal. Unfortunately, they are not at the moment.

Ms GRIERSON—Before we get to some of those issues, what is the make-up of local and international personnel who were involved in the lab?

Mr Clark—One expatriate Swede is working there at the moment. The rest either are Australian citizens or have permanent residency status.

Ms GRIERSON—That is a fairly good indication of the cost. Will any places be offered to those people for overseas placement?

Mr Clark—I would describe it as a handful. There is the potential for some of our staff to follow some of their products and technologies into the receiving organisations as we described them. Once upon a time, when the market was much stronger and the margins were much greater, there was a lot more largesse to be able to afford expatriate conditions and transfers. In the current environment, we will have to be extremely careful.

Ms GRIERSON—Perhaps that is one area where government could be very proactive—that is, in keeping the top 20, 50 or whatever in Australia. I take your point. Will exit interviews or exit information be available to government from this whole process?

Mr Clark—I had not considered that, but there is no reason why there should not be.

Ms GRIERSON—I would encourage that. I think we have a lot to learn from it. I think the downturn in the market was known about and predicted. Linking it to the fact that we need an embedded domestic market, as Ken Ticehurst has said, I was also on the wireless broadband inquiry and very much a major feature of the evidence there was that take-up was not assisted by government in many ways. The potential use of ICT in transport and in the manufacturing industry, as well as in medicine, education and those sorts of areas, has not really been assisted or taken up by government at this stage. Would that have helped, and how could that have been done?

Mr Clark—I think it could have done. I saw some research earlier this year from the Reserve Bank that suggested that, for example, in transport and construction the efficiency gained through the use of ICT and IT has actually reduced over the last few years. In some of the work that is going on with some of the other advisory groups and bodies looking at the future of ICT, we are focusing very heavily on how we can look at those verticals and apply ICT in applications where Australia has competitiveness not only in the ICT component but also in the application itself. There is some good evidence that mining software, for example, is an area where we are having some wins. But that is only a relatively small part of the process.

Ms GRIERSON—In terms of our skills, your suggestions to government are that influencing curriculum and the links between skills and industry—and therefore the curriculum and syllabuses offered—is important. Have we lacked the flexibility to respond to that need? In my own area, for things like power engineering, we are now having to get people from overseas, yet we once would have had those people here. Has that been a problem? Do our tertiary institutions link closely enough to industry need?

Mr Clark—They endeavour to, but it is rather patchy, especially in undergraduate courses. Quite often the lecturers will teach what they know, not what is contemporary. That comes back to the issue that the chair raised earlier about the interchange of staff and positions. There is simply not enough of that happening. Also, we face a huge challenge in our secondary schools. In Victoria, in particular, we have a huge shortage of maths/science teachers. If I thought I would be half a teacher, that would be my next job—quite seriously. But I know I would not be good at teaching. We endeavoured to start some work with various science teachers associations in terms of bringing faculties into our premises to show them what a modern R&D organisation does all day—so that the curriculum advisers, the counsellors and the maths/science teachers could actually have an idea of what they were shaping their charges towards.

Ms GRIERSON—In this country, taking on a second degree or postgraduate degree is penalised through HECS et cetera. Is that a barrier to attaining the best skills?

Mr Clark—It could be. The bigger problem we have had when we are in recruiting mode is the fact that a lot of the kids, especially doing computer science, are just so keen to get out into the marketplace, because there is such a huge demand and such commercial gains for them. The cost of doing a second degree clearly does cause some lack of specialisation.

Ms GRIERSON—Has there been complacency in attracting multinational corporations like Ericsson? Is there a culture that has let them just manage by themselves—a culture that says, ‘They are big; they can cope,’ without being proactive and perhaps putting processes in place that support the retention of those MNCs?

Mr Clark—If we had had this discussion two years ago I would have said yes, but the reality is that where we are today is simply because of the market situation. For example, two years ago nobody could have predicted that Lucent would be in the dire straits that it is in now. It was the largest equipment vendor in the world two years ago, but now it has a very uncertain future. You can trace the history of telephony back to the roots of Lucent, and Lucent is really struggling.

Ms GRIERSON—And without embedding it into every SME, every corporation, every business in Australia, we certainly have not assisted that. I think that is regrettable.

CHAIR—Will there be many small and medium businesses affected by your closure?

Mr Clark—There will not be many directly affected by our closure, in that virtually all of our work is global development for component parts of the global network, which we produce in Australia and then consolidate out of our central European groups. All of that work now goes to other development centres in Europe, effectively. We do very little subcontracting at the moment to local SMEs, from an R&D perspective.

CHAIR—Is there something that could be done to bring small and medium businesses more into the research and development area? It is a fact of life that far and away the bulk of research and development work is done by large corporations. I guess the fact that you did very little subcontracting is part of the reason why. Is there something else that could be done to improve that situation?

Mr Clark—The main reason we did relatively little subcontracting is that our activity was so core in the network that, for security and confidentiality reasons, we did not like to spread that around. I think there is a real case to look at greater financial incentives for the SMEs, but I think they should only be done in the context of an obligation to more closely align with the other players in the industry and, especially, specific customers. We have seen through the dotcom boom a lot of really great ideas, but also lots of solutions looking for a problem to solve. There is no real point throwing more money at those types of ideas. We really need time, energy and money invested in ideas that potentially have a real application and a real use. As I said, they need to be jointly developed by the users and developers.

CHAIR—You mentioned that Invest Australia need to refocus and reprioritise. How can we use Invest Australia better?

Mr Clark—I am not an expert in the structure of Invest Australia. We noted with interest the recommendations of the Blackburn report. I am not an advocate of turning Australia into a little Silicon Valley or a little Ireland or a little Israel, but there are clearly some good practices to be learned, for example, from the equivalent organisations in Ireland. They have a much tighter account management structure under which they take SMEs under their wing and help to introduce them to the markets, help to introduce them to the capital and coordinate that in a

much more focused way. There appears to have been a lack of that sort of focus in Invest Australia.

CHAIR—Invest Australia really, in many respects, is a bit of a marketing arm for Australia Inc., isn't it? We talked before about multinational company bashing. Can we promote Australia—beat our chests a bit more—to help overcome some of the perceptions that other countries clearly hold about attitudes in Australia?

Mr Clark—I suspect it is more about educating our people in the values and downstream advantages of a strong technology platform in Australia. Frankly, the fact is that gold medals in the swimming pool will not pay the national debt. Although sometimes people might see it as being geeky, everything we do in the modern environment is impacted closely by information and communication technology. It is an exciting opportunity, not just a necessary evil that a few geeks in laboratories understand.

CHAIR—Does anybody have anything to add? I think we have covered the issues fairly well. Thank you for your submission.

Ms GRIERSON—I just want to ask one other thing. Are you able to isolate one factor, besides commercial loss, that would be the deficit that would perhaps push a company over the line in terms of its decision making? Was there anything you could isolate besides the commercial imperative? Was it the regulatory tax environment? Was it the lack of incentives?

Mr Clark—It came down to personal decisions taken by individuals who were forced to make hard decisions. I know one of the key players in the decision was, perhaps disproportionately, concerned about the tyranny of distance. I have thought about this long and hard, because we have known his view of that, and the distance will not go away. Maybe it would be different if we had unlimited broadband access between here and his office, so that when I walked in in the morning there was a video wall and he was there and I was there. It sounds a bit silly, but those sorts of things—

Mr TICEHURST—Personal perception makes a big difference.

Ms GRIERSON—So, really, a major effort is required to overcome the reality and the perception of the tyranny of distance.

Mr Clark—That is right. Interestingly, to a certain extent the answer is in our own hands with broadband policy.

Ms GRIERSON—Absolutely.

CHAIR—Thank you for your evidence and the update that you have given us today following your submission. I could echo Sharon's earlier comments that we are obviously losing a great facility in Australia, clearly one that has been doing the work. It must be very frustrating when you know that it has nothing to do with competency. It kills one of the stories that I often tell about research and development, which I think I related to you the other day. One of the senior Ericsson people told me that the reason you do research and development is to stay in front of the marketplace, not because you happen to be able to get a tax concession somewhere along the line. If you make decisions based on that alone, you are making them for

the wrong reason. That advice has not changed but I was always proud to quote that to people on the basis that that was part of the reason why Ericsson was in Australia using great Australian scientists. Thank you for that insight and some of the excellent suggestions of areas that we, as a government, can consider for the future as well. I wish you all well with the possible flow-on of employment for the many highly skilled people that you have, because I know you are still working hard at that amongst the many research organisations and structures that we have.

Mr Clark—That is one point. I will not call it an upside, but it means that there will be 400-odd really talented people out in the marketplace, so there is an opportunity for some of the SMEs and others.

CHAIR—Thank you.

[2.24 p.m.]

ARMAREGO, Mr Paul R., Member of Intelligent Manufacturing Systems Australia Advisory Committee and Legal Adviser, Intelligent Manufacturing Systems Australia

ROBINSON, Mr Angus Muir, Member of Intelligent Manufacturing Systems Australia Advisory Committee; and Chief Executive, Australian Electrical and Electronic Manufacturers Association

STRASSER, Mr Tony Dieter, Manager, Intelligent Manufacturing Systems Australia; and Executive Engineer, IT and Automation, Sinclair Knight Merz Pty Ltd

van LEEUWEN, Dr Edwin, Head of Australian Delegation to Intelligent Manufacturing Systems International Steering Committee, Director of Intelligent Manufacturing Systems International and Member of Intelligent Manufacturing Systems Australia Advisory Committee; and Global Manager, Exploration and Mining Technologies, BHP Billiton

CHAIR—Welcome. I would like to point out to you that, while this committee does not swear in witnesses, 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 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 the request. Would you like to make an opening statement before we proceed to questions?

Mr Strasser—Yes. Intelligent Manufacturing Systems Australia thanks the committee for its interest in our submission regarding business commitments to R&D in Australia and for the invitation to attend this hearing. Our interest is to provide the inquiry with information based on our experience in this unique program over the last 10 years and also to highlight some areas for improvement to Australia's ability to revitalise its manufacturing sector through engagement in world-class R&D. The Intelligent Manufacturing Systems, or IMS, program is an industry led, collaborative, international R&D program and its purpose is to develop the next generation of manufacturing and processing technologies and to disseminate the results among the participating firms and nations. IMS is conducted under an international arrangement signed by the governments of Australia, Canada, the European Union and Norway together, Japan, Korea, Switzerland and the USA. We are pleased to have on our advisory committee representatives from Australian Business Ltd, AEEMA, the Australian Industry Group, BHP Billiton, Bishop Engineering and the CSIRO. Under their guidance a greater awareness of the program in industry has been accomplished, with a commensurate increase in prospective participation.

Australian companies and research organisations participate in a portfolio of IMS projects, formulated and conducted in accordance with R&D themes specified under the IMS terms of reference. Currently, over 30 Australian organisations participate in seven IMS projects. Another 34 participants are undergoing formative activities in a further eight projects which are expected to formally commence over the course of the next year. The global IMS project portfolio comprises 28 projects with a total of over 550 organisations participating, with a

further 36 projects in formation. Australian participation is quite modest but still significant when adjusted for population and GDP.

We would like to emphasise a few key factors in our submission, 'a significant and stimulating business investment in R&D'. They are: the availability of public funding as a catalyst to business funding, an innovative and collaborative business culture and some inspirational leadership. On the issue of funding, a recent independent review of the IMS program in Australia found that the most significant challenge facing participants was funding their participation in projects. Every Australian participant in IMS projects is responsible for securing their own funding. Australian participation in IMS therefore depends heavily on business investment in R&D and also on public funding, particularly as most projects involve collaboration between research organisations and companies. R&D expenditure patterns in Australia show very little crossover between public and business R&D expenditure. However, there is a willingness to match R&D investment. In IMS, a strong contrast in funding approaches exists between the EU and Japan on the one hand and the USA on the other. There is a strong correlation between participation, effort and new proposals and the availability of public funds earmarked for IMS projects. The EU and Japan provide strong public funding support and have attracted strong industry participation on a 50 per cent funding basis. No earmarked public funding is available in the USA and participation there has been very modest.

In the area of culture, in marketing the IMS program to business it has been noticeable that the response is mostly a reactive one. We have encountered few businesses with a strategic plan for innovation that are ready receptors for the opportunity provided by IMS and can readily evaluate where this fits with respect to their own strategic business plans. Almost without exception, those businesses who do participate in IMS already have a relationship with one or more research organisations, be they CRCs, universities or the CSIRO. We conclude that businesses whose leaders have had prior exposure to R&D are much more likely to understand and engage in further R&D. They are also more likely to engage in collaborative development and knowledge sharing, which is the benefit most cited by IMS participants. Therefore, stronger encouragement for business to form strategic relationships with research organisations would seem beneficial in stimulating business R&D investment.

Finally, on the issue of inspirational leadership, manufacturing seems to have an old-fashioned smokestack image amongst the public, yet it remains an important, if diminishing, contributor to our national GDP. Young people are no longer attracted to careers in the industry in part because we hear more bad news of closures and retrenchments than of growth and innovation. If this trend is to be reversed then a national goal to create new manufacturing industries and revitalise existing ones should be established. In their investments people are attracted to good news and national commitments. Korea, Taiwan and Ireland provide ready examples of what can be achieved. The IMS program was largely created by the vision of one man, Professor Yoshikawa, Dean of Tokyo University. He was able to inspire manufacturers and governments around the world to establish the program. We too are in need of such inspirational leadership and determination to succeed. These are the key points in our submission and we welcome your questions.

CHAIR—We people in politics can appreciate the problem of getting the good news stories out there as opposed to the bad news ones. If you can find the solution to that with the media we would be happy to know it. There seems to be a perception that it is only bad news that sells papers.

Mr LINDSAY—Gentlemen, out of left field, are you aware of the key areas of research in the CSIRO flagship programs? Do you support that concept of CSIRO in relation to innovation and research and development or do you think there should be another model within CSIRO?

Dr van Leeuwen—We have worked a lot with CSIRO with CRCs and also our company has a lot of interactions with CSIRO across a broad spectrum of research and development in technology areas. I would say that in the areas where we work with CSIRO we have achieved significant benefits. We have collaborative programs with them and we certainly have benefited from the research programs that we have tackled in the past. I am not qualified to comment broadly across the five areas—but definitely in the areas of physics, geophysics and mathematics, where we have had strong interactions, I would say that the quality of research that we have done with them is good. I think there are some issues as to whether it has been done in a timely or a business fashion but by and large we are very satisfied.

Mr Strasser—I can add that IMS is a thematic program and it is also very helpful for linkages. If participant organisations have similar themes or are thinking that way, they can be focusing their resources.

Mr LINDSAY—I told you it was out of left field but it was interesting to see your reaction. In your evidence you said:

Many SMEs are unwilling to share information for fear of disclosure ...

We heard evidence earlier that a lot of collaboration goes on in the mining industry. So are SMEs short sighted in that view or do they have good reasons for not wanting to share information?

Mr Robinson—I can answer that one because I have had the fortunate experience to have worked in the minerals industry and, more recently, in the manufacturing sector. It is a cultural thing. The minerals industry has become worldwide competitive because the programs have been in place—there are a lot of conferences and papers are written. The nature of collaboration is, in essence, an attitudinal acceptance in the minerals industry. In the manufacturing sector there has been, at least in this country—which is not the case necessarily in other countries—a fear of collaborating and sharing information, even to the extent that people are fearful of bringing other people to their factories and sites to see what they are doing. I think it is incumbent on us to develop and encourage programs where manufacturers, small and large, are prepared to collaborate and see the value of that so that, as a whole, the industry knowledge base increases. The minerals industry has been able to do that. The wine industry have done that too. They have been able to share technology, they have got an export focus and they have got a clear strategy to go ahead. There is a value seen to being collaborative because they have focused on world markets.

Mr LINDSAY—Should we be recommending that the government try to reward SMEs who do collaborate?

Mr Robinson—Absolutely.

Mr LINDSAY—That is sort of a step down from the current basic tax incentives and so on—'Take it another step further if you collaborate' is another incentive.

Mr Robinson—Yes.

Mr LINDSAY—In part of your evidence you talked about demonstrating success. I really like this approach. Do you agree that Australians do not beat their drum enough overseas about how good they are? If you agree with that, how do we do a bit more than we have been doing?

Mr Strasser—I certainly agree that Australians tend to be modest. I think we cringe a little bit in the face of much larger and more powerful economies and how we can influence those things. It is very much a cultural thing but, as we said in the submission, we should illuminate some of those success stories and show what influence they have had.

Mr LINDSAY—But you were saying to illuminate those within Australia—is that right?

Mr Strasser—Yes, as an example to fellow manufacturers—and retain those leadership positions as well.

Mr LINDSAY—The question that follows on from that is: how do we get to Australians and tell them how good we are? Rather than getting to the world, how do we get to Australians and demonstrate success?

Mr Strasser—We use conferences and media, and write the good news stories. Mr Chairman, you talked about bad news being more newsworthy than good news.

Mr LINDSAY—Come on, Angus—you have a go.

Mr Robinson—In the context of the electronics industry action agenda, on which we are working with the federal government to look at ways of better branding Australian technology, the issue of identifying heroes of technology innovation is an important issue. In the same way that we have been able to very successfully acknowledge our sporting heroes, we need to start looking at our engineering, science and technology heroes—awards programs, awareness programs and better programs focused in the schools sector—because it is important to start to influence the minds of younger people. With the focus on entrepreneurship through these technologies, young people can end up working for themselves. There are all sorts of things that we know do pull strings with young people, but we have not been very good at being able to develop those programs across a wide sector of the school community.

Mr LINDSAY—Should the government have some formal mechanism for telling good news stories? Do we have it already?

Mr Robinson—I think we talked about this. One of the things that ministers can do, for example, is to have a proactive program as they travel around the world: all the time touching base with multinational corporations and leaders in the various capitals around the world, reminding them about the good things that are happening. Government has its own way through its various support mechanisms. The activities of ministers and senior public servants can all the time be telling people about what good technology is and what good things we have in this country.

Mr LINDSAY—Earlier evidence today was that the quality of university graduates in science and engineering coming out of the system is going down. That links in with a point that

you made in your opening address about how the factories of the nation are seen. Do you agree that the quality of engineering and science graduates is going down? If so, what do we do about that?

CHAIR—I will clarify that before they answer the question. I think the comment was not about the quality of graduates in science and engineering; it was about the quality of people being attracted. There is a subtle difference.

Mr LINDSAY—I apologise. I think you are right.

CHAIR—There is a subtle but significant difference, because it is more than—

Mr LINDSAY—You are right. I apologise to the Chair.

CHAIR—It is not necessarily what happens at the end; it is what is going in.

Mr LINDSAY—Knowing that, away you go. Come on, Paul—you have not had a view yet.

Mr Armarego—It is a view that we have discussed. I think a lot of people would say that the number that you are getting at the end, in terms of choice and quality, is reduced significantly. To take it a little bit further, we would suggest that it is a very large issue because it depends on people who are able to teach and the quality of them as well. The nature of the whole problem we are talking about here is interesting. How do you demonstrate it? How do you measure success? How would you maybe celebrate it? They are complex issues—a lot of the success is very iterative. It is not a one race or a one game thing; it is something that is often very highly iterative. That is part of the nature of the problem. It is part of the nature of the danger, too, because it can take a while for trends to become obvious.

Mr LINDSAY—You are in the real world, and we are looking for things to recommend from this inquiry. It seems to me that this sort of area is something that is very much in your bailiwick. What are we going to recommend?

Mr Strasser—I certainly agree that the uptake of quality graduates in the industry in Australia is diminishing, and therefore those people become lost to the Australian economy. They make their careers overseas. Eventually, they may be, or may not be, attracted back into university teaching positions, which over the long term reflects on the quality of the teaching in Australian universities, which then affects the quality of the graduates coming out.

Mr LINDSAY—So are universities not playing their part? Are they putting resources somewhere other than science and engineering?

Dr van Leeuwen—I will answer that question. We are always trying to attract top quality students from the engineering, maths and physics departments. In looking for good students, they are the three departments at universities in which we are interested. Over the last 10 years when we put an advertisement out we would get maybe 60 to 100 top class applications. Today when I put an advertisement out I will get probably 10 or 15 applications and, of those, two or three are top class. Over the last 10 years there has definitely been a shift. In most universities, maths departments are under a lot of pressure and physics departments are being wound down, moved or amalgamated into material science. These are very disturbing trends, because industry

requires top quality science and engineering students. It should be made more attractive for students to go into science and engineering. There should be an investment back into those hard-core engineering and science fields, which have been taking the brunt of a lot of the cuts in universities over the last 10 years. That is the impression that I am getting, when continuously trying to employ people.

Mr LINDSAY—Does that mean lower HECS fees for engineering students—

Dr van Leeuwen—I think that would be a great incentive—

Mr LINDSAY—or scholarships or something like that?

Dr van Leeuwen—When I went to university we got a Commonwealth scholarship, which certainly was very helpful in pursuing engineering and science. I am not quite sure what the status is of those sorts of scholarships today. I think they are not as prevalent as they were, say, 20 years ago. HECS seems to be a big disadvantage. I am not sure whether the disadvantage is just to sciences and engineering or whether it is a disadvantage across the whole range of university teaching areas. But the quality of students coming out of the engineering and science faculties is definitely down compared with, say, 10 years ago.

Mr Strasser—I will put a view here, as well, which is not so much about what universities are doing but what industries are doing. When I went through university, I had a scholarship, a cadetship and a career development path through industry under a graduate development program. We are seeing fewer of these things in industry nowadays acting to attract good graduates to actually work in Australian industry. There seems to be a bit of a view that industry can just hire people off the streets and does not need to invest in their education.

Mr LINDSAY—In which part of BHP Billiton do you work?

Dr van Leeuwen—I have worked across all the businesses. At the moment I am in the minerals area in Melbourne.

Mr LINDSAY—Was the technology for your Ravensthorpe Nickel Project developed in Australia?

Dr van Leeuwen—Yes, primarily.

Mr LINDSAY—So it is your research and development that has made it possible for that project to look like proceeding?

Dr van Leeuwen—Yes.

Mr LINDSAY—Do BHP Billiton tend to try to do all of that research in Australia?

Dr van Leeuwen—We have two corporate research laboratories in Australia—one in Melbourne and one in Newcastle. Through the merger with Billiton we also have the Johannesburg technology centre. Most of the R&D that we do is within those three research groups but we do outsource a lot of R&D into universities and into the CSIRO, both nationally

and internationally. We have a lot of R&D that goes on in the US, for instance, developing unique and novel exploration systems. We source the best R&D wherever we can. We are a global company, so we look at Australia as well as the rest of the globe to see where our research needs are best met in terms of the technologies we want to pursue.

Mr LINDSAY—Okay. Finally, are you aware of a firm called AMIRA International Ltd?

Dr van Leeuwen—Yes.

Mr LINDSAY—Do you use them?

Dr van Leeuwen—Yes, we do. We have quite a bit of research that goes on through AMIRA projects and AMIRA sponsored projects. Normally, that is where you get six or seven companies collaborating together on a joint program of research. We have used that. I think we were one of the original founders of AMIRA, going back about 20 years.

Mr LINDSAY—Okay.

Dr van Leeuwen—That has been quite successful. It has been reinnovated and reinvigorated just in the last three or four years.

Mr LINDSAY—Thank you for that.

CHAIR—Just before I ask my colleagues to take some questions, I will come back to the education thing. This is an area that we need to flesh out a bit, but it is also helpful to make sure that we do not lose sight of some of the things that have occurred. Dr van Leeuwen, you were probably on a Commonwealth scholarship at the same time I was, and we were only a couple in the five per cent of the population that were on a Commonwealth scholarship. The rest actually had to pay their fees up front, unless they were on a cadetship like Mr Strasser.

Mr Strasser—I had a Commonwealth scholarship but the scheme changed as soon as I got it.

CHAIR—It is interesting. There are suggestions being made now about HECS. I always have difficulty with the argument that HECS is a disincentive, because you do not have to pay until you are getting a salary. We can argue about where it should cut in—at what salary levels and those sorts of things—and whether there should be discrepancies between courses. I think that is appropriate and that is where we should have some focus. Really quite dramatic change has come about—I think we are talking about the same eras. If we look at a score for getting into an engineering type course as opposed to, say, a commerce course, they have completely reversed in the last 20 to 30 years. Is that your read of it?

Dr van Leeuwen—Yes, most definitely. I think there is a push into the commerce and accountancy areas. Even your top maths graduates seem to be going in that direction. You certainly see this when you put out, like we recently did, a BHP-Melbourne University scholarship—a top-up scholarship. We have had eight applicants apply, and that bothers me a little bit. Eight applicants, and we have had that out for about six weeks. Obviously, the top maths and systems engineering graduates are going somewhere, and it is not into the areas that we would like in our industry.

CHAIR—Whereas 10, 20, 30 years ago they were following the science and engineering side—

Dr van Leeuwen—Most definitely.

CHAIR—they are now being persuaded more into commerce and law—those sorts of things.

Mr Robinson—Before we leave what Peter was asking, I just wanted to make the general comment that what has changed so much in the last 20 to 30 years is the globalisation of industry. In the various elements that Peter referred to, including education and including the role of the CSIRO, there is more of a need for Australian industry—working with government—to be strategic in terms of now having an international perspective. What we have to be able to do to attract young people into our industry is to build an industry which has a future and a strategic direction which young people can understand. I think the committee could look at the way in which the whole commercialisation and R&D equation can be linked into more of a strategic focus relating to the national investment framework that Mr Blackburn addressed and which the government is considering. Industries and governments that can work together and that have a strategic international framework will have the formulas that will work.

CHAIR—Good point.

Ms GRIERSON—Thank you. Perhaps the benefit to the committee is to hear the industry submissions and realise just what the industry itself is actually doing. As the member for Newcastle, I understand how important industry policy is, particularly for manufacturing. I would also give a plug to Sinclair Knight Merz, who I did not know managed your secretariat and who typify the benefits to regional Australia that derive when such a firm can be based in regional Australia and offer a worldwide service. There are wonderful benefits that should be rewarded by government.

I would like to deal with the education perspective. I take the point that you made—and I think it is an excellent point—that industry have a role to play in terms of offering cadetships and postgraduate development programs. It would be wonderful to see some partnership with government so that that is done more effectively. How do you react to making education training include a commercialisation component—or am I out of step and it already includes that? In terms of, say, your skill base training or competency base training in, for example, engineering, physics, science or maths, do we do enough in terms of marrying those two things? Are they mutually exclusive? Are they absolutely essential?

Mr Strasser—In my experience, the business end of science and technology has been more akin to project management—how you actually deliver something on time, within budget, at quality and so forth. A lot of undergraduate training does not entail R&D and innovation per se. Producing the service or product that they are then going to build a business around is very uncommon at the undergraduate level. There is certainly a lot of activity around that at the postgraduate level. For instance, I participate in the Warren Centre in the committee on ICT, which looks specifically at how we build more wealth in the ICT arena by getting companies and researchers together to understand each other and understand what each group is doing and then how you take that forward commercially. There is certainly a place for it in the postgraduate arena. There needs to be an awareness of it in the undergraduate level, but I am not aware that it is being given at the moment.

Ms GRIERSON—I would probably challenge that, because I think youth culture is such that that would really hook them. They like to see where it fits in that whole big spectrum. We had a submission today that talked about the reluctance of big lenders—that is, banks—to lend for R&D, particularly to small and medium enterprises who cannot access those sorts of funds and who may need them over a longer time scale than they are prepared to take the risk factor for. Do you see benefits in the government coming to some sort of arrangement with big lenders for social dividend type concessions? Would that assist the industry?

Mr Armarego—It depends how easy it is to identify the social dividend and the benefit of it.

Ms GRIERSON—It may not be very easy.

Mr Armarego—I think it is difficult. That is probably why it has not already been done. There are probably some significant cultural issues, which you have probably heard many times today and in other places. I can certainly relate—and I imagine a number of people around the table can relate—the significant difficulties that SMEs, especially technology start-up SMEs, have in getting capital access in Australia. At the moment I have some involvement in about eight, six of which will ultimately be getting their capital offshore—some years later than it would have happened had they been in the countries from which they are getting it. Predominantly, it seems to be the USA that ends up supplying that kind of capital. So I think the short answer to your question is yes, but how you do it is more difficult.

Ms GRIERSON—You covered with Peter the government encouragement of collaborative R&Ds—and I think that is perhaps something that we should note and take further. You also say that most business owners are not aware of the research programs that are open to them. We had a submission this morning that talked about overseas pilots and programs that consolidate in a one stop shop type program—often an e-program—that provides all that information, including mentoring and support programs through organisations like yours linked into the R&D process; so not just providing a government service that provides information about it but a program that is more integrated. Do you see benefits in that? Do you have any experience in that area?

Mr Strasser—Most definitely. My job is to market this program to businesses. It is more than just providing information; it is actually bringing them through the process. But again, we are starting almost with a clean sheet of paper every time, where, as we said in the submission, those business owners just have not dealt with the R&D community and therefore have to be guided through every step. If there is a program—and I do not know whether we should be doing this as part of what we are doing in our area—for the owners of the business or the director's training or for whatever it is that the businesses do, that should be part of what they learn about running a business. A deeper level of awareness would certainly be very helpful.

Ms GRIERSON—How do you think we can make our big four financial audit firms more friendly and perhaps spread the message about the benefits of R&D?

Mr Strasser—I am not quite sure whether they have science and technology advisers amongst their analysts.

Mr Armarego—To the extent they have, the fees are prohibitive for the kinds of target audiences. With a lot of people from those kinds of firms, if they help, they generally help as volunteers.

Mr Robinson—The trouble is that, when you look at the big four, some of them probably would have argued that they invested too much money in resources during the so-called tech boom, and one or two of them might say that they have arguably been burnt by the experiences. Probably only one of them has done very well. But the point is that they would argue: is it really their brief to do that, or should second-tier companies be more involved in that?

Mr Strasser—This points back to the same issue as a lack of understanding of science and technology. In fact, where was the value being generated in the ‘dot bombs’, as we called them in the end.

Ms GRIERSON—That is true. Lastly, you suggest that there should be greater promotion by government of success stories and you mention the need for branding. I assume your branding is fairly strong, particularly in manufacturing nations. It has been suggested to us in some submissions to perhaps have a research icon in Australia that everyone comes under, or perhaps the benefits of retaining things like Telstra and Qantas—particularly Qantas, because it is recognised around the world—and tacking on to those sorts of things. How important do you think that sort of branding is for Australia to market?

Dr van Leeuwen—I think it is pretty important. Take the area of mathematics, which I think underpins the branches of engineering, science, physics et cetera. I know that internationally there are quite a lot of mathematics institutes which are national institutes. In Australia, we are struggling just to set up the first one, and I think that is a real problem. If we could have these centres set up within Australia, I think that would galvanise students to go back to mathematics, for instance, which I think is very important, and it might allow you to identify through those sorts of institutes, the excellence that is done in engineering. There is nothing done in Australia to promote that sort of activity. I think the first institute in maths is being established at Melbourne—or they are attempting to establish it. I am not quite sure how much government support is being given to it, but if you look at countries like America and Canada—even nations as large as, or comparable to, us—I think they are much more aggressive in setting up those sorts of facilities, which I think benefit their industry quite substantially.

Ms GRIERSON—Have you submitted to the government on the national priorities at all in terms of knowledge base manufacturing?

Mr Strasser—We were consulted as part of the initial period. We provided some information during that consultation process, but we understood that that was affecting the block funding to universities less than areas like Start and so forth which involved industry. So we did not make a formal submission; we attended the consultation.

Mr Robinson—I would like to comment on what you said about Telstra. I think the relevance of Telstra as a brand internationally is important when Telstra is doing significant R&D and innovating and developing technologies in Australia. That is where the Telstra connection with the industry is very significant. Telstra Research Laboratories and Telstra generally have changed their business model—and you can arguably say that that should be their business model—whether or not in the future that changes the value of the perceived Telstra association would be questionable. Certainly the point of using our technology industry strengths, such as in the defence industry, which is a key sector, or in the medical equipment or mining industries, where we can go overseas and help brand Australian industry internationally

because of what has been achieved and developed in Australia, in principle, is an excellent suggestion.

Mr TICEHURST—Earlier, in your opening statement, you said that your aim is to revitalise manufacturing new techniques—the name of your organisation is Intelligent Manufacturing Systems. Does this mean that you are dealing a lot with automation type programs so that, essentially, you are dealing with larger businesses rather than small ones?

Mr Strasser—The make-up of the program varies quite widely across the world. Participation in Japan and the United States is dominated by large companies. Australia has predominantly SMEs and Europe has less than a third of large companies and many SMEs. The framework program comes into play in Europe as well, of course.

Mr TICEHURST—Yes. I saw it in a few decades, actually, when working with electrical manufacturing companies. A lot of these companies no longer exist because the problems of on-costs, labour costs and associated costs of employing people got to such an extent that those products are now manufactured in places like China and other parts of Asia. I think the same thing is happening in America to the same extent in the same industry. One that I know of is the power transmission industry; those companies are going to China, transferring their technology and importing back into the country. How do you see us being able to overcome that sort of problem?

Mr Strasser—I think Australia has an opportunity in terms of its clever graduates to export design skills while not exporting the people. We have worldwide communications now, and I think the previous witness talked about having very large broadband access back to head office. We have a great country and a great lifestyle, and that is very attractive. Other employment issues and opportunities take graduates offshore. I think there is some opportunity if we can keep the graduates and export the design skills so that the equipment might be manufactured overseas where the costs of labour are lower and so forth—retain the knowledge and the know-how that is putting the innovation into those products—and then export them to a world market.

Down the value chain in the manufacturing area we are seeing our factories being automated a lot more, largely with equipment that is sourced from overseas. There are some industry segments in Australia that are quite successful in automation; system integrators are in large numbers in Australia compared with many other countries, because we use a lot of that equipment. So there are different niches and opportunities in that whole value chain that Australia can take up.

Mr TICEHURST—There are a lot of manufactured products that do not lend themselves to automation, so these are some of the ones that we will probably never get back.

Mr Strasser—There are some projects being looked at by IMS at the moment in terms of photonics, which is the use of fibre optics. Putting those components together is a very manual process and there is some research being done on automation in that area. With time, those sorts of things become automated because the cost of labour is an economic incentive to do that.

Mr Robinson—I would like to refer to a couple of comments you made about the transformer industry. For example, Wilson Transformers in Melbourne, which is a traditional Australian company, are moving up the value chain. They are importing some of the things that

can be manufactured more cheaply overseas, particularly in Korea, and assembling them. They are actually building control systems, so they are finding where the value add is maximised. Also, Australian electronic manufacturing—where you are dealing with complex products—is worldwide competitive. In Australia, we do have world competitive manufacturing, but it is low risk when you compare it with Asia. I think Australian manufacturers are starting to realise that, if they can understand their niche and their advantage and find access to the new markets, we can find a new way forward.

Mr TICEHURST—So electronics is different from the heavy end of it? I worked with Tyree Transformers at one time, and that is quite a different kettle of fish from mass production in electronics.

Mr Robinson—That is right.

Mr TICEHURST—Also in your submission you suggest that business and scientific leaders ought to be identified and encouraged to act as roving ambassadors. Do other countries do that? How would you see we could do that?

Mr Strasser—Professor Yoshikawa, for example, who founded the IMS program, was revered in Japan as a national treasure. We have national treasures in Australia; some of them are in science and technology, particularly in medical science, because Australians can relate to that very easily. There are not too many manufacturers that I am aware of.

Mr Armarego—There are probably some cultural aspects to it. Anecdotally, we have seen in the IMS system very senior people, like engineers, becoming partially and semiretired but being retained through either their company or other organisations—in the US, for example—to almost mentor people and organisations. I am not aware of that happening in the same way in Australia.

CHAIR—Coming back to something you mentioned before, it is interesting that in your program in Australia it is predominantly SMEs rather than larger companies. That is the complete reverse of just about all the evidence we have taken with respect to R&D investment. Is there something in particular?

Mr Strasser—One factor has been that, under the guidelines for the secretariat, we specifically target SMEs. There is some funding support for a formative access process that allows companies into projects. Large companies are the big boys, so they are expected to find their own way in. We are finding that in Australia the issue is that there are not enough large companies with the resources involved with the SMEs so that some work can be accomplished. The universities are by and large taking the lead and providing the research, and the research is done only when they can get funding support for their time and for bringing SMEs into the program. The large companies are absent more and more. In fact, only BHP Billiton and Tenix would be regarded as large companies involved in the program at the moment.

Mr Robinson—You could possibly argue that multinational corporations, by their very nature, tend to have collaborative arrangements in place anyway. The opportunity for IMS to interface is less attractive to them unless we can find a compelling reason to bring in a couple of SMEs that will add value to what they do not have access to. The focus has been on getting our SMEs to collaborate internationally in the same way they do quite extensively in Europe—where SMEs are collaborating from country to country and it is part of the way they have
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e SMEs are collaborating from country to country and it is part of the way they have developed culturally. They can understand the benefits.

Mr Armarego—One of the things the IMS program does is provide a whole structure so that SMEs can participate in the process, maybe not quite equally but in a framework that gives them some assistance so that they are not having to drive it from the beginning. It gives them an intellectual property rights framework, which is at least understandable compared to a completely start-up one and one that arguably distributes benefits equally within a reasonably secure framework. A lot of the transaction costs that SMEs would normally find are reduced somewhat, although not completely, because the very nature of collaboration in R&D is highly complex. When you add international collaboration to an SME, it is very high. Angus's answer regarding large companies is probably true within the Australian context although, very interestingly, is not necessarily what has happened in Europe and Japan and maybe to a lesser extent in the USA. Why might that be? My personal view on that is that, particularly in Europe and Japan, they have very much used their domestic policy and granting mechanisms to link into IMS in a very seamless way, so it is like a continuum. In Australia and the USA that has not occurred.

CHAIR—As a result of having predominantly SMEs participating from Australia, presumably you would have circumstances where SMEs that are competitors are working together. Does that result very often?

Dr van Leeuwen—It can happen within a consortium. If you take a particular program of research you may find within that program several like-minded companies. But normally what you do is within the program work out what your domains of interest are, and the collaboration that takes place is normally without any worries about ownership of intellectual property. All that is decided up front, so we do not often see that many problems. I chaired the Holonics Manufacturing Systems consortium, where we have a good mix of large international companies as well as SMEs, and SMEs working in allied areas. There are no problems in handling the intellectual property that is developed or the commercialisation thereof.

Mr Armarego—The structure of the IMS program is such that they effectively take the results one step prior to actually going into market. It is at that point that they are able to make the differences that still allow them to compete even though a lot of the core technology that they are developing is developed together.

Mr Strasser—A lot of this research is enabling technology anyway, so it might be aimed at cost efficiencies within their companies rather than being a direct service or product.

CHAIR—I highlight this because an area that this inquiry is looking at is getting more SMEs involved in research and development, and evidence we have had has tended to suggest that it does not happen because small companies have an attitude of, 'They are a competitor of mine; therefore, I can't work with them.' If we can find models to overcome that, and if your model could be applied maybe across other industry areas, then it is worth pursuing.

Dr van Leeuwen—There is no doubt that the amount of collaboration that goes on within IMS consortium projects is quite high, and it is generally extremely successful. It is very well focused, very well managed. I think IMS projects manage themselves far more effectively and cost effectively compared with what I see happening in many CRCs. But I think the issue of

getting more big companies involved is critical. My view is that if you could get more large companies involved in Australia it is going to pull a lot more SMEs behind them, and I think that is a critical issue. Only having one or two big companies involved is not going to pull a lot of SMEs, particularly when you are starting to develop robotic systems or intelligence systems. We may not develop all transformers and so on in Australia, but in integrating that technology and then marketing it downstream I think SMEs can be quite important. Big companies like BHP do not want to be in that business; we want to be intelligent users of the technology—and that would go for a lot of other large Australian companies, particularly in the minerals industry. So I think if you can attract more large companies into the program a lot more SMEs will be pulled in behind the program.

Mr Robison—To answer that question, AEEMA has been working to establish industry clusters around Australia. This is part of the action agenda strategy where companies work together collaboratively to find a way forward in a commercial sense. At a cluster investigation meeting we had in Melbourne a couple of weeks ago, one of the people in the audience asked why government does not look at funding R&D in industry clusters, because there is a lot of clever innovation being done, a lot of engineers, scientists working within industry, rather than this process of funding CRCs and trying madly to get the IP out of the university sector back into industry. But there may be another model of funding of clustered companies who have agreed on a commercialisation of an R&D plan. So there are opportunities to look at different models that could be explored that have not been looked at before.

CHAIR—In the next round of CRCs—and I think this is a positive move in this sense—some changes have been made to the structure which will encourage more small businesses to come into a CRC where previously they had to stand alone. They can come in together with a number of others, and I think that will make a big difference.

Mr Strasser—The successes in IMS have been where the companies have gotten together in a way that is complementary to each other in terms of their positions in the value chain, rather than being, as you mentioned before, head-to-head competitors. They are all toolmakers; they are not going to collaborate except on those things that make their industry easier to work in. We have a couple of large companies who are perhaps end users of a technology and some SMEs and supplies. They all have a need, and there is a ready market. That is the sort of formula that is usually successful.

Ms GRIERSON—I think you have given us some contradictory information regarding the value of having very large companies. You are saying that it would have spin-offs to SMEs—and we would like to see government make sure that there are spin-offs—yet you have also said that sometimes their chain of services, product suppliers and their link to R&D organisations are fixed and, therefore, exclusive. Which is correct?

Mr Strasser—Was that in our submission?

Ms GRIERSON—In speaking today, you said that they often have a fixed take-up, supplier or partnerships that lock out SMEs.

Mr Strasser—I do not recall that.

Ms GRIERSON—What about BHP Billiton? Would they agree with that?

Dr van Leeuwen—No, I think we are quite flexible in the use of SMEs. When I look at most of our technology programs, I see that we source the best technologies from whichever company has got them. That could as equally be an SME as a large business enterprise. I do not think there is any fixed notion that you just use large business enterprises; it is where you get the most competitive product that suits your business needs.

Ms GRIERSON—Ken mentioned this morning a policy area that has been around for a long time—that is, government as a purchaser—and the proactive policies that support government purchase of efficient industry products et cetera. Have you taken on that issue in your organisation?

Mr Amarego—No.

Mr Strasser—IMS is essentially precompetitive.

Ms GRIERSON—So you like the free market approach.

Mr Strasser—So it is one step removed from being competitive. Clearly, if there is a market, it assists commercialisation.

Mr Amarego—That in itself is a huge question.

Ms GRIERSON—One other issue that came out this morning with Ericsson was that tyranny of distance is real or is perceived to be real. In some circumstances it is real, and in others it is a perception, but we are seen as a small market a long way away. How much of a barrier is that, and what can government do to reduce that barrier?

Mr Strasser—IMS has been singularly successful in overcoming the tyranny of distance through getting together companies and research organisations from all of these different regions. There is no doubt that face-to-face meeting assists in getting people to know each other, combined with a social program that goes along with these things. But consortia work quite effectively using modern telecommunications techniques. Aside from the most intensive design sessions, I would not have thought that bandwidth or broadband would become an issue. Email works very well for most of the time.

Mr Robinson—Industry and government can jointly realise that the opportunity for Australia is world markets, in the same way that the mining and wine industries have. If we have a focus on accessing new markets and get our export and the customers right, everything else will start to fall into place. To date there has been too much thinking which has focused internally on our own domestic market without realising that the opportunities are out there in the world. We have to be clever enough and strategic enough to identify them and to maximise our access to them.

Ms GRIERSON—Yes, I agree. People who succeed just get on with it, don't they, no matter what the distance is.

Dr van Leeuwen—That is right.

Mr TICEHURST—The other thing is probably the relative size of the business in Australia. There is a fellow in my area who imports cars from Korea, and he was saying that the total volume of cars manufactured in Australia probably represents a couple of weeks manufacturing in Korea. There is a huge difference in scale.

Ms GRIERSON—Yes, but these people will know that in Newcastle they are exporting depth pressure vessel chambers to the United States Navy, so distance is not much of a problem when quality prevails.

Mr TICEHURST—It is not distance; you need the volume of manufacturing in your home base to be able to support R&D.

Ms GRIERSON—And the skills.

Mr Armarego—Yes—relative to the nature of the activity you are undertaking and the kind of innovation that is required. One of the reasons Australian companies have often been quite attractive in the IMS field, to put it very broadly, is their ability to do very highly effective short production runs, which in certain types of high-quality manufacturing or more difficult manufacturing is not well done in many places.

Mr Strasser—I asked the managing director of that company what he thought his competitive advantage was, and he said that it was that they were small and they could react very quickly overnight to a design change.

Ms GRIERSON—And he can source over 90 per cent of his products and services locally. Hopefully, the skills and services will always continue to be available.

Mr Robinson—There is a good example which Sharon would relate to in Newcastle of the value of collaboration. The coal loading facilities in Newcastle and the supply chain relationship that has been set up in the Hunter Valley have shown how big and small companies can collaborate together, get their supply chain in place and compete in the world.

Ms GRIERSON—The coal chain is an amazing example.

Mr Robinson—They are collaborating to compete.

Ms GRIERSON—I read the history of it last night, and you are correct.

CHAIR—To finish up, would you like to make some comments about the operation of AusIndustry, Invest Australia and Austrade? In the evidence, we have had positive and negative comments about all three of those organisations. Everybody can find a horror example, but also everybody can find some great examples of assistance. Would anyone like to comment in a general sense?

Mr Strasser—To be totally negative about it, the circumstances surrounding the R&D Start grant have been rather regrettable in that they ran out of money. A lot of the programs that are in IMS depend, in some part, on that source of funding—for Australian participants, anyway. So things have been delayed and put on hold.

CHAIR—That one comes up constantly. We want to find some positive criticism as to how it may be done better. It has been portrayed as though it has been stopped rather than suspended. It was suspended because it was actually too successful. Was there a better way for government to handle that circumstance, besides just pouring more money in? There was a budget there—an increased budget—for the next few years, so there was no doubt about the fact that additional money was being put into it, but the take-up caused the problem. Was there a better way to do it?

Mr Strasser—It is just that it was an unexpected event, and lots of people had put in planning. As a pretty competitive grant, you always expect that a certain proportion will receive a grant and a proportion will not, but to also have the queue reset completely—

CHAIR—Did the government do something wrong in not being able to predict this so-called unpredictable event?

Mr Strasser—Because it was a surprise, something obviously went awry. I do not know all the circumstances behind it.

CHAIR—I think I have proved my point.

Mr Strasser—Predictability is the thing that industry is looking for, so that they can base their planning on something.

CHAIR—The government could argue that the industry was unpredictable, which then caused the problem. Totally out of kilter with what had occurred previously was an unprecedented take-up. I do not know how we plan for those sorts of things.

Mr Strasser—It is a statistical phenomenon: industries are a lot of different companies, and they do not necessarily coordinate with each other.

CHAIR—Some people suggested that we should have brought forward later spending, which would have meant that there would be less at a later stage, to make the transition a bit easier. Do you think that is something that should have been considered?

Mr Strasser—I think industry accepted the fact that the money had been spent, but that they had then lost their place in the queue for applications was, I think, the point of complaint that I heard the most. It was the administration all around, getting around that problem that everything was reset and everybody had to start again.

CHAIR—So if they were still in the queue where they were when the money starts to flow again, there would not have been such complaint?

Mr Strasser—That is right—as it was related to me, anyway.

CHAIR—To play the devil's advocate, will you then be spending taxpayers' money most efficiently when it is available? The competitive nature of it may have changed, and what was appropriate 12 months ago might not be appropriate then.

Mr Strasser—If there needs to be a reassessment by all means publish it, but do not simply issue a blanket statement that says, ‘Sorry, everybody will have to reapply.’

CHAIR—What about the role of Invest Australia?

Mr Strasser—I have no experience of that.

Dr van Leeuwen—I am just starting to generate some experience but I am not qualified to comment at this stage.

Mr Robinson—I would like to comment generally on those issues. Firstly, we certainly believe—and I think there is a view emerging—that there needs to be a closer connection between trade and industry. It has been argued that the two portfolios should perhaps come back together to provide greater continuity between trade exports and industry. Certainly the UK Department of Trade and Industry have excellent policies and access to information. Their web site is really worthwhile for the committee to have a look at to find out how they make information on the connection between policy and government practice freely available.

Secondly, the national investment framework, which the government is now focussing on and which will bring a renewed focus to Invest Australia, is a very positive move. We are delighted to see that happening, and I think that will bring benefits. Thirdly, I think it is fair to say that there are government programs in AusIndustry which are not being used as well as they could be, because they are hard to access and hard to use, so one might ask whether there are ways in which the programs can be made more accessible, simplified—red tape removed—and perhaps more effectively marketed. In talking to government officers I often hear, ‘We’ve got this money but no-one’s accessing it.’ It is a question of SMEs in particular saying, ‘It’s all too hard.’ So looking at the whole process and what can be done to make those programs more readily available to industry would be a positive step forward.

CHAIR—Any particular programs?

Mr Robinson—The technology diffusion programs generally. Even though people might say that dollar-for-dollar programs are hard to cope with, if they could be made easier to use and understand and there were more proactive programs of marketing some of that money could well be spent and used creatively.

Mr Strasser—Another experience being related to me is that the people responsible for dealing with particular applications change quite often during the process and a reset occurs there as well which makes the evaluation a lot longer.

Mr Amarego—I think it comes down to the cultural problem that commercial bodies dealing with government often have, being used to much shorter decision making time frames and, I think it is fair to say, easier decision making processes. So, to the extent to which it is possible, there should be integration of the services available and a one-stop smart place that can make decision making quicker or more understandable to those dealing with it, especially when they may be SMEs who are not used to dealing with government in that way.

CHAIR—Thank you for your submission and your evidence and also for the annual progress report. There being no objection, the committee will receive the 2001 annual report of IMS as

evidence to the committee's inquiry into business commitment to research and development in Australia.

Proceedings suspended from 3.30 p.m. to 3.41 p.m.

MACDONALD Professor Graham, Director, Medical and Scientific Affairs, Merck Sharp and Dohme Australia Pty Ltd

PANTZER, Ms Sara, Principal Policy Adviser, Merck Sharp and Dohme Australia Pty Ltd

TENNYSON, Dr Mark, Director, Healthcare Strategy and Corporate Affairs, Merck Sharp and Dohme Australia Pty Ltd

CHAIR—Welcome. Do you have any comments to make about the capacity in which you appear?

Ms Pantzer—As the Principal Policy Adviser with Merck Sharp and Dohme, I coordinate the company's position on various issues. Professor Graham Macdonald, as Director of Medical and Scientific Affairs, heads up our R&D initiative. He came out of academia about four years ago from the Prince Henry and Prince of Wales Hospitals. Dr Mark Tennyson is a medical doctor who heads our Healthcare Strategy and Corporate Affairs area, which, as well as having the corporate affairs function, is the area responsible for reimbursement pricing and listing of our products on the PBS.

CHAIR—I would like to point out that, while this committee does not swear in witnesses, 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 contempt of the parliament. The committee prefers that all evidence be given in public, but should you wish to provide any evidence in private—any confidential information that you think may be of benefit to the inquiry but you would not want to see published—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. Macdonald—Yes, I will start. I am going to talk mainly about the scientific aspects of our work. I would like to point to two parts of the puzzle. The first is the role of large pharmaceutical companies in developing Australia's biotechnology sector, and the second is the role of a local subsidiary within a global company in championing local biotechnology.

We believe that the principal gaps in developing Australia's biotechnology industry to its full potential lie partly in the investment picture that we see and the relative failure of capitalisation in biotechnology companies. We were a member of a consortium which commissioned the Centre for Strategic Economic Studies in Melbourne to look at investment and scientific output, and there were some quite salient observations made. The first was that, although the cost of bringing a new drug to market is the order of \$US800 million—people might argue about that, but you cannot get it below \$US500 to \$US600 million—of the levels of capital raisings in Australia over the last four years we found only two that exceeded \$50 million, and most of them—70 per cent of them—were in fact less than \$20 million. So people were thinking small. We believe that this is a reflection of a relatively immature section of the Australian economy, and the immaturity may be in the relatively limited ability of venture capital sources to assess with any confidence a biotechnology risk and also a little bit of averseness to taking an informed risk. So there are those structural sorts of problems.

We believe a global pharmaceutical company has more to bring to the biotechnology industry than just money in aid of capitalisation. To get back to capitalisation very briefly, one of the other bits of information that the Centre for Strategic Economic Studies gave us was that, although Australia's scientific output is quite impressive, as you know, in terms of medical literature, our investment rate per 100,000 population was actually the second lowest in the OECD. Only Greece had a lower investment rate in biotechnology per 100,000 population.

The other thing that a pharmaceutical company brings to the table in biotechnology is the expertise in commercialisation—moving a product from its scientific base into the commercial base. That involves aspects like the specific research involved in commercialisation, bringing a product to market, regulatory affairs and things like safety studies and toxicology, which are really the remit of a pharmaceutical company but are economically beyond local companies to a large extent.

That brings up the question of what sorts of partnerships might usefully be formed between pharmaceutical companies and local biotechnology. As part of this research, they looked at the sorts of partnerships that had been formed and they looked at them between academia and biotechnology companies, between the pharmaceutical industry and biotechnology companies and academia, and between biotechnology companies. In the last three years, although the number of partnerships and linkages that had been formed had increased exponentially, more than half of them are between biotechnology companies. So almost certainly, these are not partnerships about investment; they are partnerships about technology transfer.

One of the things we believe ought to happen is that the proportion of these linkages that occur between the pharmaceutical industry and the biotechnology industry ought to be considerably increased. That is just to say that we believe there is a real need for larger pharmaceutical companies to partner more consistently—I do not want to use the word 'aggressively'—in a more targeted, more resolute way with the biotechnology industry.

The second important feature, we believe, is the role of the local company. Mark will talk a fair bit about where we stand in the global company. In a company like Merck and Co. Inc., we look at something like 2,000 or 3,000 proposals a year from biotechnology companies. The default answer is no. It is very easy to say no. You are unlikely to get the company into any trouble. So, firstly, there is the role of the local company in being a champion at court.

The way this works is that my job is really to liaise with the biotechnology industry and research institutes. We have a screening process. The idea within the company is that it gives very rapid turnaround. We do not keep people hanging about. We ask for a non-confidential statement about their research. It goes to a group called the review and licensing committee, which comes from all over the company—marketing, external scientific affairs, Merck research laboratories—from anybody who is interested in that field. We turn that around in six to eight weeks. In other words, people give us a proposal and we can say, 'Yes, let's go on' or 'Sorry, we're not interested,' in eight weeks, which is important.

We actually go to those meetings. We teleconference into them. It has been put to me quite plainly that my job is to be a bump in the road so that we actually hold up the process of saying no. We get people thinking about it and bring local knowledge to those deliberations. I do not know what happens in other companies, but there will be some parallel system in which the local subsidiary has a potentially important role.

Above and beyond that—and this is probably true for the industry; it is certainly true for Merck—we see these relationships with research institutes and biotechnology bodies as being embedded in the shell of other relationships. In other words, we are entering an agreement with the Australian Research Council to support their grants to the tune of about 10 PhD fellowships a year. We are talking to the NHMRC; we are looking at supporting research institutes with seminars. This is not big money but it is all little bits of help that we can offer across the range.

Obviously it is a huge program in America, where they have a scientific system that they can get people to visit and take advantage of. We have to stand off a bit here because we do not have a research laboratory. We see the whole picture of research support, institutional support and getting investment in biotechnology as a unitary whole. The local initiatives, like PhD support and supporting institutions, have to be local subsidiary initiatives. The really important thing is that we go out and look. It is quite surprising how people are themselves surprised when we come and knock on their door and say, ‘Do you want to talk to us about biotechnology?’ We obviously do not expect them to be waiting for us; we just want to be there for them to ring us when they have an idea.

So there are two main things. Firstly, we believe that global pharmaceutical companies have a pivotal role in bringing the Australian biotechnology industry to maturity and in making it work. Secondly, we believe that the local subsidiary has a critical role within that in championing and making sure that in the global company—which is sort of looking at a panoramic view of the whole world—the two per cent market in Australia actually stands up a bit higher than that. I think Mark will talk about how we can make this work in the local context.

Dr Tennyson—Yes. The first point I want to make is that we think we are doing pretty well in R&D in Australia, which leads us to think through for the future what would make us do even better. We have the view that there are a certain number of things in the environment that are impediments or that slow us down in that endeavour. There are basically two sorts. First of all, there is the sense that Australia is not sending a strong message about being innovation friendly. I do not know why that is, but it is a general sense. The way it works internally in the company is that a few things land on desks overseas and that is what they tend to see on a repetitive basis about Australia. I will go through some of the things that make our job a lot harder in attracting R&D investment for us in Australia—because our job really is to work for the future success of the subsidiary.

Australian science is amongst the best in the world—there is no doubt about that. There are other countries that compete with us. Increasingly, these are countries like Korea, Taiwan and Canada, and the US and the UK obviously. They have cutting edge science too, and in a way now the cutting edge science is a starting point. It then comes down to what proactive incentives the different countries have and how the operating environments compare. That is really how a company like Merck is looking at proposals for future investment.

I will go through these points fairly quickly because you have probably heard them on a number of occasions. One of them is a sense that there is a price suppression on the PBS in Australia. The Productivity Commission looked at that last year and found some price suppression in the marketplace. The way that works through for us and causes us a bit of a hurdle is that, at the end of the day, for our newest medicines, we have to get approval from our

chairman over in the US for those prices, which often seem to be fairly low, if not some of the lowest in the world. The problem with that is that each time he sees Australia—

Mr LINDSAY—Was that a commercial break?

Mr Macdonald—A non-commercial break.

Dr Tennyson—These requests for lowish prices in Australia frequently land on Ray Gilmartin's desk, which is not a good thing for the next time we go to him to ask for investment. The other thing—and I think it came up earlier in the proceedings—is about how getting on the PBS is a bit of a lottery for the industry. To put that in context, the PBS is really the viable marketplace for us in Australia. Without the PBS or without admission onto the PBS, there really is not a viable market. For industries like ours, the marketplace is pretty critical and so it is very important to us. The uncertainty around it plays out at our headquarters and makes them doubt whether Australia is serious about being an innovation friendly country.

The other thing is the lack of transparency in the processes. Sometimes it takes a long time. A couple of our products have taken five-plus years to get onto the PBS, and that is a long hard slog—that is what they see overseas. We do not like to draw attention to it but inevitably it is something that they do see. The R&D tax concession is a great incentive, although it does not work for us because of the intellectual property issue: the beneficial owner of intellectual property resides overseas, so we do not really benefit from the R&D tax concessions. This contrasts a little with the Factor f and PIIP type situation where it is activity in Australia, regardless of where the intellectual property lies, that is the positive thing.

The last thing I would say is about what other countries are doing and what we have to compete with. There are a number of countries—such as Singapore, Ireland and Canada—which put together product investment incentive packages, and there is a perception around operating environments that they are able to spend a lot better than we do. These sorts of tailor-made packages are very hard for us to compete with at times. When Ray Gilmartin, our CEO, came from our headquarters at the end of last year, he stopped off in Singapore. What he described to us when he got here was 'the next step in the sell job when I came through Singapore'. He was sat down and given the next step in this sell job. I think I am right in saying that he did actually commit to another manufacturing plant during that visit. In other words, he felt as if someone there had a vision of a 10-year interaction with Merck and that this was the next step in delivering the sales line. That sometimes makes it hard for us to compete. I think part of the solution for us here lies in an industry development scheme and a continuation of a PIIP-like incentive program after 2004, when it expires.

In summary, I would say that a strong research based industry like ours does have a very significant economic benefit spin-off—35,000 jobs from a \$12 billion industry, and you could put down the whole length of the value chain. As for our presence in that industry, we did some work with Access Economics to understand what our contribution to that was. The spin-off benefits were around 4½ thousand jobs and \$550 million worth of benefits that went out into the community. We produced for export products worth around \$450 million, and local sales were around the same level. A large part of this comes from R&D and manufacturing, and there is a sense that the two things are codependent: you do not really have one without the other, although in some countries the two things can be absent. We lead the industry in terms of manufacturing for export. In closing, I would make the point that, in a complex industry like

pharmaceuticals, it is very important to have this synergistic relationship for big companies like ours and therefore to have a strong local presence in Australia along with the interactions, alliances and partnerships that we can build with these small to medium sized R&D companies.

CHAIR—Thank you for that. Is Merck a net exporter or importer of product?

Ms Pantzer—It is a net importer. The most costly part of a pharmaceutical is the active ingredient. There are not many actives produced in this country. Only one or two companies actually produce the actives. It is the high value added part of the industry.

CHAIR—Is there some potential in that area?

Ms Pantzer—There is potential but the thing that drives major investment for actives is tax incentives for chemical manufacturing. Merck, as a number of other pharmaceutical companies did, responded to the tax incentives that Singapore offered for them to site their chemical manufacturing in places like that. Major tax incentives drive major investment. These are \$500 million or \$1 billion investments.

CHAIR—I noted your comments about the PBS. From what you are saying, the PBS is almost a two-edged sword for you. You said that you need it because there is not a market there without it but that you believe you are taking a lower price. Other commentators would say that the Australian PBS system is the best in the world, that Australians have probably the best pharmaceutical benefits system of any country. I have heard that said numerous times. So how does it fit with other countries? Why are you able to get a higher price in other countries when you say you do not have a market without the PBS here? Would you like to make some comparisons?

Dr Tennyson—First of all, let me just make it clear that we, as a company, and the industry would support the existence of the PBS. We do not want to see it dismantled or anything like that.

CHAIR—And you would support a slight increase in the amount that the user uses, to make it a bit more viable?

Mr LINDSAY—A copayment.

Dr Tennyson—I have no comment on that. If industry were to be asked, we would say the issue is that we probably need more certainty about it. It makes business planning very difficult. I think the current government would argue that the issue is around the PBS and blow-outs; that makes it very difficult for them to manage the PBS budget. We understand that, because it is very difficult for us to do our business planning when we just do not know what the outcome is going to be. With a couple of our products—like Singulair and Trusopt—it took five-plus years. That is very hard to plan around, business-wise. That would be our main point: it is the certainty, and how it ties in with the knowledge economy bit. You get a sense sometimes that there is not a whole-of-government approach to this and how it all ties together. Sometimes the PBS is seen as a bit of a cost when actually it could be seen as a bit of a net investment for Australia—an investment in the health outcomes of the community, that sort of perspective. But I think it is the certainty that is the main point.

Prof. Macdonald—I think it is the issue also of seeing the two aspects of the pharmaceutical industry as a whole—of course, they reside in different government departments. As Mark said, the government expenditure is regarded as a cost because the investment loop disappears somewhere down the line—particularly in health, where investment in pharmaceuticals benefits state health systems, because the main benefits are in the use of downstream, more expensive cost resources and they mainly belong to the states.

Mr LINDSAY—Get the states to pay for it.

CHAIR—That is a good argument.

Prof. Macdonald—Don't quote me.

Ms Pantzer—It is an issue.

CHAIR—Take it out of their GST payments.

Prof. Macdonald—We have a sort of triangular thing here where you have got an expenditure centre in the Commonwealth government that benefits the states, but then another bit of the industry which is looking to another part of the government for support.

CHAIR—Good point. On that, Peter, did you want to say something?

Mr LINDSAY—You understand the problem for the government of the enormous cost of the PBS.

Ms Pantzer—We understand that, yes.

Mr LINDSAY—And you saw that in the last budget we tried to do something about that.

Ms Pantzer—Yes, we saw that.

Dr Tennyson—Absolutely.

Mr LINDSAY—I just hope that you understand your role should be out there helping the government, in a way—

Ms Pantzer—As part of the industry, we have put in a submission to the IDC on the PBS. While Australia might not be in crisis now, if you think about the ageing population and the new biotechnology based drugs, then this is an area that needs some long-term policy options. As an industry, we think that there needs to be some sort of broad based community consultation. We would call for a white paper, actually.

Mr LINDSAY—Understanding that this is not about politics—it is about innovation, research and so on—the PBS is not sustainable the way it is going. Do you understand that?

Dr Tennyson—Yes.

Mr LINDSAY—We all need to push the Australian Senate to do something about that—sorry, I will get back to where I should be.

Dr Tennyson—I think you are preaching to the converted.

Prof. Macdonald—What Sara is talking about also has an element of innovation, because I do not think people have actually been thinking innovatively about the PBS model. There are other reimbursement systems around the world which work. You could say that in terms of cost to government they are not as effective as Australia's system but there are some ideas in there. We think about making room in the PBS budget for innovative products. But at the moment it is a very flat pricing structure, that everything on the PBS is reimbursed, once it is reimbursed, at the same level. There might be some choices to be made—for instance, in Italy they have a stratified reimbursement system depending on the urgency of the medical need for the drugs.

CHAIR—I guess there are people out there who are paying several hundred dollars a month for a particular drug and who would be happy to pay \$50 or \$100 a month.

Ms Pantzer—And there is a difference between life-threatening drugs and less essential ones.

Prof. Macdonald—They are not life-threatening drugs; they are life-saving drugs.

Ms Pantzer—Sorry, I meant to say life-saving drugs. I am talking about essential medicines versus comfort medicines.

Mr LINDSAY—And you are the principal policy adviser!

Mr Tennyson—Non-medical adviser!

CHAIR—We have that problem in government too.

Mr Tennyson—The irony about innovation is that it is going to produce more. It is actually going to have a positive health outcomes benefit but there is also going to be a cost driver; so how do we manage that? That is part of the reason that we are here.

CHAIR—I turn now to the research side of things. One of the suggestions we have had in evidence, to help the relationship between industry and universities or research agencies and things like that, is to increase the number of postdocs and have the government and industry each fund half of the cost to have those additional postdoctorates. Do you have a comment on that?

Prof. Macdonald—As you know, there is already an NHMRC scheme called postgraduate industry fellowships and we are actually in the process of writing to all the pro-vice-chancellors for research indicating our interest in participating in that. We are also interested in extending our postgraduate support; it is just a question of finding out exactly where the land lies at the moment. Our loss of postdoctoral researchers has always been catastrophic. They finish a doctorate and, very often, there is nowhere for them to go. So undoubtedly there is a part that

industry can play. We are still understanding the degree of complexity of it and working out what an industry contribution would look like.

The other thing is that, if we had research laboratories in Australia, we ourselves would be employers. We are quite keen to have postdocs work in our laboratories overseas. People have a feeling that a brain drain is occurring here but I do not think that is really the way it would happen. We are talking about onshore postdocs, which we need to build up and support. This is a terrific national resource which, more often than not, goes to waste.

Mr Tennyson—We think about those sorts of roles in terms of business development work: roles negotiating the commercial agreements between companies like Merck Sharp and Dohme and smaller companies or maybe roles like Graham's, which serves as the connection between the R&D community and us.

Mr TICEHURST—Graham, you were saying that in the biotech investment area Australia is rated second lowest in the world, but what about in terms of the success rate in biotechs? Where do we stand there?

Prof. Macdonald—I cannot answer that precisely in terms of how many products are rolling through to production. I do not know what the number is. I do not actually know where we are in terms of international competitiveness. I know that one of our major drugs under clinical trial at the moment is a vaccine that arises from Australia. I know that we are in negotiation with a major Australian company to license a major product from them. Then there is the 'success' of Relenza, the flu treatment. There is the outstanding success of colony stimulating factors, which came from the Walter and Eliza Hall Institute of Medical Research. What I cannot tell you is how that compares in terms of the investment in Australia as against the product per investment overseas.

Mr Tennyson—I did see some data about what is happening in the UK and Germany which suggested that we are more productive than those two countries in terms of the outputs we are getting. That is a positive message, but I do not know of any hard data.

Prof. Macdonald—We did get some interesting statistics, again from the CSES study. We discovered that, per billion dollars of government expenditure on academic research, Australia produces 16.2 start-up companies, which is actually the highest level in the OECD. The figures in Europe and America are about 13.1 to 13.8, which is an interesting observation and suggests to me that we ought to be asking that question in five or six years time to see how this process goes.

Ms Pantzer—The biotech sector is an emerging sector and the venture capital market is much more immature than, say, the US venture capital market. I think you have heard in evidence that this is a cultural difference too. In Australia we risk less, but we do not appreciate failure as much as people appreciate failure overseas. In the US you expect to fail. It is part of how you get success. Here it is not seen that productively.

Mr TICEHURST—Also in your submission you made a comment about the substantial R&D in countries such as the UK, Canada, Italy and, in particular, Singapore. You said that the governments in those countries seem to encourage making all sorts of concessions to companies

to set up. Do you think there is a role for Australia to follow some of those models, particularly the Singapore model?

Ms Pantzer—I would have to say yes, because we want to be a thriving local subsidiary. We have so much in our favour in Australia. We have got a great medical infrastructure, so we run very good clinical trials; we recruit populations; and we have good science. But, in a world where there is a lot of proactive incentive from other governments, we need an incentive to put us on a level playing field. R&D costs here are much lower than in other countries. We have got so much going for us, but it does not stack up against a tax incentive offered by Singapore.

Mr TICEHURST—Are you talking about income tax or are you talking about things like payroll tax?

Ms Pantzer—Different countries offer different things. In Singapore they offer things like income tax holidays and subsidies for staff. They do a whole range of things—whatever is needed to get the companies there. In Ireland there is a corporate tax rate of 10 per cent; that is being phased out, but there are different incentives depending on where an economy is—whether it is a mature economy or an emerging economy.

Prof. Macdonald—One of the points we have not made is that the pharmaceutical industry, as an industry, has a very significant contribution to make to the development of the knowledge economy. We really are technology based in many ways. We are business theory based; everything that makes a knowledge based economy exists in the pharmaceutical industry. Even in a subsidiary like ours, things like IT and manufacturing expertise are all very strong.

Dr Tennyson—But we have to work hard to do it internally. The Australian Industry Group made a point about how hard it is for local management to get that investment from overseas to come here. We have to work very hard to do it. So we need that—what you are describing—because it sends a very clear message. I think the issue for us is that we tend to sometimes send dichotomous messages. Which is it? Is it borderline, is it good, or is it not sure?

Ms Pantzer—That is why something like a new industry development scheme would be so important to us, because it is a way to argue that there is something in Australia that is worth looking at.

CHAIR—Would you agree, though, that some of those so-called government incentives in places like Singapore are perceived to be of much higher benefit than they really are when you get to the bottom line; meaning that the things that we have going for us in Australia that other countries do not have—the quality of our researchers, the actual cost of R&D—do not get considered on an equal basis? Because government incentives can be on the table and easy to see, they probably get greater consideration when a board sitting in New York, Washington or London makes those decisions.

Ms Pantzer—I am sure Pfizer will tell you tomorrow that they did a complete study on this to try to attract some investment from their Singapore plant. The issue is that we do the best sell job that we can on how good the Australian environment is: we tell people that there is low-cost R&D here and we talk about the way that we can recruit patients. The problem is that they are hearing it in a negative way because of the reimbursement environment.

Prof. Macdonald—Mark used the expression ‘tie breakers’. Faced with a lot of what look like balanced choices, boards will ask: ‘What’s the thing that makes the difference?’ In answer to your question about Singapore, a very interesting phenomenon is happening in Singapore that ties in a little with yours in that the Singapore biotechnology centre that has been set up by the government is hoovering up Australian very high-quality postdocs at the most incredible rate. So, in a sense, the postdocs and the intellectual property move around quite freely but the capital stays where it is. You build up quite a complex picture when you think of that.

Ms Pantzer—I was involved in the Pharmaceutical Industry Action Agenda, as part of the industry team, and we conducted a survey of the head offices of global companies, both generic and innovative. The survey looked at what factors influenced the decision to invest in R&D and how Australia scored on those factors. The things that are important for R&D investment are human resources, IP, operational costs, but, most importantly, the pricing reimbursement system. How does Australia rate? We rate great on HR—on the HR resources, the operational costs and the legal infrastructure—but we do not rate so well on the reimbursement of pricing issues. So we have a lot of good things in place.

CHAIR—Do you think Invest Australia has a greater role to play in helping to sell positive messages about Australia?

Prof. Macdonald—I have been dealing with them recently and have been brokering a meeting with the New York people, with our corporate licensing section. The answer is yes, undoubtedly. Although I do not have all the feedback yet, my impression is that the messages are very much centred on Australia’s needs and not really on what might actually draw a pharmaceutical company. Whether that applies across all industries or not, I do not know.

CHAIR—That is criticism.

Prof. Macdonald—We arranged a meeting with our director of corporate licensing, our senior vice-president, who said he thought it was quite productive but that it was much more about a generic investment sell rather than somebody talking about specific aspects of the Australian business scene which would attract a pharmaceutical company. So the answer is yes.

CHAIR—It is basic marketing, isn’t it?

Prof. Macdonald—Yes.

CHAIR—That you should be out there telling those companies what is in it for them rather than what is in it for us.

Prof. Macdonald—We have set up a feedback loop. As we find out what everybody thought of it, we will give some feedback in both directions.

Dr Tennyson—Our view is that that is very important. The clarity and purposefulness of the message that we give when we go to our headquarters to seek investment is really important. But it still comes down to what are perceived to be reasons why not, and we have to deal with them. It is not so much about the reimbursement of pricing; it is more about access to a viable market and whether that is certain. That is the piece that plays out. But a clear, purposeful message would be useful.

Mr LINDSAY—Let me start off with what might be an unkind question.

Dr Tennyson—Right: Graham.

Ms Pantzer—We like those.

Prof. Macdonald—I am the unkind question person.

Mr LINDSAY—In relation to this reimbursement of pricing issue, if you left us with the wrong impression, we would be sitting here thinking that you are appearing here to try and up what you get from the PBS. I know that you are not here for that reason. If you develop some IP in Australia, why do you not then make that product in Australia, export it as other companies in your line of work do and recover your costs from sales overseas?

Dr Tennyson—Do you mean develop an Australian molecule within the local organisation and commercialise it globally from Australia?

Mr LINDSAY—Yes—actually make it in Australia and export it to the world.

Prof. Macdonald—I think the answer is that there is not just the capital. Remember that I said that what we bring to the table are these other expertises in regulatory affairs, commercialisation and things like toxicology—there are no toxicology laboratories in Australia—and doing proof of concept studies. We have very limited capacity for that in Australia.

Mr LINDSAY—Do you agree that other pharmaceutical companies make product here and send it elsewhere in the world?

Dr Tennyson—We do that too.

Prof. Macdonald—Do you mean develop it from the molecule through? I think Relenza is the only one I know of where that has occurred. The colony stimulating factors were a spotty development, as I understand it—a lot of that was done overseas. In fact most of the products come from overseas.

Ms Panzer—I think the issue for Australian companies developing IP is that if they get it on the market here they also suffer the same low prices that we do as a multinational company. The issue is around reward for innovation. That is what the pricing message is.

Mr LINDSAY—We have had evidence already in this inquiry from small Australian companies saying that, unless you develop for the global market, give it away. They recognise the Australian market is too small and you may not be able to get the prices. But they do it and they do it successfully, so you should be able to do it successfully.

Ms Panzer—The company does do it successfully but the head office is in New Jersey.

Dr Tennyson—It is just not going to happen.

Prof. Macdonald—I think we have to consider where we are in the history of this development. We do not have a company in Australia that is big enough to produce a pharmaceutical product, but if you look at companies in America which are twenty years ahead of us like Genentec, Biogen or Amgen you see that they started off as biotechnology companies and made themselves into pharmaceutical companies just by developing successful products for the market. I think inevitably that is what is going to happen in the Australian biotechnology industry. I suppose what you are asking us is: 'Is our role to capitalise Australian companies that do that work?' I think I have sort of answered that already. It is the local expertises that are lacking.

Mr LINDSAY—So this is why you are only spending \$8 million on R&D annually when your global budget is \$2.8 billion?

Prof. Macdonald—That is up to now. As a company worldwide we are looking much more robustly at external licensing and we are certainly looking at at least one major licensing opportunity in Australia now which will be quite considerable and many times that investment level. There are a couple of others backed up behind it that have potential.

Dr Tennyson—We actually think there is an opportunity for us now. The two to three per cent of turnover here, the \$8 million, was fairly standard for the last 10 years. I know it does not compare favourably to global spending. It does not compare favourably to specific competitor countries like Canada and others. It is a bit of a starting point in many ways for us. It actually speaks to this difficulty of the innovation industry group. The point they made was that it is very hard to get that sort of investment. The Factor f scheme took us in manufacturing from a couple of million dollars for export to now nearly \$500 million 13 years later. That is what we want to do.

Ms Pantzer—There are some features of our industry as well that make us different from the environment, agriculture or biotechnology industries. We are talking about the biomedical industry where you have to have a global approach, because you do have to run worldwide clinical trials in order to get FDA approval for the drug. We bring to this the perspective of a global company and the role that the local subsidiary could play in helping Australian companies achieve that globalisation.

Prof. Macdonald—I had forgotten to say that at the moment we are in a phase III study of a vaccine for human papilloma virus, which has been licensed through CSL. We believe this will create a huge income stream of which CSL will get very substantial royalties. At the end of the day, I think that is the sort of thing that will springboard a company like CSL, which will give them the cash flow to look seriously at this. As you know, they have a quite an impressive line of pipeline products.

Dr Tennyson—That relationship with CSL I think came out of the original one.

Mr LINDSAY—How does that \$8 million on \$2.8 billion compare with other companies in your field?

Ms Pantzer—The Australian industry generally spends a lesser amount on R&D than the global industry.

Mr LINDSAY—The ratio of Australian expenditure to world expenditure by Merck might be similar to Pfizer or SmithKline?

Dr Tennyson—It is similar.

Ms Pantzer—Yes.

Prof. Macdonald—I think Glaxo might be a bit ahead of us because they have a major phase I clinical institute in Sydney, but most of them are similar to our expenditure level.

Mr LINDSAY—Easy questions now. In your opening statement, you mentioned 10 PhD fellowships with the ARC. What are the arrangements for managing those? What are the arrangements for the IP that is produced?

Prof. Macdonald—I cannot answer the second part of that, although, if I remember rightly, the ARC rules are that the IP resides with the investigator.

Mr LINDSAY—So you give the money over with nothing in return? Is that what happens?

Prof. Macdonald—Oh no. Let me start at the beginning. The ARC has a scheme called the industry linkage program and grants called APA, Australian Postgraduates Award—Industrial. They involve the ARC supporting that PhD student. It goes through the normal ARC selection process, and that university or institute is invited to form a linkage with an industrial partner, and together the two submit that application. The deal is that the industry partner contributes \$10,000—\$5,000 in cash and \$5,000 in cash or in kind. I am pretty sure that the ARC rules are that the IP resides with the investigator.

The advantage from our point of view is that we have relationships with investigators; we are looking to be the partner of first choice with biotechnology companies and institutes. The other thing is that we are quite keen that people consider industrial research as a career. People say, ‘Aren’t you encouraging brain drain?’ My answer is that the brain drain is almost invariably going to be temporary. Between us all what we are doing is building up a cadre of Australian researchers who have experience in industrial research. Our head of external scientific assessment was out here last year and identified the lack of medicinal chemistry in Australia as a significant limiting factor. In fact, the biotechnology forum presented this point of view.

We are looking to make people competent and experienced in industrial research and to reimport them. To set that up, we need those sorts of relationships with the relevant people. We plan to have seminars where these people will talk about their research. We are talking to the NHMRC about some similar piggybacking system that we could do with NHMRC fellows. The pay-off is that we establish the relationships, we potentially recruit people and, of course, some day the people in those situations will turn around with some intellectual property and say, ‘We have this relationship with Merck; let’s ask them if they are interested.’

Mr LINDSAY—Thinking of that with a view to looking at something this committee might be able to recommend, you said that you would like to be the partner of first choice with these sorts of people, and I guess you would like that to be on a more formal basis in the relationships you have directly into universities. Should we be recommending that, in relation to IP, there should be a different regime in this country about how business and science work together so

that you can actually lawfully get access to that IP on some basis? This is a minefield, but you know what I am talking about.

Prof. Macdonald—Yes.

Mr LINDSAY—I understand that currently it is very difficult. What should we be recommending?

Prof. Macdonald—I think the difficulties arise from different companies, different ideas and different expectations about IP. It is almost global practice to ask for rights of first refusal, but I am not sure that we would regard \$10,000 for a PhD scholarship as giving us any rights of first refusal. That would really come out of a significant licensing effort—or out of one of the things that we do as part of our work, which is that we look for research workers, usually in research institutes, who need a bit of a help to get to investment readiness. There is this idea of ‘investment readiness’. Although I thought that we could not make a significant contribution, it turns out that we can on occasions. If we were to help someone over that barrier, we would think that that was a ‘right of refusal’ issue.

Mr LINDSAY—Do you think your company would invest more if it had a more secure legal framework where you knew that you would get the benefits of your investment?

Prof. Macdonald—I am really not sure about that, but I think the answer is probably that that is not a tie breaker for us. There is a world competition handbook, and the last one—two years ago—showed that Australia was the fourth-best country in the world in terms of its IP protection. I think that gives us an element of security about IP.

Ms Pantzer—In pharmaceuticals, we have a strong IP regime. We are as competitive as the UK and Europe on the IP issue. For us, the issues around IP are to do with the pricing system on one side and the R&D tax concession on the other.

Mr LINDSAY—In your evidence, you talked about ‘clusters of innovation’ and ‘sites of excellence’ and you mentioned clusters like Silicon Valley and the research triangle. Do you think that could ever happen in Australia and, if so, under what circumstances?

Prof. Macdonald—I think that there is a conscious effort by state governments to build these biotechnology hubs, which are a smallish scale approximation of things like Research Triangle Park. There is a little bit of unreality in Australia. We have a total population of 19 million and I really doubt very much that we can support three separate biohubs in New South Wales alone.

Mr LINDSAY—Whose fault is it that there are three? Perhaps ‘fault’ is the wrong word.

Prof. Macdonald—I have my personal views. There are different cultures in different states. For instance, Queensland and Victoria are moving towards a much stronger coalescence within a limited number of sites. New South Wales has had a tradition of more competition in these things and the way people are thinking is more competitive, whereas I think our view and the view of the studies that we have done is that we should be looking for linkages. Maybe we can support a major centre in each state. Queensland and Victoria are being set up with strong linkages between the states. They are talking to one another. There is a lot of complementarity. You could almost look at Victoria and Queensland as a large, dispersed hub. It has a lot to do

with the research cultures and people's failure to form linkages, which we see as absolutely vital in these things.

Ms Pantzer—There is a sort of cultural thing in Australia as well about academia being a bit reluctant to work with industry. There is not the same culture as in the States, where people move between industry and academia much more flexibly than they do here.

Dr Tennyson—I think that somehow we have to be one cluster nationally. We also have to be virtually part of a bigger cluster than that and organically virtually connected into some of the American and regional clusters. That is about linkages.

Mr LINDSAY—Having a model of Australia as a single cluster means that the regional areas of Australia can be just as much involved as the capital cities—is that so?

Prof. Macdonald—Yes, that would be so.

Mr LINDSAY—That is a good recommendation. I am going to stop there, Mr Chairman—as a regional member!

Prof. Macdonald—I think you have to capitalise on the strengths and you cannot assume that they are in any one place; you have to look and see where they really are.

CHAIR—To some extent that culture has grown out of what has occurred in our universities in years gone by when they tried to offer everything to everybody in each university, which for a country the size of Australia was crazy.

Prof. Macdonald—And, relative to other countries, our research expenditure through universities has been very low.

CHAIR—Have you got any suggestions about how we can improve movement between universities and industry? There are certainly barriers there. Are there things that government could do to improve that?

Prof. Macdonald—There may well be financial incentives for universities to have closer ties with industry. I have a picture in my mind that in Sweden the ties are intimate. I know that in the cardiovascular division of Astra Hassle one of their chiefs of research has been a senior member of the department of physiology at the University of Goteborg, and this is one of the world's premier departments. So you can make these things work if people are not self-conscious and do not have moral baggage about working between them. It has benefits in both directions. The difficulty—and I tried to do something like this in Sydney many years ago—is that we have many pharmaceutical companies and three medical schools in the state, whereas at Goteborg they have one pharmaceutical company and one medical school. But it should still be possible. Part of it is attitudinal. I do not know how much is financial. But, again, it is the sort of thing where a good investment environment would encourage industry to form these links. In a way I am an embodiment of that sort of link: I still have a chair at the University of New South Wales although I am a full-time Merck employee.

CHAIR—I guess in an ideal world you would want to be able to have somebody like that who has come out of a university and might spend four or five years in industry but possibly to go back to university without any reduction in—

Prof. Macdonald—Without any compromise of their seniority or academic standing.

CHAIR—Yes.

Prof. Macdonald—You could look at it as a sort of part-time job, you could look at it as a period in, period out—there are probably quite a lot of models that one could look at. Some if it is already happening, in that spin-off companies from academic institutes are formed with academic heads who are the heads of departments—say, biochemistry—in a university but also the CEOs of the spin-off companies. I think that is natural; it is going to happen because we are encouraging it. I would like to see, and I think there is a lot to be said for, a more intimate relationship between the larger pharmaceutical companies and universities.

CHAIR—Are issues like superannuation relevant?

Prof. Macdonald—Yes, but they are manageable.

CHAIR—They are manageable?

Prof. Macdonald—I would think so, yes.

Ms Pantzer—It is the other way as well: it is not just placing university people going into industries, it is also placing industry people into universities as visiting professors or whatever. It is both ways.

Dr Tennyson—As a company globally we encourage this sort of thing. We have had exchanges with the World Bank—those sorts of exchanges. We have not done it locally—the environment has not been conducive. There is a stigma thing still playing out in Australia.

Prof. Macdonald—It is probably worth while for me to tell you what we do in the States. We have a system called academic programs, with a budget of something like \$120 million—although I would have to look that up to get it absolutely right—which supports PhD students, funds research grants at arm's length through independent funding bodies and runs things like summer vacation scholarships for school and university students, career scholarships, career guidance and also seminars where people who are doing their PhDs can present to us. In return, the heads of our research divisions will go and give seminars in the research institutes and universities. So the potential for very intimate involvement is there.

What we do not have is a research laboratory in Australia. But, as Sara says, you do not actually have to have a research laboratory. We are doing other things that I think could be important learnings for a biotechnology company or an institute. We can contribute things like intellectual property management and so on and we can talk about commercialisation. So there are potentials, even if we do not change anything about the company. There is the potential for much more intimate engagement, which would be mutually beneficial.

Dr Tennyson—In the US, Graham's background is the norm. The senior research positions in Australia are a bit of an exception.

CHAIR—Do you think there is a tall poppy problem there? We suffer from this in Australia in a variety of ways. When people leave academia and go into high-flying industry, do others say, 'You are off into the corporate world, so you do not belong back here,' or vice versa, where people leave industry and go into academia, do others say, 'You're going into the airy-fairy world, so you do not belong back here'? Is there still a bit of that about?

Prof. Macdonald—It is a very interesting theory. I think my problem was that I was almost at retirement age when I took this job, so going back to academia really is not an option. But, had he lived, my predecessor—I am the second senior academic to have this job—may well have gone back to university after another couple of years. He could have easily occupied an academic position. Looking at a succession plan, there are all sorts of options, but one of them is that we actually look in a focused way at somebody like me coming in maybe part-time and doing the sort of part-time academic research-trawling position that I have. It is certainly a very live option as far as we are concerned.

There is one other academic, Debbie Saltman, who works in the industry. She is a medical director of Wyeth and a professor of general practice at Sydney University. I do know that there are other very outstanding academics who would think seriously about the idea of working in the industry. On your original question, I am not sure about what the government might do to encourage that. But I think it needs a bit of a climate change. Maybe something could be set up where people could give it a try for two or three years and then drop back into academia. That would be the strongest message that could be sent.

CHAIR—I think we have covered all of our questions. Thank you for your submission and your evidence.

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

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 4.43 p.m.