
COMMONWEALTH OF AUSTRALIA

# Official Committee Hansard

# HOUSE OF REPRESENTATIVES

## STANDING COMMITTEE ON SCIENCE AND INNOVATION

**Reference: Business commitment to research and development in Australia**

MONDAY, 2 DECEMBER 2002

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**HOUSE OF REPRESENTATIVES**

**STANDING COMMITTEE ON SCIENCE AND INNOVATION**

**Monday, 2 December 2002**

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

**Members in attendance:** Ms Corcoran, Mr Evans, Mr Forrest, Mr Hatton, Mr Lindsay, Mr Nairn and Mr Tony Smith

**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 9.05 a.m.**

**BANFIELD, Mr Donald Ernest, Executive Manager, Rural Policy and Innovation, Department of Agriculture, Fisheries and Forestry—Australia**

**CATTANACH, Mr Gavan James, Manager, Research and Development Corporation Policy and Portfolio Agencies, Rural and Innovation, Department of Agriculture, Fisheries and Forestry—Australia**

**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 and welcome the representatives from the Department of Agriculture, Fisheries and Forestry. I point out that, whilst this committee is not swearing witnesses, the proceedings here today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. Misleading 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. Would you like to make an opening statement before we proceed to questions?

**Mr Banfield**—Yes, I would, Mr Chairman. Firstly, thank you for giving us the opportunity of appearing before the committee and making some brief opening remarks. I would like to explain briefly how the partnership between government and the rural industries has successfully harnessed research and development to improve the international competitiveness and sustainability of our rural sector.

The Commonwealth government's commitment to rural research and development started more than 50 years ago and now represents one of the longest standing and most successful innovation programs. As you would be aware, Australia's rural sector is distinctly different from the other business sectors in the economy. There are many producers with very different scales of operation who operate in diverse environments that present unique challenges. Declining terms of trade and the strong export orientation of the sector means a strong commitment to innovation is required in order to remain viable and maintain the sector's international competitiveness. Similarly, the need to meet the environmental challenges means innovation also underpins its efforts to produce on a sustainable basis.

The government's support for rural research and development relates to a market failure and difficulty in organising the many rural producers to fund and pursue research and development. If not addressed, this market failure could lead to significant underinvestment in research and development. The other major consideration is the need to fund research and development that addresses national needs and priorities and delivers public goods and benefits such as those related to improved natural resource management, regional development and general management of the nation's food supply. Here it is accepted that the broader public and the industry have a strong shared interest in addressing those needs and priorities and a partnership is the most effective and efficient way of doing so.

For Australia's rural industries, research and development corporations and companies are the major R&D delivery system. At the core of this partnership is the matching funding arrangement, where the government matches industry's research and development contributions on a dollar for dollar basis up to 0.5 per cent of the industry's gross value of production. I

should make the point here that the research and development corporations and companies are the funders of research and development. They do not undertake research themselves but, rather, commission this through R&D providers.

The great bulk of the industry contributions are collected via a statutory levy or charge that is usually imposed at the first point of sale. Producers have been willing to pay the statutory levy and, in some instances, have paid beyond the limit of the Commonwealth's matching payments. Government support provides a solid foundation for rural industries to maintain or increase their level of research and development funding as they grow and develop. Overall, rural research and development income and expenditure have increased steadily since 1984-85. Between 1984-85 and 2001-02, the overall expenditure on rural R&D through the research and development corporations and companies has increased from $63 million to $391 million.

The key elements of the partnership are the independent board that is charged with taking a strategic approach to rural R&D, a national and integrated approach to R&D priority setting, strong involvement of industry throughout the whole process, the broad scope of rural research activities that may be funded, a strong focus on outcomes and a dual accountability to both industry and the Commonwealth.

Research and development corporations and companies have delivered significant benefits to their industries. Research, development and adoption have underpinned some major successes for the rural industry, such as the export achievements of the wine industry and the development of the canola industry and aquaculture. There are many success stories across all the industries and we consider that one of the major indicators of the research and development corporations' and companies' success is that producers continue to be happy to pay the levy, because they can see the benefits from their investment.

In closing, we have brought along with us copies of the 2001 edition of the book *Innovating Rural Australia*, which highlights the successes of the research and development corporations, and we would be happy to make that available. I should note also that the 2002 edition will be available shortly and is expected to be tabled early in the new year.

**CHAIR**—Thank you, Mr Banfield, and thank you for this document. If next year's edition is tabled early in the new year, we will get a copy of that as well as part of our deliberations before we finalise the report.

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

That the document entitled *Innovating Rural Australia: Research and Development Corporation Outcomes 2001*, presented by the witnesses today, be received as evidence to the committee's inquiry into business commitment to research and development in Australia and be incorporated into the committee's records as exhibit No. 28.

**CHAIR**—The way in which the RDCs work has been an excellent model for rural industries. The committee was interested in looking at that model to see whether there are any opportunities to adopt a similar sort of model in other areas. We are finding that one of the failings in R&D investment is in the smaller medium sized enterprises. It is often very difficult for a small company, on its own, to have an R&D budget as such. Often they are just small businesses putting something into a pool and it is working quite well. Could the model be used elsewhere? I know I am asking you to look outside your particular area of expertise, but would you like to comment on that?

**Mr Banfield**—We believe that the R&D model, as you indicated, works very well for the rural sector. I am not really the appropriate person to comment on whether it would work as well in other sectors of the economy. The only point I would make is that the R&D model in the rural sector works at an industry level. The issues are addressed at an industry level and I think there is much less commercial competition in terms of some of the outcomes of that research. It is generally undertaken at an industry level.

**Mr MARTYN EVANS**—We are competitive—

**Mr Banfield**—Yes, that is a fair comment.

**CHAIR**—That is the key. If it were to work elsewhere, it would have to be in a situation where you could do a similar thing; it would have to be in a particular market. Farmers are competitors; it is not as though they are not competitors. So it would have to work in a similar sort of fashion.

**Mr Banfield**—Yes. That would be my assessment.

**CHAIR**—I notice that a reasonable amount of the expenditure of the RDC is through the CSIRO, either directly or indirectly—15 per cent directly with the CSIRO and another 15 per cent indirectly as part of CRCs. How do you think that relationship with the CSIRO is working? Do you think there is anything that could work better in that sense? How is the rest of the funding split up between universities, private research agencies et cetera?

**Mr Banfield**—I will pass to Mr Cattanach for some of the detail, but I just have a couple of comments. Under the model, as I indicated, the Commonwealth matches dollar for dollar expenditure or investment by industries. The allocation of that funding is largely left to independent expertise based boards which are appointed to manage the investments. We do not, as a government, have a guiding role in terms of indicating proportions of expenditure between different R&D providers. We match the funding; we have expertise based boards. They assess the priorities and the needs of their particular industries and then they commission research on the basis of those priorities and needs. Mr Cattanach might have some more detail.

**Mr Cattanach**—Unfortunately, I do not have the detailed break-up of expenditure; I thought I did. We have noticed over the years that the funding proportion that CSIRO have got has gone down. It is not directly going to the CSIRO; it is now going through CRCs and other things. In part it reflects the competitive nature of the RDCs and the fact that they are looking for the best science for their industries.

**CHAIR**—What about the relationship with the CSIRO?

**Mr Cattanach**—It is a good, healthy relationship. There are good commercial tensions because the RDCs are going out looking for the best science. That means that on occasions the CSIRO is not successful. It helps get the best science for the industries. The industry involvement in the priority setting for their industries means that the RDCs are looking for the best to meet the needs of their industry.

**CHAIR**—Does intellectual property stay with the RDCs? If you contract work out to CSIRO or you do something jointly, what is the normal situation with respect to IP?

**Mr Cattanach**—There is not a normal situation. It really depends on the individual contract that is let for the particular piece of research. That really depends on who the funding partners are and what their proportions are. In the end, from the RDCs' point of view, the most important thing is to get the research adopted. They look at it from the point of view of how best to get it adopted, rather than necessarily capturing the IP. If they thought it was best to leave it with the researcher or the CSIRO to get it adopted, they would put a contract in place to achieve that. But if they thought it was best for them to achieve it through some sort of other commercial arrangement, they would fight hard to ensure they had the IP.

**CHAIR**—You said you did not have the figures for the rest of the expenditure. Just in general terms, would the bulk of that be going to universities?

**Mr Cattanach**—Broken up between the universities and state governments. A lot of the state agriculture departments still have quite extensive research and development facilities.

**CHAIR**—Could we get that information at some stage?

**Mr Cattanach**—Yes.

**Mr MARTYN EVANS**—Are there many examples of spin-off companies from R&D in the RDC area? I would have thought that the research they generated would have resulted in a fair few commercialisable ideas. Have any of those ended up in notable spin-off companies as such that have commercialised a particular product or idea? Are you aware of any?

**Mr Cattanach**—There have been a few and increasingly it is a way of getting adoption. It is fair to say that the RDC model is an evolutionary one. Mr Banfield talked about the generic nature of the research. There was a feeling at the beginning that, because it was public funds commissioning the research, you should make the research results publicly available. Increasingly the RDCs are getting a bit more sophisticated, believing that is not necessarily the best way to get adoption. A number of them are going down the commercial path of spin-off companies. The Grains Research and Development Corporation has undertaken a couple and I am sure the Dairy Research and Development Corporation has also taken that route for a couple of their projects.

**Mr MARTYN EVANS**—Given that all of the stakeholders contribute through the levies towards the work of the corporations and then the research is farmed out and comes back in, how do they ensure that all of the people who have contributed through their small levy contributions then benefit from that research? If you undertake this research on such a wide base of consumers and contributors, how do you then ensure research into an improved pasture technique for dairy cows, an improved milking technique in the dairy or a grain breeding technique for the seed stock? What are general mechanisms they use to get that back out in such a broad range of stakeholders? Obviously if people are still willing to contribute on such a wide scale, which is certainly true and which is fantastic credit to them, what are the mechanisms they have used to get that research out to the farms?

**Mr Cattanach**—There is a great variety of mechanisms. To pick up on your first point, in the independent industry orientation of the boards and the RDCs it is very important that they look at projects and determine how best to get that adopted. That is the reason they go into the research. The way they manage the results or the adoption is how best to make it available to

the individual producers. In some cases it introduces a tension because if you were to commercialise, for instance, seed product, then the farmers would have to pay a premium for that seed. If it is the only way of making it available to the individual producers, the RDCs wear that flak.

**Mr MARTYN EVANS**—But presumably they get a royalty back from the people who commercialise the seed, which would then provide new funds for research which would not have to be funded by the levy.

**Mr Cattanach**—Exactly. There are many ways for the corporations to get the results out. Commercialisation is one way. They do use the funds to increase the results of the commercialisation to fund more research. It is to the industry's benefit.

**Mr Banfield**—It might be worth making the point through you, Mr Chair, that RDCs have very active communication programs. They are very conscious of their accountability to producers and they consult with them extensively in the development of research priorities and the general directions of research. As a general comment, they are very good at communicating the results of the research back to industries. They have quite sophisticated and grassroots research communication strategies in place.

**Mr MARTYN EVANS**—I have to disappear for about 15 minutes and you may or may not be here when I return. That is why I begged the indulgence of my colleagues to ask a couple of priority questions about matters that I was very interested in. Thank you very much.

**Ms CORCORAN**—You have partly answered the question I want to raise, which is to do with the fact that producers are all putting money into research. Who decides what research is to be done and how does that process work? I also want to test with you the acceptance of producers of the levy. I gather from what you have said in answer to other questions that it is pretty well accepted.

**Mr Banfield**—I will answer that at the broader level and Mr Cattanach might have some other comments. In terms of the direction of the research, RDCs are required under the legislation to prepare three- or five-year strategic plans and annual operating plans. That is overlaid by a request from the government to take into account certain broad national strategic priorities—for example, measures to improve natural resource management and to improve food safety. The government priorities are at a very broad level. They are factored into the strategic plans and the annual operating plans.

In terms of the development of those plans, there is an extensive consultation process with industry. In the model that has been established, there are industry representative bodies. They are consulted on the development of those priorities and eventually the board of the corporation will put the proposed strategic plan and annual operating plan to the minister—in this case the parliamentary secretary—for endorsement, following that consultative process.

**Mr Cattanach**—The corporations have to report back to the representative bodies at the end of the financial year to say what has been done. It is to their AGM, so it is not just a report; it is talking to the peak bodies.

**Ms CORCORAN**—I take it that this evolves in several different directions at once and is developed into a plan. Is it developed at board level and then taken back to the farmer, the producer, to be consulted? If Joe Blow wants some work done in a particular area, does he have a way of feeding that request through the system?

**Mr Cattanach**—Ultimately the board make a decision. They can have input from individual producers and from the representative organisations. I would have thought that the normal way would be for the individual producers to go through their peak body.

**Ms CORCORAN**—I may be using the wrong terms. I am trying to get a feel for how involved individuals can be, if they choose to be, and how easy it would be for them to get their requests through.

**Mr Cattanach**—The R&D that we are doing is industry-wide, rather than a specific problem on a particular farm or with particular individuals. If the individual went to the peak body with a similar problem to that of a lot of other producers, then it is likely to be pushed by the representative organisation and factored in by the board of the corporation, rather than if an individual said, 'I've got this problem in my back paddock. Can you help me?'

**Ms CORCORAN**—There is a track there.

**Mr Cattanach**—It is unlikely that that sort of research would be funded.

**Ms CORCORAN**—Do you have a feel for what individuals think about the whole program?

**Mr Banfield**—What they think of the program?

**Ms CORCORAN**—Yes. Are they happy to pay the levy?

**Mr Banfield**—It is certainly not the case that 100 per cent of producers are 100 per cent happy. You will always have a group of producers who, for whatever reason, are not happy. The feedback we have had is that the overwhelming majority of producers, across a range of sectors in agriculture, fisheries and forestry, are happy with the model. They are very happy at the degree of ownership they have and are actively involved in the establishment of the priorities and those sorts of things. We have had very positive feedback on how the model is operating. In fact, there have been very few complaints.

**CHAIR**—To come back to the funding, the Commonwealth's contribution is dollar for dollar up to 0.5 of one per cent of the industry's gross value of production. How close are we to that in the most recent results?

**Mr Cattanach**—It is done on an industry by industry basis, so there are industries that are contributing significantly more than that. The wool industry is two per cent; the grains industry is at about one per cent; dairies are at about 0.5 per cent; and some of the smaller industries are a little below that. I do not have the figures for all of them but I can get them for the committee, if you want them.

**CHAIR**—I am interested in the overall figures. When you look at the graph, it is the sort of graph we would love to see in just about every industry—a good, even rise in R&D investment. If that was happening right across the board, we would be doing extremely well. We are looking at a total expenditure of about $360 million. Is that right?

**Mr Cattanach**—It is now up to $391 million.

**CHAIR**—How does that sit with the gross value of production across all of those industries? Do you know?

**Mr Cattanach**—No. I do not think we have done that figure, but we could do it, if you like. It is done on an industry by industry basis.

**CHAIR**—Yes, I appreciate that. I am just wondering how close we might be to reaching the maximum.

**Mr Cattanach**—We are with most of the industries.

**CHAIR**—Across the board we are probably pretty close to it.

**Ms CORCORAN**—I notice that a lot of the R&D benefits go back to the industry itself but a lot do not. They spill over into the broader community. Is that an impediment to the research program? Is there a level of resentment that, 'We're putting our money in but the benefits are going elsewhere'?

**Mr Banfield**—Part of the rationalisation for the Commonwealth contributing half of the dollars in agriculture is for essentially two reasons. There is a market failure argument that individual producers, if left to fund research and development themselves, would not do it because as a general rule they are too small to undertake the research on a scale that is required. The other reason is, quite clearly, that there needs to be some public good benefits for the wider community in terms of the research that is undertaken. Quite a lot of the research—things like natural resource management, food safety and those sorts of issues—is of benefit to the wider community. We have not detected any resentment of that requirement, if you like. Indeed, in many senses the kinds of public good objectives are not too dissimilar from some of the industry objectives as well. It is quite a good marriage between the two.

**Ms CORCORAN**—My other questions is unrelated to that. You have noted that there are a lot of environmental projects that have had really good results. I am wondering if there is a key common factor in all of those which has led to that position. Do you want to take it on notice?

**CHAIR**—You said in answer to a question to Mr Evans that some of the royalties being earned by the R&D corporations on commercialisation of particular research is then put back into research. Is that included in the industry's contribution in the figures that we have? Is that money that then becomes part of the industry contribution or is that separate expenditure?

**Mr Cattanach**—That is separate. It is what we call the other money, which is income on the reserves and royalties.

**CHAIR**—That presumably would be kept industry specific, obviously. The royalty would come back to the individual RDC.

**Mr Cattanach**—Yes.

**CHAIR**—That would then be reinvested—

**Mr Cattanach**—In their industry.

**CHAIR**—in research for that particular sector. Is it significant?

**Mr Cattanach**—It varies across the corporations—I think grains and dairy are the two that spring to my mind—but it is not a significant amount of their revenue. I would have to give you the figures on notice.

**CHAIR**—When there is research done, say, with CSIRO or one of the state governments—it does not matter which—which results in a spin-off company setting up, seeing an opportunity to commercialise a particular aspect of this, do the RDCs generally speaking have a shareholding in that and maintain a shareholding, or is it something that the RDCs really do not want to continue being part of?

**Mr Cattanach**—It really depends on how the individual board view the investment, whether they believe there is benefit to their industry in being a continuing shareholder in it and whether they have the expertise to continue that involvement. It is really on a case by case basis. It is for the individual boards to decide what is in the best interests of their industry.

**CHAIR**—Can you give us any examples of where they remain shareholders in what are effectively private companies.

**Mr Cattanach**—The one that springs to mind for me is GroPep which the Dairy Research and Development Corporation has been involved in. I cannot recall the details, but they have a joint venture going that developed this particular company.

**CHAIR**—What does that company do?

**Mr Cattanach**—There was some health by-product of the milk process and they have been able to develop that in collaboration with some other entities. I cannot recall the details, but I do know that the Dairy Research and Development Corporation is still involved in that.

**Mr Banfield**—It might be worth making the point that the kinds of issues you are raising are also in the minds of the RDCs at the present time. In fact, back in September we had an intellectual property forum and as the corporations are maturing, these kinds of issues are becoming increasingly relevant and we are doing some work with them in terms of how to manage further development and adoption of research.

**CHAIR**—That is why I asked the questions earlier on about the intellectual property and the ownership. That whole issue, in many cases, gives an opportunity to provide an income stream that maybe has not been pursued in the past, to maximise the amount that can be ultimately

redirected back into further research and subsequently take a little bit of pressure off individual producers.

**Mr Cattanach**—I do not disagree, but I think the line that our parliamentary secretary, Senator Troeth, has been pushing with the RDCs is that it is adoption first and foremost, then commercialisation. The royalty revenues is not a distant second, but that is not the primary thing; adoption is the most important one.

**CHAIR**—I understand that and I do not disagree. But as they continue what I think is a successful program, there is certainly some potential there.

**Mr HATTON**—You have indicated in the submission that you are relatively happy with the model, as it has developed over time, for the research and development corporations. Do you see any need for basic structural change or opportunities where the model could be advanced significantly?

**Mr Banfield**—The model, I think it is fair to say, has evolved to an extent. As you indicated, we are happy that it is working well. It has evolved since it was introduced back in 1989. At the time the research and development corporations had no other function. There was a clear separation between some of the marketing issues that industries undertake and research and development. With the passage of time a number of industries have moved to bring together again some of their marketing functions and research and development.

For example, Australian Pork Ltd, Meat and Livestock Australia, Australian Wool Innovation Ltd et cetera, have moved to bring some of those functions back. That is working well. We have clear Chinese walls to ensure that some of the marketing activities are treated and considered separately from the R&D, where there are clear accountabilities back to government. Those arrangements are currently working well. There has been a move, as you may be aware, to set it up rather than have it done through statutory authorities. Australian Pork Ltd and Australian Wool Innovation Ltd are Corporations Law companies with dual responsibility to government and industry.

The model is continuing to evolve, but if you ask me whether we see fundamental changes to the core underpinning of the R&D model, I think the answer to that is no, not at this stage. We and government are happy that it is working well and those in industry are happy that it is working well.

**Mr HATTON**—Would you see any effective way in which you could utilise this model in other areas of industry for small and medium business? We do not have linkages now across the manufacturing area—there is in the agricultural area, which is what you have—but could you see that model being transferred there and a levy across the industry? I do not think we have much in the way of interoperability at all across manufacturing.

**Mr Banfield**—The chair actually asked that question at the start of the hearing and I indicated at the time that we were probably not the appropriate people to ask about that because our focus is agriculture. I did make the point that one of the reasons why we think our model has worked well—and it would be a factor that would need to be taken into account—is that our research is done on an industry-wide basis and effectively at the precompetitive research level. That would be an issue that would need to be taken into account in extending the model to the

manufacturing sector to ensure that it was done at a level where the commercial competition between particular firms was not an issue.

**Mr HATTON**—But it would be your experience from the grumbling and complaint at the start of the process that a levy would be put on, and a lot of people would not have seen much point or purpose in it, that has been overridden over time by the success of what has been produced.

**Mr Banfield**—It is an important point you raise. The government, to my knowledge, and certainly not in recent years, has never imposed a levy on industries. We act as the agent of industry, in a sense. The government has always said that it is happy to facilitate a levy but on the clear understanding that the vast bulk of the industry wants that to be done. There have been a couple of instances where that has not been the case and the government has not proceeded with levy arrangements. It is very much with the government acting at the request of industry to impose a levy rather than the government saying, 'This levy will be good for you, believe us,' and imposing it. It has not happened that way.

**Mr HATTON**—But the government has been a proselytiser in those terms, saying to primary business, 'It would be good for you to actually do this, and we are willing to come to the party.' So the grower organisations and those other organisations which have had to make the fundamental decision have had encouragement to do it.

**Mr Banfield**—Yes. We are strong supporters of the model but the request to impose levies comes from industry itself.

**CHAIR**—Was it the honey industry or another of the industries only in the last 12 months which very proactively came to government and said, 'We want to do this'? I recall some discussion about it at the time. It was a very strong representation. I just cannot recall which particular industry it was where a levy was introduced for the first time recently. It came as very strong representations from the industry itself.

You have some figures on benefit cost analysis for each year. Is it more statistical anomalies than anything else that had such a range? In 1995-96, an average BCA of 10; 1996-97, up to 39; 1997-98, 35; and then back to 13 in 1998-99. I notice the ranges are very large and that is only an average, but it is still quite a marked difference. I also notice that the number of projects is a lot lower for those years where the average BCA was a lot higher. Is there something in there that occurred that would help explain such a variation?

**Mr Cattanach**—No, Chair. I think the problem with BCAs for research and development is that it is very difficult to do. You have to make a range of assumptions. Realistically it is a long lead time from the time the research is done to adoption or to benefit to the industry. The earlier you do the analysis, the more assumptions you have to put into it and I suppose the more rubbery the figures are. The other factor is that there is a huge range of projects across all of the RDCs. Different consultants are using different methodologies to undertake these BCAs.

We have been working with the corporations to improve it so we get better information coming out, but it still comes down to what assumptions are used and the methodology that had been used. We have been working with the R&D corporations to use the triple bottom line of

economic, social and environmental. You will note in this book and subsequent ones we have used that basis for reporting.

**CHAIR**—Research very rarely is done in any particular year anyway.

**Mr Cattanach**—That is right.

**CHAIR**—And for that alone you would have the anomalies of different things coming to fruition in a particular year, whereas in other years it could be all the early work. Thank you very much for your time this morning and for your submission and the booklet. We look forward to the next one.

**Mr Cattanach**—Thank you, Mr Chair.

[9.54 a.m.]

**BOLT, Mr David, General Manager, AIIA member company, Australian Information Industry Association**

**DURIE, Mr Rob, Executive Director, Australian Information Industry Association**

**WHITE, Ms Teresa, Director, Australian Information Industry Association**

**CHAIR**—Welcome. While the committee does not swear in witnesses, the proceedings today are legal proceedings of the parliament and warrant the same respect as proceedings in the House. Deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers that all evidence be given in public but should you at any stage wish to give evidence in private on anything of a confidential nature which you think would assist the inquiry but would not like 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?

**Mr Durie**—Yes, I would, thank you. AIIA is very pleased to have this opportunity to meet with the committee and to contribute to debate on what is an important issue for our industry and also for the country. I want to take a few minutes to run through some of the key points and themes from our submission. By way of background, AIIA represents suppliers in the ICT industry. We have approximately 400 members that between them generate revenues of over $40 billion, employ over 100,000 Australians and have exports of more than $2 billion. Our members operate right across the ICT sector—hardware, software, services, telecommunications, IT, Internet, multimedia and so on. Most of our members are small businesses, with about 70 per cent having revenues of under $5 million.

R&D is extremely important to our industry because, by its very nature, the industry is a major undertaker of research and development. By any measure, the level of business investment in R&D—which is the main focus of this inquiry—in Australia is too low. For AIIA and its members, this is the critical issue. For example, if you look at the OECD indicators, Australia's business expenditure on R&D is below average and significantly less than our major competitors—countries like Finland and so on. That really is the critical issue and we believe we should have a national goal of improving our performance in this area.

Government policy settings are extremely important in determining R&D outcomes, but government policy is not the only determinant of business expenditure on R&D. Business expenditure on R&D is driven by market demand and by competition. While government funding is important, the majority of business expenditure on R&D—perhaps 85 per cent—is funded directly by the companies themselves. Looking at the ICT industry in particular, the committee needs to be aware that the market and the environment for global investment are extremely tough. Over the last 18 months, industry growth rates have slowed dramatically. In Australia for the two years to June 2001, profitability has fallen by about 35 per cent. We have also seen across Australia significant disinvestment by international companies, particularly in R&D related to telecommunications. However, the role of our technology in the economy, in

productivity growth and competitiveness continues to grow in importance, so supporting and increasing R&D in our industry is of critical importance to the economy.

What are the issues that are of concern to our members and what should government be focusing on? We have identified three or four key areas where government policy should be focused and examined. The first of those areas is helping SMEs fund research. By its very nature, our industry is dominated by SMEs. Most companies in the industry—and, by most, I mean about 90 per cent—have fewer than 10 employees. By any definition, they are very small companies, so their access to capital and funding for R&D is absolutely critical. A strong tax concession program, increased and continuous funding for programs like Start, continued support for the IT incubator program and the innovation investment funds are critical. The second area of importance is attracting and—I cannot stress too much—retaining investment in R&D from international companies. This may require additional incentives in special cases. The third area of importance is facilitating collaboration between the public and private sectors, particularly SMEs.

For the SMEs, consistent application of government policy is a key issue. The freezing of applications under the Start program, which fortunately has ended, was a significant blow to our industry, because that program had become a major funder of R&D and was acting as a quasi-venture capital fund for our industry. The second area of concern to SMEs is the complexity and time-consuming nature of engaging with government programs. Most programs outside the tax concession are competitive and they become, if you like, a beauty contest and the extent of material required from companies in order to win grants is, we believe, excessive.

We believe Australia needs to have a better balance between support for public sector and private sector R&D. Obviously, government funding for public sector R&D is critical, but we believe there are a number of ways in which the private sector is disadvantaged under present arrangements. Compared to other countries, very little direct government funding goes to the private sector. Most of the government funding that goes to the private sector is indirect, through programs like the Start grants and tax concession programs. For example, there is no private sector equivalent to the pre-seed fund for commercialisation of public sector research, which was announced several months ago. I am happy to end our statement there and to take any questions the committee might have, thank you.

**CHAIR**—Thank you, Mr Durie. I appreciate your submission and your being here today. In your submission—and you also referred to it in your opening statement—in talking about some of the government programs, the recommendations you make do effectively call for increased spending by government. That is fine, but the purpose of this inquiry is to really get to the nub of why business investment is at the low level that it is compared to other OECD countries. You can pick out several countries where business investment is significantly higher than Australia, but government investment is actually lower. If there was a possibility for government to spend more money in research and development, I would be the first member of parliament in there pushing for additional investment—not expenditure. What is wrong? Is money being spent by government in the wrong places? Certainly there are a number of examples—and you possibly raised a couple of them in your submission—of countries where there is significantly higher investment by business compared to Australia. From a government point of view, we are doing okay, but now you are saying that we need to spend to more to make business spend more.

**Mr Durie**—You need to differentiate between government expenditure on R&D and government support for business expenditure on R&D. The point I was making about the difference between Australia and other OECD countries in that respect is that in other countries where the government directly funds R&D programs, rather than industry support for R&D, it spends much more of that money with the private sector in other countries than it does in Australia. For example, we spend more money on public sector research through public sector institutions, like various research organisations including the CSIRO, and less money directly with private sector organisations doing research on behalf of the government. Doing it that way—that is, involving the private sector—we believe would stimulate further expenditure on behalf of the private sector.

**CHAIR**—If it is not possible to spend more because of budget situations, would you encourage government to look at spending what we are spending—which has increased, particularly in this last Backing Australia's Ability program—more effectively?

**Mr Durie**—Yes, by directing it either to the private sector or, as in some countries, to the public sector. Public sector expenditure is contestable, I believe. Private sector organisations can bid or tender to undertake public sector research.

**Ms White**—But also add to that—which Rob will come to later, I am sure—the greater collaboration between the private sector and government. That is one of the major issues which is referred to towards the end of the submission.

**CHAIR**—Certainly one of the major issues that has come up in just about every submission is how we can get a far better interaction happening between the private sector, academia and government research agencies. The flow of personnel, for instance, is one thing—how people can jump out of those organisations into the private sector, spend some time in the private sector and possibly go back again and not be disadvantaged. We would welcome any comments you might have in that respect. Mr Bolt and Ms White, you both work for private organisations. If you have any suggestions of anything government can do to make that flow of individuals easier, we would welcome them.

**Mr Durie**—The collaboration with public sector research organisations for our industry is a particular challenge. If you look purely at the Australian-owned sector of our industry, it is extremely small scale. Very few companies which are research oriented in the industry are big enough to manage collaboration with the public sector. As I said earlier, almost 90 per cent of the companies have fewer than 10 employees. You can see that companies of that size cannot deal with a large public sector bureaucracy. That is a key issue. It may be different in other sectors, but certainly in our industry it is very difficult for Australian companies to have that sort of collaboration. There are some additional things which our association probably needs to be doing, with assistance from government, to facilitate that collaboration.

There are other issues related to collaboration with the industry of a similar nature. For example, with the CRC program, if you look through those focused on our industry, most of the private sector collaborators are in fact international companies. Very few Australian companies have been able to make the funding and, more importantly, the time and management commitments needed to participate in that program. One of our inputs into the CRC review about 18 months ago was that more attention needs to be paid to that issue as they examine the bidding process for CRCs so that some weighting goes to those bids that make a particular

focus on how they are going to engage SMEs in the ongoing CRC process. That is also a feature of the ICT Centre of Excellence. We raised the issue that how the Centre of Excellence engages with the SME community in our industry is going to be critical. They are now putting in place special liaison officers to manage that issue because the companies lack the capability to do that. David, you might have some comments from an international point of view.

**Mr Bolt**—Yes. The general feeling through the multinational companies is a desire to be more engaged with the university and research community in Australia. There is a challenge and quite an expense in identifying the research that is going on at an appropriate level for the due diligence process. That takes a fair bit of investment up-front to delve into the current projects and get a close enough understanding about what is going on, with a view to whether that is a viable research project for the multinational company to get engaged in from an international standpoint.

My own company has found that the only way we can do that is to hire people full time to engage at that level. One of the reasons for that is that it is quite diverse. The university research programs are very broad. That is a strength and also a weakness when it comes to the critical mass nature. Australia's size obviously does not allow the sorts of budgets for research in the areas that multinational companies are often looking at. Relatively they are small scale. It is only good luck sometimes that they are investing in the areas of interest to the multinationals. That process of engagement is quite expensive and there is no incentive for the multinationals to fund that in Australia, other than for the executives of the companies to have an Australian operation where they are pushing internally to do that work. The other challenge is that a lot of the research is at seed level. Engaging at that level takes a lot of management resource and time as well, so most of the multinational companies have tended to focus on the A and B level investments from a capital injection standpoint. That seed level investment is still a challenge for us.

**Ms CORCORAN**—You made a point before in answer to a another question talking about what can be done to encourage business to put money into R&D. You made the distinction between government expenditure and government support for business expenditure. Both of those things are money coming out of the government's pocket.

**Mr Durie**—Sure.

**Ms CORCORAN**—I am not at all walking away from the need for government to do that. It has to put its money where its mouth is. Are there things the government can do, other than put its hand in its pocket, to encourage a business to invest more in R&D?

**Mr Durie**—There are two areas I would suggest. Firstly, in the way the programs are administered, they need to be a lot easier for small companies to engage with.

**Ms CORCORAN**—Can you be specific? Can you give me an example?

**Mr Durie**—In our industry, generally they would not have a person whose job it is to familiarise themselves with all government programs and decide which is the most applicable and how to apply for it. Generally the CEO is going to be doing that. The simpler it is, the easier it is, the more SMEs will be able to engage with the process. One of the reasons why industry is attracted to a program like the tax concession is that you do not have to make an application; as

long as you meet the guidelines of the program, you have an entitlement. Even there, now with requirement for companies to be registered, that can cause problems. We got a note from one of our SME members explaining the day and a half of tribulation he had experienced when he tried to register for the tax concession. Most of the problems are being caused by the fact that the—

**Ms CORCORAN**—The tax concession or tax offset?

**Mr Durie**—I think for either you now have to be registered.

**Ms CORCORAN**—Okay.

**Mr Durie**—The guidelines for registration on the web site and the guidelines of the person at the end of the advisory phone number were two different documents. There was a lot of frustration. He was being told to look at page 15 of the guidelines and his copy of the guidelines did not have a page 15. In the end he gave up because he had to go back to running his business and paid a consultant simply to register his company for the tax concession. That, to me, is a nonsense. It ought to be a very simple process.

That is one thing. The second thing would be consistency. We understanding the funding difficulties faced by the industry department about the Start program but the decision to freeze the program had a cataclysmic effect through our industry. Because of the way the sources of funding had shifted, the Start program became a matcher of funds for early stage venture capital investors. Many companies' venture capital funding was done on the basis that they would get a Start grant and they would then get matching funding from a private source. Many companies have had to cancel R&D programs because of the freeze on the Start program. We have had many discussions with Minister Macfarlane on this. He understands that. He had gone back, we understand, during this freeze process and tried to re-engineer the program so that it could be administered consistently with a steady flow of funds rather than a stop-start process.

The third area is collaboration, where it might require some funding but not of the order of funding on the Start program or tax concession, where government facilitated that process of collaboration. You have just heard from Mr Bolt that even for a multinational company it can be a significant expenditure just to get their heads around what is going on in Australia, who they should be engaging with and how to engage with them. You can imagine for SMEs it is much more difficult again. They certainly cannot put somebody on who is on every SME in the industry to find out what research is going on. There must be some way that we can centralise that information, not at a superficial level, but the general level, if you like. Then companies which wanted to follow things up would have to get their hands dirty. But there must be some way we can centralise information about who is doing what.

There is a fourth area concerning what the government could do to spend its money more wisely. We have already talked about perhaps spending more money with the private sector when they undertake research. The other thing, picking up on something Mr Bolt said, is the importance of focus. We are a relatively small country and one of the issues we have raised in the present government's industry review, what they call the ICT Framework for the Future, is this need to decide what we want to be good at and focus on that and direct funding to those things. We cannot do everything.

When you look at our international competitors—Ireland, Singapore, India, Israel—they have set their stall out, if you like, and they are trying to succeed in a particular aspect of our industry. That is really important, because it gets us into the realms of whether we are picking winners or not. If there was some broad agreement about what things we are going to focus on and that informed decisions by the ARC grants process, by Start et cetera, if all the funding coming from the Commonwealth and state governments was informed by a broad agreement about what we wanted to focus on, that would have a great benefit as well.

**Mr Bolt**—Part of the answer to your original question is that, if the money is limited, which it is, focusing on outcomes is also a way to avoid picking winners. Picking an area of research in which we want excellence and to be renowned for as an excellent country would allow the free market to adjust to those areas and stop picking winners. But at least you have an outcome that says, 'Let's fix the salinity problem,' for example. If we put our minds to that, research has to happen in all areas in order to fix that problem. If we say, 'Let's fix the in-home patient care problem,' the cost of research in that area is going to get a significant additional focus—or the telematics industry or whatever. Outcomes focus is allowing you to pick an area of focus but not picking winners of companies in particular and allows the free market forces to occur. Therefore you get a critical mass effect happening over time.

**Ms CORCORAN**—You seem to draw a connection between private venture funding and funding available through different government programs. Is there a connection there? In one part of your submission you talk about the BITS program and the need for the investment guidelines to be reviewed because venture capital is disappearing. Why is the venture capital disappearing? Is there a relationship between what is available from government and what private people are prepared to put in?

**Mr Durie**—That is a very complex question. The answer might take a couple of minutes. If you think about it as a continuum of funding requirements which are met in different ways, from seed funding through to equity funding through the stock exchange, at different levels the requirement for government support is different and in some areas it does not exist. Certainly at the lower end, in every economy, there is a need for government to get involved. For example, the program we have in Australia called Innovation Investment Funds, where there is government support for venture funds—it is not seed funding; it is bigger than that, in lots of about $3 million—is based on a US program called Small Business Investment Corporations. That program has been running for 45 years, I think. That is the sort of commitment we need to make. In Australia we have had that program for four years and we may be looking at going for four again, but governments need to make long-term commitments. We had the same argument with the government and officials about the Centre of Excellence. Having a five-year funding program for medium- and long-term research does not make any sense and the government has accepted that and made a longer term commitment. Obviously it cannot commit to what the specifics are of annual funding, but it has accepted that the government has an ongoing commitment to contribute funds to the Centre of Excellence. One of the issues in Australia is that we do not get consistent and long-term support. If the US government—they have the most successful venture capital industry by some margin in the world—after 50 years still has to support seed and low-end investments, that is something we need to pony up for, if you like.

It is a similar thing with the incubator program. Senator Alston has been making the point—and it is correct — that everyone knew this was just a one-shot program to fund the IT incubators. We may have known that, but that does not mean that is the right policy. To expect

incubators—which we are asking to operate at the low end and work with very small companies whose funding is limited to about $450,000 per company—to be self-funding is not a realistic expectation in our view. Where the government does need to get involved is at the lower end and those involvements need to be ongoing.

The second area, in terms of venture capital, is to make sure that there is no impediment to the flow of venture capital within Australia and into Australia. Over the last four to five years, through changes to capital gains tax and treatment of limited partnerships, we are gradually putting in place those elements. Again, the thing that government or the parliament needs to keep in mind is that this is not standing still. This is a competition for capital and Australia needs to make sure it is always up with the leading bunch in terms of how we treat the movement of capital, how we treat limited partnerships, how we treat capital gains, how we treat share options and so on. In that final area of share options, we still have not been able to get any attention on that issue as it affects capital raising and remuneration in technology start-ups. There is a range of ways in which government action affects the way companies raise capital.

**Ms White**—I would like to add a comment about the BITS incubation program. One of the great issues which affected small companies was, because of the short-term nature of that program, that they were not able to take the risks that you would expect a program like that to take. There were a lot of projects sitting around in the industry which everybody was very excited about, because this was the first time they were actually able to get up. There was not really enough money for them, but that was anticipated and expected. But they were knocked back because there was a requirement for short-term success for those programs. You get a bit of a false view; you have to be very careful in the way you look at the outcome of that particular program.

**Mr LINDSAY**—Mr Bolt, you said that you are general manager of an international company. Can you indicate the sector that that company operates in?

**Mr Bolt**—The company is in the microelectronics and computer industry. The company is called Intel.

**Mr LINDSAY**—Do you manufacture in Australia?

**Mr Bolt**—We do not manufacture here, no.

**Mr LINDSAY**—Is it sales and marketing?

**Mr Bolt**—Sales and marketing. We run a venture capital group here which has been active for the last three years.

**Mr LINDSAY**—Does that mean you are a financier?

**Mr Bolt**—Yes. We have invested about $60 million in nine companies in those last three years.

**Mr LINDSAY**—Do you battle to get money to apply into the marketplace?

**Mr Bolt**—We do not battle for it.

**Mr LINDSAY**—When I say 'battle', I mean from your overseas principal. Do you battle to get dollars to do that investment?

**Mr Bolt**—It is a competitive process. We have an international review of each project and we compare the level of technology in this country in that project relative to all of the other projects we are looking at around the world. We have a very competitive process of review. If it meets all the merits of a good investment, then we will go ahead.

**Mr LINDSAY**—Switching to you, Mr Durie, in your opening statement you said that Australia's expenditure was below average. It was below our competitors, and you gave the example of Finland. Is Finland, in fact, skewed by one company in terms of the investment that Finland makes into its ICT industries and, therefore, an unfortunate example?

**Mr Durie**—It would be one of many, Mr Lindsay.

**Mr LINDSAY**—Do you stand by your statement?

**Mr Durie**—Australia is below average. If you compare us with most of the other countries which are successful in our industry, we spend less on R&D as a percentage of our GDP.

**Mr LINDSAY**—You also said that over the last two years there was significant multinational disinvestment in Australia's R&D and you mentioned telecommunications. Again, were you really referring only to one company?

**Mr Durie**—No. There is a long list of companies, not just in Australia but around the world, that have cut back on R&D. That has come about through three main factors. One is that the dotcom crash changed everything. Secondly, the carriers in the telecommunications sector have stopped spending so that their market has dried up and companies like Lucent, Alcatel, Ericsson, Siemens et cetera, have cut back significantly on R&D everywhere. The third factor is September 11. The supply lines have been shortened. There has also been rationalisation because of the economic factors. I know a company like HP, which now involves Hewlett-Packard and Compaq, has dozens of research groups between them around the world, and the person who is responsible for that in California is trying to get all of that research back as close to California as possible so he has to spend as little time as possible in an aeroplane going to see what is happening. There are several factors which have made the last two years the most difficult for a long while in terms of attracting and retaining investment.

We could ask what we could have done in the face of those global changes, which did not just affect Australia. For example, the Ericsson closure was one of about 60 that Ericsson has made over the last 12 months, so they were not picking on Australia. In fact, I have been through that in some detail and we came very close to retaining that facility. The thing that killed us in the end was distance. What could we have done differently in Australia? Firstly, we do not put enough attention and effort into attracting investment and we put almost zero effort into what we in the industry call account management or case management in retaining investment. In business you take a different approach. You focus a lot on existing customers, because they are often the best prospect to get more business, whereas the way we go about attracting investment

is, once we have Ericsson here, we then turn to, 'Who else can we get here?' We really need to focus on retaining that investment.

**CHAIR**—The old 80-20 rule.

**Mr Durie**—That is right. One of the things we have put through various fora to Invest Australia and to Minister Macfarlane, as well as to the Prime Minister and senior ministers, is that they need to cultivate the big investors in Australia, to ensure that Ericsson head office knows how important it is to Australia to have that facility. That opportunity has gone but I think we need to be very proactive.

**Mr LINDSAY**—You made a key point about the time taken in assessing programs for assistance and doing the paperwork; indeed, finding out what paperwork had to be done. Do you have any suggestions about what sort of a model the government could use where there was no paperwork, where companies automatically knew what the incentive was and the government was protected when it had to pay out?

**Mr Durie**—There are several programs like that. The tax concession is exactly like that.

**Mr LINDSAY**—Would you recommend to the committee that we should recommend that there should only be tax concessions and nothing else?

**Mr Durie**—There is a whole literature on the efficacy of tax concessions. I am sure Treasury would say in their parlance, 'There's too much of a deadweight loss in a tax concession'—that is, you are providing an incentive to companies who would be doing the research anyway.

**Mr LINDSAY**—Yes, but just think of what I am suggesting. You cut out all the paperwork entirely and, because you cut out all of that, more money goes into this and business does not have a problem.

**Mr Durie**—Certainly I think the tax concession, if it is carefully designed, is a good way of doing that. The Export Market Development Grants Scheme works the same way. If you spend the money, you have an entitlement, and the government protects itself by putting an annual cap on how much it spends. I think the beauty contest associated with things like the Start program has got out of hand. You need a consultant now in order to prepare your application. It is a bit like the Olympics. I think we need to go back and say, 'What is the absolute essential information that's required for a committee to determine who should get Start grants, who should get pre-seed funding?' et cetera, and the information requirements should be restricted to those essential elements.

**CHAIR**—Is it, in fact, possibly worse than the Olympics, in that you can have a situation where, if you are good at filling out a form, you have significantly higher prospects of getting the grant, other than the quality of the project? Can it be that bad?

**Mr Durie**—I have not looked into that. I suspect that the consultant you choose probably has a major impact on whether or not you get the grant.

**Ms White**—I could comment on that directly, because we have been involved in the program and actually stopped a project and lost some very senior engineers because of this current stop,

so we can provide a fairly recent example. Certainly, the consultant that you have is a determinant outcome. That may, however, be dependent on the capacity of the company to select a consultant. There is much too much emphasis on the administrative nature of the submission.

**Mr LINDSAY**—Does that mean that, if whatever it is the government does is rejigged to get rid of that problem, you would see a lot more SMEs involved in it?

**Ms White**—You would, but you need to be very careful with the type of program and the purpose for the program. The great advantage of the BITS program is the mentoring that it provides to all these small companies. As you know, there is all this innovation that is sitting in industry, but no capacity to get it out into these sorts of programs and develop it further. The administrative component of the R&D program is a burden and it is an opportunity cost, if that is your question.

**Mr LINDSAY**—Yes.

**Ms White**—As a small company, you only have so much that you can spend on consultants and you would be better to spend it on technical consulting advice than administrative consulting advice.

**Mr LINDSAY**—Mr Durie, you said in your opening remarks that, in relation to R&D and multinational companies, you wanted some kind of special concession and you talked in your written evidence about a 200 per cent concession. How do you think Australian companies would feel if they did not have access to that and multinationals did? Do you see the political question I am asking you?

**Mr Durie**—Absolutely. This is something we face all the time. In fact, there has been an issue over whether or not subsidies were paid to two Indian companies to establish development centres in Victoria in the last six months and a lot of the angst about that came from our members in Victoria who are not able to apply for them. This is not a new thing. State governments particularly, when they bid for overseas investment, offer incentives to foreign companies that they do not offer to local companies. Motorola was given some incentives to invest in South Australia. Red Hat, I think it was, and other companies have been given incentives to invest in Queensland.

**Mr LINDSAY**—Do Australians in your industry accept that that happens?

**Mr Durie**—What we would say is that—

**Mr LINDSAY**—Careful!

**Mr Durie**—if we went into refining what we were asking for—it is always that thing; be careful what you ask for, you might get it—there are investment opportunities that we as a nation will get from time to time and, in many cases, we are up against other countries who are bidding for these development centres or whatever and we ought to give ourselves the capability to compete for them. I am not sure that we would write that as, 'This is a special program to give money to multinationals.' I can think of a number of Australian companies who the Singapore Infocomm Development Authority would love to have move their development

centres to Singapore. Those companies should be just as eligible for that sort of selected program as an Intel, an IBM or a Motorola. I would not describe it as a program for multinationals. We put it in that context because that is where it comes up most often.

**Ms White**—It is tremendously important to Australian companies that the multinational companies are here, because it is so difficult to do business with, particularly, the public sector in Australia as an Australian company. This is a perception issue that I hope you are looking at, because it affects investment in R&D, that you cannot get reference sites in Australia. The multinationals are a very important channel out to commercialisation globally.

**Mr LINDSAY**—I understand that.

**Mr HATTON**—I am interested in the two men and a dog question about IT companies in Australia and the evidence you have given indicating that lots of things probably should be done, like shifting public sector investment over to the private sector. How can you effectively do that if there are only two men and a dog in the company? If it is difficult to go to the tax office to register in order to get a tax concession, because there is a problem with the people on the end of the phone at the tax office not knowing what they are doing, or if there are not enough resources or manpower within the company, is it a strong argument to say that the big problem is that CSIRO and the rest of them are getting all the bucks and not much is running out into the private sector, when there may be a problem, because of the small size of the companies, in actually doing anything if they were getting the funding?

**Mr Durie**—I do not think there are any panaceas. That is a very good point, but at the same time there are companies which do have research teams—thinking of the Australian companies—on a very small scale, relatively. Am I right in saying, David, that Intel spends more on R&D every year than Australia does; not just in ICT, but Australia across the board?

**Mr Bolt**—That is true, yes.

**Mr Durie**—The scale is very important. There are Australian IT companies which have research teams of up to 100 people. Those organisations, if it was easier, would be very capable of collaborating with CSIRO or some other public sector research organisation or undertaking research on behalf of the government, if it was funded up-front. It would be a matter of horses for courses. The problems for the 10-person companies and below are different from the issues facing our Australian IT companies which have $50 million to $200 million in revenue.

**Mr HATTON**—But, comparatively, the vast bulk of companies in the industry are less than 10.

**Mr Durie**—The vast bulk, and very many of those would not be doing R&D in any event.

**Mr HATTON**—For that vast bulk though—the evidence you have given in regard to the tax concession going back to 150 per cent and keeping the 175 per cent premium—it is more beneficial to access that?

**Mr Durie**—Yes, particularly the rebate approach. We have had a lot of very positive feedback about that; not just about its very nature, but about how seamless the process is. That seems to work very well.

**Mr Bolt**—I would add that the programs also need to work in conjunction. There needs to be a lot of thought in the hand-off process between the programs. The rebate programs—for instance, Start—can affect the seeding. The BITS program obviously gives the mentoring that is so necessary and you can get some scale through that program. There needs to be a lot of thought in those hand-offs between how the programs migrate as well, in order for you to increase your chance of success. It is not one size fits all by any means, we have found.

**Ms White**—But it is also this capacity to pick winners, or whatever it is, so that small companies can feel some confidence in collaboration with their VC pitchers to understand why they are in a particular part of the industry. This whole issue of growing through that 10-person barrier is something that is fairly serious for the industry, because it is so difficult. Whatever happens as an outcome, you have to make that simpler and there have to be more incentives for collaboration, partnering and growing through that. That is probably the 30-person barrier or whatever identified as a requirement to build management expertise and the things that you need to become successful.

**Mr HATTON**—One of the ways that might happen—this is one of the suggestions you put forward—is that there could be another cabinet-initiated rule that, in special circumstances, overseas IT companies might be encouraged to come here with 200 per cent research and development caps on their heads. Do you want to expand a bit on that and how small local companies might be able to feed off that?

**Mr Bolt**—If you focus that program in the right areas—and what I mean by that is the incentive needs to apply certainly to things that only multinationals can do—then the argument about whether it is fair or not goes away. Multinationals typically have an international research and development program. They have a track record of success. They have focus in certain areas. If the scheme is targeted in such a way that it brings in multinational resources, for example, it may mean for a period of time—maybe two or three years—bringing world-class researchers from that organisation, helping them set up and be mentors to universities and so forth—a scheme of support around that. It is very hard to argue that a local company can offer that program anyway. There needs to be some tuning of those sorts of programs that would encourage multinationals to be more active partners. It does not have to be outright funding for a project; it can be support for initiating those sorts of engagements.

**Mr HATTON**—With regard to our public research entities and the potential that is there in IT in the private sector, should we be looking at Australia trailing its coat more effectively internationally to sell our educational, IT and research skills to the world, to try to bring more business to Australia and get the private sector intimately involved in that?

**Mr Bolt**—Without question, an element of that is needed, but you cannot do that in all the areas you would like to, so you have to focus. Going back to the point of the outcomes I was talking about, if you had a national focus on solving this problem over the next 10 to 20 years, people around the world can get their minds around that. It can have spin-offs in all sorts of area of research and development. It does not have to be one particular industry. The examples we look at in other countries include the Indian national effort to develop software or the Taiwanese one where the PC industry started its incubator there. There is a national focus on an area or areas. Part of the problem we have is: in order to sell yourself, what is it you are going to sell? As multinationals bidding for projects internally, being able to refer to some success in an area

or being able to show critical mass in an area is so important in order to get that next round of engagement. Otherwise you just get dismissed out of hand.

**Mr HATTON**—What you have identified there, and it is a key argument you have put, is that we could target particular areas in the way that Ireland, Singapore and so on have done; Singapore not only in the information area but also in the pharmaceutical area. I am not afraid of picking winners. Australia's problem is it has picked a lot of losers in the past—losers that could have been winners. We were world leaders in satellite technology launch and development. We were also world leaders in computing science. We let both of those go because we decided not to target them or we could not see the potential of them.

**Mr Bolt**—My proposition is a little more subtle. There is a subtle difference between picking winners and having a national focus.

**Mr HATTON**—Yes.

**Mr Bolt**—You can have a national focus which allows winners to evolve through free market forces.

**Mr HATTON**—I have found free market works particularly well when it is done in conjunction with the government.

**Mr Bolt**—As I said, there are a number of stages that are involved.

**Mr HATTON**—But in pushing that forward and the idea of having a broad focus somewhere that we can do it, the Singaporeans have not taken that approach, have they? You could say by deciding on pharmaceutical information technology they have, but they have determined they will be world leaders in particular areas. Whatever they have to do, they will do it in order to achieve it, whereas in Australia we have not taken that approach at all. It is a case of, 'Well, things might turn up,' a bit like Mr Micawber. We might shake things a bit here and there and hope that they might fall out a bit better.

**Mr Bolt**—That is part of the strength of the Australian environment. There is such diversity but the scale is not there. The problem is we do not have the scale and the critical mass, so you have a quandary here.

**Ms White**—Also it is a complete fluke. You might happen across a research project going on inside a university that is tremendously important and could be world beating in a project you are working on in industry. Ninety-nine times out of a billion you do not come across it, do not know about it, do not know it has ever existed.

**Mr Durie**—If I can come back to the national strategy perspective, AIIA would strongly support taking not exactly the approach adopted in Singapore in other countries because we do not have their situation, but a clearer picture of where we want to be, what we are doing to get there and what we now focus on in order to achieve those outcomes. We believe that would be in our best interests. That is why we lobbied the government to initiate this framework for the future process—so that can have that broader vision of, 'Where do we want to be in five to 10 years time and what are the things we need to do?'

**CHAIR**—I remind people we are currently going through a situation in Australia of identifying national priorities.

**Mr Durie**—We have made a submission to that.

**CHAIR**—Exactly what you are saying; I was going to ask the question whether you make a submission to that?'

**Mr Durie**—Yes, absolutely.

**CHAIR**—Those points have been identified and are being acted upon.

**Mr Durie**—Just to comment on that, once we resolve what those national priorities are, our view is they should be applied as widely as possible. If they are only going to be used through the ARC process, that would be disappointing. This needs to influence and inform all government decisions about research funding.

**CHAIR**—That is exactly right. As far as government can influence those directions, it will be doing so.

**Mr MARTYN EVANS**—One of the alternative approaches that could partially supplement the grant systems we were talking about earlier, and the tax concession systems which have the administrative difficulties for government and the companies that we spoke of earlier in the discussion, would be government support for science based infrastructure, communications based infrastructure, which supports the whole market and all the companies that are involved in a precompetitive way—almost the Semitech approach in some respects. You can broaden that base a lot more if you try. You can extend that to include a lot more of the infrastructure which all of the companies rely on. You can include within it a lot of the high-speed communication, the underlying data transfer systems, the computing infrastructure or access to high-speed computing—whatever communications infrastructure, large communications facilities or research equipment is the flavour of the month at a precompetitive level, just as the synchrotron in Melbourne is being supported now.

If government does that at a precompetitive level, that to some extent provides facilities everyone can use and is an attraction to Australia that other countries may or may not have in varying degrees. It does avoid for companies a lot of the problems which go with the individual applications but still provides a level of support in the community. To what extent would you trade that off against the complex applications? Obviously it cannot totally replace some other kinds of targeted concessions and support but it could partially be balanced as a precompetitive infrastructure system in the community to support various aspects of R&D, just as Semitech in the States partially supported the semiconductor industry. Indeed, some would say they rescued it from South-East Asian competition.

**Mr Bolt**—Semitech is a very focused example and addresses communication networks.

**Mr MARTYN EVANS**—Yes. I am not substituting Semitech in Australia; I am just using that as a precompetitive example of how government puts money into a research infrastructure that all of the companies gain benefit from. As part of a trade-off against complex grant based systems you can support things like synchrotrons, you can support high-speed computing areas,

you can support gene sequencing machines that cost a fortune but can be used by a range of people for private projects. You can trade that off against hundreds of millions of dollars worth of grants.

**Mr Durie**—I suppose generally, like industry, we like to have our cake and eat it as well. If you look at the software industry, the opportunities for the sort of infrastructure provision that everyone will be able to feed off are probably limited. I have not spent a long time thinking about this but that would be my off-the-cuff response. There has been some expenditure in this area in Australia through the Advanced Networks Program which is funding some experimental wireless and high-speed networks. That is certainly productive.

Again, the key challenge we have, if you compare that with, say, Internet II and CANARIE in Canada, the capacity of the industry in those countries to participate in large-scale programs like that is so different from what it is here. Outside of Telstra, we really do not have any companies who can come up in the way, I think, of the CANARIE program. Companies have put hundreds of millions of dollars on the table to participate in those programs. That sort of model cannot work in the Australian environment, if you really want to engage with the grassroots of the industry, whereas some of those smaller scale wireless networks—for example, the mNet consortium in Adelaide—is putting a lot of effort into engaging with applications developers who can then use the experimental wireless network that has been put in place to work on their applications. I think that is the sort of model that would work but, as I say, it is hard to identify an across-the-board infrastructure need of the sort you are talking about that the industry generally would be able to feed off.

**CHAIR**—The previous witnesses were from the rural research and development corporations and we asked the question of whether the model that is used in agriculture, which is an industry of many very small businesses effectively—in many cases only one or two people—could be applied elsewhere. One of the problems is the fact that their researches apply to, as Martyn was saying just now, the pre-competitive side of it. But in the information technology area, particularly with an association like yourselves, do you do lots on behalf of your members and is there scope for—I am not saying the same—a similar sort of model where a lot of those very small companies are able to invest through your association and might then contract various researches that could be of benefit across sectors?

**Mr Durie**—It is not something we have focused on. The business model is so different in software. If I can translate it into another area, to what we try and do in our export programs, it is so difficult to find a thing that we can do that more than a handful of companies want to get involved in. The industry is so diverse in terms of the difference between the various horizontal applications, databases et cetera—those sorts of things—and the vertical applications. We get very frustrated because most companies with a vertical application—if you think about our export effort—do not want to go to an IT trade show. They want to go to the hotel association trade show or the financial services market trade show because they are developing software for that market. The IT industry from outside probably looks like it is made up of a large group of very similar companies; in fact, the diversity is amazing. That is something that we are happy to take back to our members and explore but I would be cautious about saying that is a model that we could successfully apply, whereas if you are a wheat farmer contributing to improved wheat varieties, it makes a lot of sense. One area that we might want to focus attention on, for example, is software quality. There is a government funded group at the moment which is looking at that issue. Maybe that is something where we would be able to work on something

where companies could take away the benefits of that and then apply them to their particular area.

**CHAIR**—We are going to have to leave it there because we have run out of time. Thank you very much for your contribution, both in the submission and today. It has been very valuable for us.

[11.04 a.m.]

**SYKES, Dr Stephen James, Research and Development Manager, Flavourtech Pty Ltd**

**CHAIR**—I welcome the representative from Flavourtech. Thank you for taking the time to drive across from Griffith to appear here today. We very much appreciate that you have taken that time. The company that you represent is the sort of company that we are wanting to get as much feedback from as possible as part of this inquiry. I point out to you that, while this committee does not swear 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—that would be confidential matters of the company that you think may assist the inquiry but you would not want publicly 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?

**Dr Sykes**—Thank you, Mr Chairman. I am representing Flavourtech Pty Ltd. Flavourtech is a small, regionally based, high-technology company which invests heavily in R&D. As such, we thought that our experience as a company might be very relevant to what is being discussed here. In this brief statement I will give you a short history of Flavourtech, describe as briefly as possible our range of R&D activities to try and set a context, and then I will attempt to address some of the questions raised by this inquiry in the light of what I have told you.

Flavourtech was formed back in 1986 to commercialise spinning cone column—SCC—technology. This is a specialised food processing system. A key point is that the technology was developed by CSIRO, so it was CSIRO technology that was spun off and the company Flavourtech was formed specifically to commercialise that technology. The three principals of Flavourtech came from the wine industry, particularly winery engineering, hence the company's location in Griffith. The SCC is what we call a flavour management system, essentially a distillation system, used widely in the food processing sector and installed in 20 countries now. We have nearly 100 systems out there.

In addition to the spinning cone column, last year the company acquired from Tetra Pak in Sweden the rights to build, sell and service the centrotherm evaporator, which is the standard setter for premium or high-quality concentrations. These devices are used in the food industry and in the pharmaceutical industry. There are about a thousand of these devices in about 90 countries, so acquiring that technology, in addition to the technology itself, gave us a large customer base to work with.

We are currently developing what we have called an integrated extraction system. This combines the spinning cone column, the centrotherm, and a number of other processes which we are developing as we speak, and this is, as the name implies, an integrated system, almost a turnkey system, which will enable our customers to produce a range of products based around premium liquid extracts and concentrates. Coffee and tea are the main commercial applications for this system. The commercial applications are very important in Asia, Japan, Korea, and also

in Europe and the United States. All the manufacturing is done in Griffith. It goes without saying that Flavourtech is totally export oriented. The world is our market. The Australian market is simply too small to support a company like ours. I would say that, for every 100 systems we sell, 99 would go offshore.

Research and development has been a key element of Flavourtech's activity throughout the company's history and never more so than now. The reasons for that are several. The nature of the business itself necessitates a fairly strong R&D culture within the company. Also, the company was born out of CSIRO research, so that has established a kind of tradition, and the background in the wine industry has probably assisted because the Australian wine industry is very strong technically and scientifically in world terms.

As far as our R&D activities themselves are concerned, I have divided them into five categories which I will briefly run through. The point of setting them out like this is to try to give you an impression of the range of R&D activities that we pursue. At one end we have customer trials. The vast majority of sales arise directly from these activities. Very few systems are sold without some form of trial work being done on the customer's own products. In addition to facilitating the sales process, this is a very valuable stream of information for the company—information that we have to hold confidential for the most part.

The second category of R&D activity is what I call in-house trials. These are short-term trials—weeks rather than months—and, in our case, typically associated with addressing straightforward engineering questions. We are both a user and, to a limited extent, a supplier of contract R&D. That is not a major part of our activity. Towards the larger scale end of the spectrum, we have collaborative projects. In the early days, in the late eighties, early nineties, there was a great deal of collaboration between Flavourtech and CSIRO. CSIRO still had a strong interest in helping us to commercialise the technology and that relationship was strong and there is still that strong relationship between ourselves and CSIRO.

Currently we are the industrial partner in an ARC linkage grant, which is for a project being undertaken by the University of Sydney's Department of Chemical Engineering. This project is focused on simulating by computer the liquid and vapour flow patterns inside the spinning cone column. Flavourtech has achieved a considerable degree of success in the soluble coffee industry throughout the world and it is in response to this success and the knowledge that we have gained by working with that industry that we have started to develop this integrated extraction system.

The key point here is that it has necessitated a rapid ratcheting up of our R&D effort, which has been supported by an R&D Start grant. As I will probably say again, that R&D Start grant has been crucial to our ability to quickly establish substantial research and development capability of our own in-house. That, I hope, covers our R&D activities, and the scale. What I am trying to put to you is that there is a range of activities across a spectrum.

I will now refer to the specific questions posed by the inquiry: what would be the economic benefit for Australia from a greater private sector investment in R&D? There is a gap in this continuum of R&D tasks which the nation faces. The gap is at the low-cost, short-term end of the spectrum, in our view. If private R&D expenditure was increased in both absolute and relative terms, we would expect to see increased economic growth due to a better balanced, more efficient and more effective national innovation system. In my submission I have quoted

from the Australian Research Council's published submission to this inquiry, where they describe this continuum of R&D tasks. They state:

Gaps along this continuum contribute to an innovation system that performs below its potential.

In other words, this lack of commitment on the part of the private sector to R&D is a systemic weakness in the Australian economy. If we could address that weakness specifically, we would expect to achieve a better balanced and more effective national innovation system. As far as the impediments to business investment in R&D are concerned, from our point of view the major impediments would be a lack of R&D culture in many small to medium businesses. I think the most important factor in fostering an R&D culture in these types of companies is the attitude of senior management. If senior management are committed, the rest will follow.

In Flavourtech's case, there is a recognition throughout the organisation that our primary resource is know-how and that R&D is the business of systematically acquiring that know-how. R&D is therefore a vitally important activity. The other major impediment for many small to medium businesses is the lack of an R&D infrastructure. This represents a substantial investment, more than many small to medium businesses can easily accommodate. In Flavourtech's case, the R&D Start funding, as I said before, has been crucial in accelerating the development of a basic R&D infrastructure within the company. The commercial benefits have flowed far more strongly and more quickly than anticipated.

I suggest to you that government assistance of this type is particularly effective in enabling small to medium businesses to take that first key step in establishing their own R&D capability. With regard to the steps that need to be taken to better demonstrate to business the benefits of higher private sector investment in R&D, I do not have any easy answers. Simply marketing the benefits of increased R&D expenditure to management of small to medium businesses would seem to be a logical response to this. How this should be managed is not something I feel qualified to advise you on.

Our view is that the current R&D tax concessions are of only limited use to a company like Flavourtech. As stated in the submission, the compliance costs are high and the benefits in many cases do not justify that additional effort. I think I should leave my submission there.

**Mr HATTON**—Dr Sykes, I can appreciate the importance of what you are doing in regional Australia, because the food industry has been important throughout regional Australia for building capacity and that is fairly vital. Also I have a private interest in this. My stepdaughter is in the food industry, trained at Hawkesbury. There has been an explosion in this area in the last 10 years or so in terms of the number of jobs and the capacity that is there—not just in Q&A, but more generally the fact that R&D has driven a lot of that. Spinning cone technology and centrotherm suggest centrifugal processes. Can you explain a little bit more about the core technology that you developed?

**Dr Sykes**—Both devices essentially have rotating conical elements in them and liquid flows over those conical elements in a thin film. In the case of the spinning cone column, you have a vapour stream passing in a countercurrent direction to this thin film—you have multiple thin films, in fact—and the volatile components in the liquid phase are transferred across into the vapour phase. The vapour is then drawn out of the system and condensed and what you get is effectively an essence or an aroma extract. One of the principal reasons for doing this is to

protect the aroma from some of the more damaging downstream processes. What typically happens is that the aroma is removed as early as possible and added back as late as possible. That is certainly the way it is used in the instant coffee industry and in the wine industry in the United States.

Centrotherm is similar, although it is an evaporator, but again you have a thin film of liquid flowing over a rotating surface. Heat is applied to that surface and water is given off. The function of an evaporator is clearly to remove water from a product, to reduce its volume. There are other reasons, but that is the main one.

**Mr HATTON**—Given the nature of the technology as you have extended and developed and the fact that this is virtually a niche market that you have created, is that part of the reason why no-one else has come along and gobbled you up? Is it the fact that your expertise is directly related to the original specific technology?

**Dr Sykes**—These specific technologies, yes.

**Mr HATTON**—You are specifically selling company to company and you have been able to have an expansion where your IP has not been taken by someone else. Is that a form of protection?

**Dr Sykes**—I think it is. That is probably an accurate way of seeing things. The reasons why Flavourtech has not been gobbled up by some other company are varied and have a lot to do with the way the company has been managed. There has probably been a resistance to surrendering any control on the part of the principals. Yes, I think that is a reasonable way of seeing the system. It is a kind of niche market.

We see ourselves as an engineering company, not a food processing company. We are building equipment to enable our customers to achieve the results with products. We do have competitors, there is no question about that. They are simply competing for the same applications with different technology. As to whether Flavourtech is a ripe target for acquisition, I am not really in a position to say. It would not surprise me.

**Mr HATTON**—The reason I raised that is that we have had evidence before, on this and other committees, that there is a particular problem where we have government money invested in supporting the development of intellectual property in Australia across a range of industries, particularly in CSIRO. Then that is taken out and commercialised. Companies get to a point where they cannot pick up the money to further develop in Australia—we have seen this case after case—and where their needs can usually only be addressed in the United States. There is a fairly clever process that often happens in the United States, where the value is stripped out of the company and it looks like it is not going to go very far. It gets sold down to virtually nothing and then another entity, using exactly all of that IP, flourishes afterwards. Have you seen examples of that happen out of commercialised products and do you think that is a significant problem that you have obviously avoided?

**Dr Sykes**—I have seen instances of something very like that, with CSIRO technology that was developed almost alongside the spinning cone column. The commercialisation process in that was more difficult and probably not as well managed, for a number of reasons, and it was ultimately acquired, I think, by a large American food company. They might have since divested

themselves of it, but the value of that investment initially in CSIRO has probably been lost. I do not know what we do about that, to be honest, but it is certainly a problem.

**Mr HATTON**—More broadly in that area, one of our fundamental problems throughout the history of Australia has been our inability to commercialise. Do you think we have got over that hump now, with not only your experience but that of a range of Australian companies? Do you think there is enough knowledge within Australian industry and within our entities like CSIRO to make those breakthroughs commercially or do you think the government still needs to do something more in spreading the knowledge of how you are going about it or providing a better means of intervention so that people are aware?

**Dr Sykes**—I think the government is in the best position of anybody to take that particular role and it is a worthwhile one. There are certain ways in which government funding can be particularly effective, in which the leverage produced is significant. Referring back to our experience, the R&D Start funding has given us more than just this research capability. It has given us much greater confidence to take on difficult technical challenges. It has also given our customers much greater confidence in us. We have reached the position now, I think it is fair to say, where our customers see us as reliable suppliers of solutions, and one of the key factors is that they are happy with that situation. We are giving them what they are seeking in a cost-effective manner now. In a sense, to disrupt Flavourtech by selling it off to somebody or breaking it up would be, I think, viewed with some concern by our customers. Establishing a basic R&D capability within small to medium businesses does more than just get the tasks done. It builds the confidence and experience within that company to address difficult questions.

**Mr HATTON**—Dr Sykes, lastly could you expand on the point you made, I think in item No. 1, with regard to specific questions. You talked about the systemic weakness and gaps along the continuum—that high-end, high-risk area. Could you tell us some more about what you think needs to be done there to plug that gap.

**Dr Sykes**—The gap, as I have tried to set out in the submission, I believe is at the low-cost, short-term end. Certainly in Flavourtech's experience, since we bit this bullet and decided to get serious about doing our own in-house R&D, we have been in a position to address a lot of these small questions immediately. We do not have to have planning meetings, we do not have to apply for funding. The capability is there. We just use it. This is one of the key factors. Small to medium businesses in Australia, I suspect, are a bit frightened of taking this step for a number of good reasons. But once you are over that hump, things change and I think they change quite radically. The company can then make far better use of its own internal resources in terms of technical knowledge and experience.

**Mr LINDSAY**—Dr Sykes, Flavourtech is a small company.

**Dr Sykes**—Yes.

**Mr LINDSAY**—What is your company's interest in making a submission to this inquiry?

**Dr Sykes**—Our interest in making a submission is to effectively inform the committee, to tell our story and to give you something to think about—some sort of example of what is happening out there.

**Mr LINDSAY**—Can I then ask you about the commercialisation of the cone technology. You said your company was born out of an invention of the CSIRO. You had three directors? Is that what happened?

**Dr Sykes**—Three principals, yes.

**Mr LINDSAY**—What were the arrangements with CSIRO? How did you acquire the technology? Are there royalty payments? Just explain the financial side of things to me.

**Dr Sykes**—Insofar as I am aware, the commercialisation negotiations would have been going on in the early to mid-eighties. There was a royalty stream. From what I can tell, it was a fairly standard commercial relationship between this start-up company and CSIRO. The royalty stream continues but on a reducing rate, as far as I remember. I cannot give you many other details of commercialisation.

**Mr LINDSAY**—Are you a model for commercialisation from what CSIRO develops and then away it goes into the marketplace?

**Dr Sykes**—Insofar as the process has succeeded quite significantly, I suppose we could be seen as a model.

**Mr LINDSAY**—Any suggestions on how it might be changed to suit current times?

**Dr Sykes**—How the commercialisation process might be changed? In Flavourtech's experience a lot of it has to do with personalities, with good personal links between the CSIRO researchers and the people involved in the start-up company. That has continued. Our relationship with Sydney Uni is similar. Beyond that I cannot really comment.

**Mr LINDSAY**—Moving to current days, your evidence under the impediments to business investment in R&D, one of the points you made was the lack of R&D infrastructure. You mentioned not only physical resources but people.

**Dr Sykes**—Yes, I did.

**Mr LINDSAY**—I understood that people were not a problem. Can you explain what you meant by 'not enough people'?

**Dr Sykes**—One problem is that in Australia we do not produce enough engineers, scientists and technologists. Given our tertiary education system, we have too low an output of technological professionals. That is probably the main problem facing all small to medium businesses. We have the additional serious burden of being in a remote location, which makes it far more difficult for us to attract people.

**Mr LINDSAY**—In relation to what steps need to be taken to demonstrate to business the benefits of more investment, the last point you made was that you wanted to see an increase in the small company turnover threshold from $5 million to $15 million. That is in relation to tax concessions. How did you hit upon the figure $15 million? What made you say, 'It's $5 million now. It should be $15 million'?

**Dr Sykes**—This was given to me by the financial controller of the company. I would have to ask him precisely. My guess is that it just looked like a good round number. Maybe you could say $10 million, $12½ million. I suppose the real point is $5 million seems too small from our point of view. A substantial increase would necessarily include a lot more companies under the bar rather than over it.

**Mr LINDSAY**—You mentioned earlier the difficulties in attracting people to Griffith. We have had a lot of evidence about what incentives governments might give. Should there be an incentive for locating R&D regionally?

**Dr Sykes**—In principle, yes. It is a separate problem to those being discussed here but if the regions are to improve in the sense of being able to attract people, especially away from the coast, some fairly vigorous action needs to be taken. One of those things could be an initiative like you have suggested.

**Mr LINDSAY**—You think there are benefits to Australia in having R&D done in regional Australia?

**Dr Sykes**—Yes.

**Mr FORREST**—Thanks, Dr Sykes, for your evidence. It is good to be reminded about a success story where pure research has moved on to good commercial outcomes. I was interested in the point that Mr Lindsay has just introduced about moving from $5 million to $15 million. My own feeling about that is that it is not start-up anymore. If you are talking about a $15 million company turnover, it is not start-up. How can you argue the need for a start-up grant to a substantial company? You would really have to change the nature of that program. It is designed to get people into research, more than the companies that are already well engaged and realise the benefit. I just tease Mr Lindsay's question a bit further. You could be suggesting a new program.

**Dr Sykes**—That could be the case. I simply go back and say that from our point of view the only tax concession, as it stands—and I am taking this under advice—is not particularly useful to us. The suggestions for making it more useful would need to be argued back and forth, I dare say. There is nothing sacrosanct about $15 million, in my view. I restate that of far more importance to us as a company has been the R&D Start funding. The R&D tax concession is much less important to us. This could change with the size of the company but for us the R&D tax concession is of minor importance when we are looking at defraying the costs of research and development.

**Mr FORREST**—You complain about the excess paperwork. We hear a lot about that but there is a need to protect proper accountability for public funding. An earlier witness's suggestion was to move towards a stronger emphasis on tax deductibility. I think that is what your complaint is about: record keeping in respect of tax deductibility. Other than accounts and records, what else would you need, other than what you would normally need for your tax return?

**Dr Sykes**—Again, it is a matter of how much extra work. I take your point, but if you are keeping your books correctly, then theoretically there is probably not much extra work at all. I do not think it ever works out that simply. Certainly in our experience with the Start grant,

accounting for that—and I do not consider the administrative burden to be excessive by any means—it is still significant, but the benefits to us from that are clear and obvious. The decision that every small to medium business has to make is: is it worth it? Are the gains in a tax deduction going to warrant the effort that has to go into it? That is all I can really say in answer to your question.

**Mr FORREST**—Thank you, again, for your contribution.

**CHAIR**—Dr Sykes, I have a couple of questions. How many employees do you have?

**Dr Sykes**—Flavourtech itself in Griffith would have no more than 20 employees. Those people are purely administrative, engineering and design people. The building of these machines is done by our sister company Agricultural and General Engineering which has in Griffith 80 to 100 people working for it. Flavourtech also has employees in the UK. We have a technical manager and a sales manager over there, and some technical infrastructure. We hire space in a pilot plant laboratory at the University of Reading. We also have some links and sales officers and some technical expertise in the United States, in California. We have an office there. The total number of employees in Flavourtech is probably 30 to 40.

**CHAIR**—Flavourtech is more the R&D side of the overall business, if I am reading it right. You said that your sister organisation does manufacturing.

**Dr Sykes**—That is correct.

**CHAIR**—Is it a wholly owned subsidiary of Flavourtech?

**Dr Sykes**—No, they are separate companies, arms-length companies.

**CHAIR**—Common directors?

**Dr Sykes**—Correct, or common principals.

**CHAIR**—Common shareholders?

**Dr Sykes**—Yes.

**CHAIR**—You may not want to answer these questions, but I am trying to get a feel for the sort of investment involved. What percentage of your turnover are you reinvesting into R&D? That may be confidential and you may not want to tell us. Are you happy to give us that information? To be correct, maybe you would need to combine Flavourtech with your manufacturing to get a real picture of investment back in R&D. Is that right?

**Dr Sykes**—Yes, I would have to take that question on notice, to be honest. I cannot give you the numbers off the top of my head—not a realistic percentage off the top of my head.

**CHAIR**—With the R&D Start program, did you use a consultant?

**Dr Sykes**—Yes, we did.

**CHAIR**—Was there a reason for that?

**Dr Sykes**—The reason we used a consultant?

**CHAIR**—Yes.

**Dr Sykes**—Basically, to facilitate the process.

**CHAIR**—Did you do that because it was too difficult to be done in-house or because you felt that you would have a better chance of getting it if you used somebody who knew how to work the system?

**Dr Sykes**—I think we felt we would have a better chance if we had good advice on how to set out the application. In retrospect, we probably did not really need to use a consultant but it was a decision we made at the start of the process. It is not one that I particularly regret, but certainly most of the thinking, most of the writing, was done by us.

**Mr FORREST**—I was interested in the five categories of research that you had, especially the first two where you do a customer trial. Does the customer pay you for the research? When you do an in-house trial, is there a shared risk? Do you do that on your own punt or on a fully paid basis?

**Dr Sykes**—With customer trials, the typical situation is that we will charge the customer for those trials, because there is a significant cost involved in sending a person and equipment to their factory, whether that be in Wisconsin, Japan or wherever. Yes, we charge for that service. As I say, we always have confidentiality agreements in place with our customers before any of this proceeds, so the intellectual property generated in the course of this work is protected from the point of view of both parties.

As far as the in-house projects are concerned, they are funded by the company itself. We use our own resources. To me, one of the key points in that area of our activity is that, putting it in simplistic terms, it is the sort of job where you just do it. They are short-term, quite often relatively easy problems to address and it is simply a matter of getting down and doing it—having the things made, the parts brought in, the systems assembled, the instrumentation installed, the measurements taken and the conclusions reached. As I say, those sorts of projects are typically weeks—months, at most.

**Mr FORREST**—With a customer trial, especially if you are still working in the wine industry—that is an industry that does have the benefit of funding supplied by growers and the wine industry, and then they pay you for the research with the benefit of those grants—is that a popular and emerging way of funding research?

**Dr Sykes**—Charging the customer for it?

**Mr FORREST**—Yes.

**Dr Sykes**—It is the way Flavourtech has operated from the start. Some companies object, it has to be said—some companies which are used to dealing with, say, a large outfit like Alfa

Laval, for instance. The larger equipment manufacturers have the resources to simply hand over a large-scale machine for six months for the customer to decide whether or not they want it. We are not in that position; we have to recover our costs, and I think that is the main reason that we have taken this approach.

Having said that, notwithstanding the fact that there are companies out there who do not like to pay for this sort of trial work, there are certainly enough who are prepared. Another factor is that we find repeatedly that the value which a customer attaches to a piece of knowledge is often related to the amount that they have paid for it. If you give things away, they tend to think they are worth nothing.

**CHAIR**—I know that you are going on advice from others within your company about the tax concessions, but one of the suggestions that has been made to the committee is, rather than having just the 125 per cent and then the 175 per cent optimum for certain circumstances of increased investment in R&D, have a multilayered system which basically rewards higher expenditure on research and development. To keep that cost to government reasonably neutral, you would probably have to lower the 125 per cent to about 115 per cent—these are rough figures—but then you would have levels that went right through to, say, 200 per cent. The more you invested, the higher the tax concession would be.

I think it could be relatively simple but I know that anything to do with tax is never relatively simple. Would that sort of incentive process be of interest for a company like yours that does invest heavily in R&D, because this suggestion came from a company that spends something like 30 per cent of its turnover in research and development every year?

**Dr Sykes**—It would be of interest to us. The principle is fairly straightforward, if I understand you correctly. As you say, you are rewarding greater levels of investment using that scheme, and that is probably a good idea. I think it would encourage people to maybe go that little bit further.

**CHAIR**—Thank you very much for coming across to Canberra. We appreciate hearing from organisations that are very much R&D focused private companies and you have had the additional interest that your company started as a spin-off company out of research and development being done at CSIRO. Thank you for your time.

**Dr Sykes**—Thank you.

[11.52 a.m.]

**BATTERHAM, Dr Robin John, Chief Scientist**

**CHAIR**—Welcome. As you are probably well aware, with these inquiries the committee does not swear in witnesses but the proceedings are legal proceedings of the parliament and warrant the same respect as proceedings in the House. Deliberate misleading of the committee may be regarded as a contempt of the parliament. The committee prefers all evidence to be given in public but should you at any stage wish to give evidence in private you may ask to do so and the committee will give consideration to your request. Would you like to make an opening statement before we go to questions?

**Dr Batterham**—Thank you for the opportunity to present to the committee and also to make some opening comments. I have a few which I do not think will be any news to the committee. Nevertheless, I would like to make them, just to emphasise where I am coming from. I found the quotation of Lord Sainsbury, Britain's Science Minister, recently to be the most appropriate base from which to think about this whole question of more R&D in industry and how to encourage it. His statement, which has been very much adopted, states:

> Business's ability to innovate is vital to its global competitiveness. It is only by continually developing new products, processes and services that business can gain the competitive edge necessary for the increasingly global economy. R&D (research and development) is a key component of this, helping to generate the advances that lead to new value-added products and enabling people and capital to be more effective.

That is a direct quote from Sainsbury. It emphasises the critical importance of R&D to Australia's future. It is not just having R&D; there are three components and your committee is looking at one key element of those three components. Recently we heard from another person who put it very succinctly. Lord May, who is of course an Australian, iterated that you have to have a really good science base. That is the first element—absolutely key. It has to be world class; it has to be competitive as a science base. Secondly, you have to seize the opportunities that science base produces. Seizing the opportunities is both an active and a passive device. It requires the environment that encourages opportunities to be seized. Thirdly—and the current Senate debate is a timely reminder of it—you have to engage the wider public so that they have the appreciation of what the science base can deliver so that they are comfortable with the ethics, with the content and with the directions in which things are heading. All of that is primarily so that they see the need to seize the opportunities and agree with it and support it. That is enough of generalities from me, although I am quite happy to expand on that. This notion of seizing the opportunity is one that I would encourage you to consider with all the deliberations you have in front of you.

**CHAIR**—Thank you for that and thank you for the submission and the comments you have made on the terms of reference. In a question regarding levels of funding, I pointed out that you could take another country overseas where the level of expenditure by business is substantially higher than what we spend in Australia, but the level of government expenditure in that particular country is actually less than government expenditure here in Australia. In answer to that, one of the witnesses this morning was suggesting that government should be spending more to help make sure business spent more. I pointed this sort of anomaly out and an extension of that discussion was that perhaps then government should be spending some of its money in a

different way, that maybe it is not the most effective way of encouraging business to spend more. Are there any areas where you see some of the current programs might be better focused to achieve a better business investment?

**Dr Batterham**—Thank you for the question; I am very happy to comment on it. Can I do so by coming from fairly wide out on some of the broad settings and then home in on some practical suggestions? We are looking at a changing scene here. We are looking at a scene where, even if you look at the figures I quoted in my submission for commercialisation performance—and I quoted the figures of the number of spin-offs, new companies formed in the 1990s from publicly funded R&D—and the comparison with the US and Canada, taking the 1990s as a whole, the figure does not look all that attractive. It is part of substantiating through the nineties the well-founded myth that government spending is about right, industry spending is on the light side, therefore it follows we are pretty good at inventing but not too good at commercialising. That has been the underlying myth. The figures I quoted were 3.3 new companies per $1 billion of R&D public funded organisations, versus 7.4 in Canada and 12 in the US.

If you fast-forward to the most recent data we have, which I know has been made available to you, you see a somewhat better picture of order: 16 start-up companies per $1 billion of research expenditure in the year 2000—this is a survey undertaken, with a fair amount of rigour, of the medical research institutes, the government funded research agencies and the universities, so it is fairly comprehensive—versus 13.8 in the US and 37.5 in Canada. You can look at this and say we are on track for the sort of target that I had proposed to PMSEIC a year or so ago of creating 250 start-up companies from our public investment in R&D within five years, with an expectation that this will add $20 billion per annum, which is addressing one of your specific questions, to our exports per annum and with a reasonable expectation of that. We are now more or less on track for that and this is telling us that we are now getting the settings more right than we have in the past. If I look at some of the specifics, I note that there have been considerable changes to the way venture capital has been treated in recent years. I applaud that as being a clear step in the right direction. I note, looking ahead slightly, that we have an innovation and research mapping exercise that has been announced. I would see this as a fairly important vehicle in helping to partly answer the question you raised.

I note with interest the current CRC selection process is likely to announce a significant number of CRCs that will have considerable potential and, just in terms of public alignment and public support, I think the announcement at the CEDA talk on 20 November that science and technology is a key part of Australia's future is important.

I come to some of the specifics where I think change should still occur and I emphasise to the inquiry that this is my personal opinion as Chief Scientist. I am not representing government or departmental positions, so of course what I present is my personal opinion, not any official position. Firstly, I look at how equity options are treated for people who are joining high-growth companies, who have perhaps been researchers or associated with research institutions and the like and are getting into that high-growth scheme. There is a lot more funding available now; courtesy of pre-seed funds; courtesy of our venture capital changes and venture capital funds being much better organised; courtesy of our business angels being a lot better organised than they have been in the past, and a growing number of them. If you look at it from the point of view of the people who have the information between the ears, who are out there learning by doing, this is such a key element of getting high-growth companies and getting more of them

and getting people into them. This is not something that you can teach in an undergraduate course. You can teach the elements, but you have to get your hands dirty. I think that is well accepted, by the way, on the North American stage, where you often hear the comment, 'If you haven't failed once, we're not even going to talk to you.' I do not think we have to adopt that as a culture, but the learning by doing we do.

If you look at that situation, at the moment there is not much encouragement for what is a bit of an inevitable path. This is an inevitable path of some investment into a good idea to get the thing going and then it will get to the stage where considerably more investment is required—perhaps to take it global, perhaps to get into production of whatever it is, and the like—and at that stage the investment vehicle is likely to change. That is the practicality. Whatever venture was set up, perhaps with a business angel or a pre-seed fund, moves into its mezzanine funding and so on. At that stage, it is quite likely that there is a change of ownership or the company structure changes and the taxation treatment then of equity positions which the inventor, the researcher, or the investor for that matter, might have built up means they have to pay tax on their options at that point, because the options are realised when the company structure changes. I am sure you have heard that from others, but I emphasise it. It is one that I have seen and heard plenty of people comment on.

I do emphasise that, if we want to have more learning by doing, we have to make it easier to get people into this path and that is one aspect of it. Another is that, if they have come out of CSIRO or government funded research agencies or universities, it may be that once the thing has taken off and become a ResMed or whatever, their best path is back to the institution they came from. How do they get back in again? Is there a clear open door policy; superannuation not truncated because of their lack of continuous service and so on?

We have some well-targeted schemes—the enhanced taxation concession, the Start scheme, pre-seed funds and the like—all of which should be encouraging more, rather than less, and it seems to me that one must have some sense of continuity there. As such, the representations that I get in moving around and talking to a lot of people are that some schemes are particularly effective and the Start scheme is seen as one. I think that suggests that the forward budgeting for that scheme and, indeed, any inspection of that scheme ought to bear in mind that it is seen as being fairly effective. This is the representation that I get and it is certainly my opinion. The question might be, 'What do you want to see more of, rather than less?' not just, 'What are the good ideas for more?'. That is easy; you rehearse almost everything and put it in a prioritised list. If the question then is, 'Which ones really should we be concentrating on?' I look at the pre-seed area. It is so important. I have already mentioned the options in taxation. I look at the Start scheme and see that that it is so important as a core and a backbone.

When I look at the taxation concession for R&D, there are almost as many opinions as there are people that are recipients of it—or not, as the case may be. I look at that one and say, 'That clearly has had an impact.' Its impact on additionality, however, is interesting. I think the data is not so easy to come by in that area. My own opinion, for what it is worth—and of course I make this comment now, having experience both within a large corporation, Rio Tinto, and also my position as Chief Scientist—is that, in the large company areas, the taxation concession is somewhat marginal in terms of any additionality. It is worthwhile, in that it is the right language. It does keep a focus. It does keep an awareness of the importance of R&D. It does occasionally make a difference to major investments. For example, I think I cited before the HIsmelt developmental R&D facility, which was put in in Kwinana. The choice was Kwinana

or Japan and at the time—this is going back a few years—clearly the presence of what was then a somewhat higher net effect taxation incentive swayed that decision. That has been admitted by the company concerned.

There is marginal impact, but I see the main impact of the general taxation concession as being that it is keeping the consciousness there. That said, if one wanted to target high-growth companies or those with potential high growth, then you quite clearly need more than 125 per cent. If one has accepted that the Start scheme is intrinsically good—because this is specific projects; it is competition; it is one to one type funding; it is exactly the sort of thing which many other countries do—for example Finland and Israel, where money flows to the end users rather than as a general concession—then I think you can look into the taxation concession and suggest perhaps some rebalancing to favour the high-growth areas at the expense of the longer term relatively stable areas. That is obviously against my own personal interests, in terms of Rio Tinto, but that is my considered opinion overall and a fairly brave one at that, I think.

If you look at the balance sheet of Australia, you find that it is really quite remarkably different from even 20 years ago—certainly from 50 years ago—and it is remarkably different in terms of the extent of intangibles on the balance sheet as compared with tangibles. Of course, this is a measure of the fact that we are moving into more of a knowledge based economy. It is worldwide of course. It is a reflection of the fact that capital and items associated with capital is only one part of the equation and probably, most economists tell me, only responsible for, at best, half the growth in economies. The other half comes from the intangibles, which is ultimately a function of the knowledge and its application—that goes back to science seizing the opportunities and the public support for them.

If we look at the way boards operate—and I have seen a little bit of that from time to time—they have the law of the land and a lot of training and culture associated with managing the financial side and that is particularly associated with the tangible assets. If you misquote your stock and inventory, that is 'go to jail' type stuff. If you fail to inform the regulators that you have made some significant accounting changes in how you treat your assets, that is a pretty serious offence. That is appreciated and understood. But if you either have or do not have an options policy—and I am not talking financial options but a way of valuing your innovation strategy within the company—I do not see that in annual reports, let alone see in the law of the land or the way directors are taught when they become fellows of the Australian Institute of Company Directors. I commend that body and the Australian Institute of Commercialisation, which are working hard to change the culture so that there is a focus by those who lead both small, high-growth and large companies on innovation, building it into the company strategy and treating the innovation assets—that is what option value of R&D is, so that is what option value of your innovation strategy is—the same as the bricks and mortar. There is a lot that can be done by encouraging the Australian Institute of Company Directors and others to treat intangibles with the same rigour as they treat tangibles.

**Mr MARTYN EVANS**—Dr Batterham, what you put forward earlier made me question. If we have reversed our track on the issue of the number of start-up, spin-off companies, for example—and you cited the latest figures which show a very pleasing trend in that area—it would not be easy to point to the changed policies which have brought about that very pleasing reversal, and it would not be easy to pin down the factors which have necessarily brought that out. You would not be able to say, for example, that reducing the tax concession from

150 per cent to 125 per cent was what brought about that change. If it is, perhaps we can have even more success by reducing it to 100 per cent, and that will increase the rate even more.

**Dr Batterham**—I trust that is a shared nightmare, good sir!

**Mr MARTYN EVANS**—What that made me think is perhaps we need a little R&D about R&D. While we have committees like this and we have your excellent report of a year or so ago now, this type of inquiry now is an exercise which we conduct in the public arena and they are basically, we might say, economic, political, public inquiries. They are not scientifically based R&D research into the actual motivating factors. They are not research in the scientific sense of that word, which might examine the multiple variables at work here, try to isolate some of the factors that are at work and look at the science behind the science of R&D. Do we need some of that to pin down some of the policy variables? If we are experiencing some of these changes, are we changing some of the variables here without actually understanding the underpinning science at work? While we might change the tax rates and boost the start grants and so on, are we doing that just a little bit more in the dark than we ought to be?

**Dr Batterham**—It is a splendid question. There is no definitive work or answer in that area, which means that yes, it just has to be worthwhile looking at it more carefully. If I could perhaps suggest two broad areas where more understanding is required rather than less, the first is that I have come to the conclusion, after some years of looking at this, that there is no such thing as the best or a perfect national innovation system.

**Mr MARTYN EVANS**—Sure.

**Dr Batterham**—It is actually for a theoretical reason. It is a little bit like the uncertainty principle; the more you observe something, the more you don't know what it is because you change it by observing it.

**Mr MARTYN EVANS**—You change it by observing it, yes.

**Dr Batterham**—In the innovation area it is the fact that innovation ultimately has to stand in a very competitive world market. People are out there trying all sorts of things and they are not just individuals—governments, nations, are trying all sorts of things—and by the time you have figured out what you are doing, somebody else has come up with a smarter way of doing it and they have got the GlaxoSmithKline, or whichever large multinational, to come to their place rather than to ours. You have to say, 'Whoops, we've got to take on another bright initiative.' But that does not say that one should not look, and look fairly carefully.

Indeed, there are a few things which should happen with the mapping exercise before I get onto another specific. The mapping exercise that is coming up should be taken fairly seriously as a way of identifying some strengths and weaknesses and where we might go. The other part of this first response is that it is very clear from the classic Porter and Stern analysis that competitiveness comes from not just clustering but the factor conditions, the input conditions, the market connections and what have you around whatever the cluster is that we are talking about, whether we are talking Neurosciences Victoria or the Italian shoe industry. The Porter and Stern analysis is one that we can well look at to give us the macro picture. It tells us that activities you take which promote clustering and the factor input conditions that are relevant to it are worthwhile. I use Neurosciences Victoria as an example to say that co-investment by the

federal government and the state and territory governments has to be worthwhile. Whether we are talking new ways of producing energy with zero emissions, whether we are talking commercialising the latest science or whatever, there is a gospel according to Porter and Stern. Australia can well take heed of it.

The practical example which I wish to lay before you is Neurosciences Victoria where four world-class institutions in neuroscience—world-class in terms of the quality of some aspect of neuroscience which they are undertaking—the National Stroke Research Institute, the Howard Florey Institute, the University of Melbourne and Monash University decided to pool resources because they saw the complementarity of what they were doing. Neurosciences Victoria formed a critical mass of research which pooled together about $30 million of funding. They were able to attract $14 million of Victorian science and technology infrastructure fund—I hope I have got what STI stands for right but it was certainly $14 million out of that. Then there was $18 million from the federal government through a major national research facility to take that Victorian initiative national. I applaud the co-investment mentality behind that.

Of course the consequence is that they now have a critical mass of world-class neuroscience going on, recognised within six months of the formation of it by $25 million coming from Schering AG, the German pharmaceutical company, for just one specific research topic. That is the sort of industrial investment that is almost drawn in—I would not say automatically, you have to work very hard to make it happen—when you concentrate on being world class. That is an answer of this multifaceted nature that says co-investment is the name of the game. Concentrate on excellence. Clusters do matter. It is not a single answer of, 'Let's have more on the tax concession,' or not. It is multifaceted.

There is one other line in this area, in response to your question, which is about outcomes. We do not have a consistent approach to outcomes in our R&D and its commercialisation, particularly in government funded research agencies and universities. You see it in all sorts of ways: the triennial funding for the major research agencies and, for that matter, for the universities in terms of how their research moneys are handed out. I do not think we are targeted enough in the competitive areas, point 1. Point 2: the language of outcomes is very varied, such that we are not able to pull common elements out of it and answer your very question: have we actually changed things for the good or for the bad by making any significant changes?

I could cite recent work of the Centre for International Economics, which looked at some CSIRO activities that showed quite spectacular returns for research in terms of its impacts, not to just single companies but to a range of companies and for public good, as measured in various ways. When that is showing internal rates of return around 60 per cent, which it was, for a range of projects—and not picking the eyes out of CSIRO's portfolio, I might add; it was properly done, a decent economic study—the question is, 'Why don't we encourage the superannuation funds to shift their moneys from nonperforming equities and put it all into Australian R&D?' The answer is, if I can answer my own question in answering yours, that you cannot do that sort of rigorous analysis of outcomes and their impacts for the whole of the R&D, both private and public, because the amount of effort to do so would, of course, mop up a lot of resources. But you can do it for selected areas and you can get, I think, an agreed framework of the broad areas that are important. By that I mean things like economic benefit of improvements in the environment, or at least a common framework for how we look at environmental impacts, for example. What, if you like, are the 12 key outcome areas and how are you going against them in general? For every agency and, for that matter, for every scheme

that we have, what is the impact of your scheme by a few case studies to give you a measure of it? We just do not have that sort of common data.

**Mr MARTYN EVANS**—No-one is doing that, are they?

**Dr Batterham**—No. I think it should happen. I agree with you.

**Mr LINDSAY**—Dr Batterham, do you have any comment to offer the committee in relation to the way state and territory governments should work in a more coordinated way to bring investment dollars into the country? Do you see that as a problem?

**Dr Batterham**—I do see that as a key area. I gave Neuroscience Victoria as a positive example of how it is happening. I see that we have a ministerial council for innovation. We do not have one for science or R&D and I do not see that as a particular problem, but I do see innovation and how we are making it happen as a most appropriate item for the heads of government to consider—COAG and their ministerial councils and the like. The realities are that we are seeing more and more co-investment happening, but all sides of that co-investment—it is really three-sided because it is industry as well—have to accept that silo mentality on any single funding initiative is not helpful. The cooperative research centres are a classic, in that they have always pulled various sources together. We need to see the same thing with the major national research facilities; we need to see it with any scheme that looks for real opportunity for co-investment. The Queensland and Victorian governments, I note, have gone a long way to looking at how they can co-invest with the Commonwealth government—and, indeed, with each other, I might add—in something like the Biomolecular Research Institute. To sum up, my answer is that this is an area of great importance because we are too small a nation—I know we are a mid-sized economy—to allow silo mentalities to rule. You need significant critical mass to have impacts in most areas of R&D these days.

**Mr MARTYN EVANS**—I want to ask you about biotechnology and the way in which research in that is being undertaken. Clearly biotechnology is going to be one of the focuses of research, particularly in Australia, not only with human health but also with agriculture and with plants and animal research. That is significant for Australia, as well as the human area. It has been an observation of mine, and I have heard it said by others that it is going to be a focus of university based research, that whereas much of the industrial and manufacturing R&D has been able to be undertaken by industry itself in-house—and the example you gave of Rio Tinto recently has been true of that—a lot of the biotech research seems to be undertaken in university based facilities and in other external research facilities. Is that a trend that you have noticed in your work as Chief Scientist? If so, does this indicate that government, in its approach to grants and support for R&D, needs to be aware of that differing trend? Clearly the degree of expertise that is required in biotech, the differing areas from which it will come, does indicate that a longer term, independent base in the universities, for example, may well be an easier way for industry to fund research and to capitalise on it and commercialise it as it emerges from those institutions, rather than attempting to do that in-house, with the obvious exceptions probably being some of the big farmer companies which have particular lines to pursue. In general, is it the case that you have observed that this is true of the universities and how do you think we are going to adapt to that in terms of our industry support for R&D support programs?

**Dr Batterham**—This to me is a very structural issue. It represents the different nature of the companies that we have. It is equally as meritorious to have the knowledge intensity increasing

in our agricultural and manufacturing industries, in our mining industries, as it is in our purely knowledge based products and the service industries. You can make a world impact and carve out a world market and show good returns for Australia in all of those. Whether it is western rock lobster or whether it is new varieties of wheat or what have you, particularly when you look at Australia heading along the line in whatever it does of showing it is sustainable, that becomes highly marketable in the long run. I am not too worried by the fact that we put a lot of effort into those industries that are not, if you like, the bio-related areas per se. When you do look down into the bio areas and, for that matter, the ICT areas as well, you find that because of our structure there are two things that we have to do well because we do not have that ground of large multinational Australian companies operating out of Australia. Our scorecard of what we have grown up to large size is pretty small thus far.

That says to me that the two things that we have to do and do very well, perhaps with a lot more emphasis than other countries, is firstly concentrate on high growth; concentrate on the high-growth companies that may come out of the university and the government funded research agencies. Easing that path and encouraging that path is so important. There are not the natural mid to large size receptors there already to be doing the work, so we have to create them. I did mention that I think we are on track for the 250 start-up spin-offs heading towards high growth within the next five years. That, I think, is the first part.

The next one is that strategically we should be saying that multinational investment in R&D in Australia is worth while, even if it is not in the first instance targeting manufacturing whatever the product is in Australia; pharmaceuticals, for example, although I would not like to get too far along that line and perhaps pharmaceuticals is not the best case in point. The general point that I am making is that getting R&D done by multinationals in Australia is worth while, because it has all sorts of impacts apart from just doing more R&D. It is in the number of the people who are available; it is in the training; it is in the notion that we might provide more postdocs, for example, specifically to work with companies in the bio areas, because then you can see people will move out and do their own thing.

I would use an ICT example in Finland and my understanding of some local translation of Finnish when I saw a Finnish newspaper about two years ago which listed the top 10 wealthiest people in Finland, where six out of the top 10 were, firstly, aged under 45 and, secondly, all in the ICT business. Unlike the lists that you see in Australia which do not have that characteristic, as we all well know, that one has massive impact of course. It is a message to students in schools as to what they are going to study, it is a message to government as to what works and what does not work and so on. The point I make about it is that of those six within that category, not one of them worked for Nokia, and it just tells you something.

**CHAIR**—I just privately asked, 'Did they all work for Nokia?'

**Dr Batterham**—No, not one of them. What that tells you is that there is a whole string of medium sized enterprises which undoubtedly feed into Nokia and supply all sorts of components and developments for Nokia and they are the base on which Nokia rests. Given that about 40 per cent of our R&D is in the life sciences and biotype areas, it is a reasonable area to be targeting. This is why this 250 per cent is so important because, if we get that base going, just by chance and by a bit of encouragement now and then one of them is going to become a brand name like Nokia. We cannot guarantee it, but what is our best chance of seeing that happen? Answer, concentrate on getting that 250 per cent through.

**Mr LINDSAY**—Your suggestion in your evidence that Australia develop the teaching and promotion of entrepreneurship and business skills to science, and the reverse—to science, to business students—does that happen in any other country in the world that you know of?

**Dr Batterham**—The answer is yes and I might say also it is one of these areas where there are some pretty encouraging signs happening in Australia. The classic examples are Stanford and MIT, where the MBA students get to work up business plans and the like for real R&D going on within their institutions. There are various working examples of that, some of them along the lines that the university once a year opens the door to the outcomes from those—what the actual business plans are—as a way of highlighting opportunities that can come out of the university and there is a waiting list to get in and you pay quite an up-front fee to get in.

**Mr LINDSAY**—If this committee was of a mind to recommend that, what would it be that we recommend to the government? How could you encourage tertiary institutions or tell tertiary institutions they should be doing this? What would be your suggestion?

**Dr Batterham**—Rather than try and remember the few initiatives—because there are a few initiatives going on in Australia in this direction—and perhaps getting the names of the institutions wrong, if I may, can I give something in writing on that specific point? It would be along the lines that there are some encouraging initiatives going on in specific institutions and naming them, but I do not want to get the institutions wrong. This can happen within a couple of days, if it is appropriate.

**Mr LINDSAY**—Yes, and I would be interested to know if you thought that it should be mandated that courses do this or it should be left to individual tertiary institutions to do it.

**Dr Batterham**—I wonder how you encourage this. I suspect that the ability of universities, in particular, to mandate anything is extremely limited, given that they all operate under their individual acts and they have some quite extraordinary governance processes. However, the way one can get at this, of course, is in how one assesses their outcomes in terms of the broad funding that flows to them.

**Mr LINDSAY**—Yes.

**Dr Batterham**—I do not think I would recommend mandating. I think the effective thing is to say, 'Well, if there is research and it is in this area or in terms of base teaching, here are the sorts of outcomes we are looking for,' and it might be that some of the block grant money is put aside to, say, encouragement of commercialisation and then there are three or four specific recommendations. What you are suggesting—and I am endorsing it—is like the quality teaching process for the university several years ago, when there were some funds made available. I do not see why it would not come off what is there—although my university colleagues would not like to hear me say that—and be specifically awarded for initiatives in a particular area.

**CHAIR**—That is an interesting topic. It has been around for some time, though. When I did a degree, the science based degrees—engineering et cetera—were required to do a certain number of general studies subjects—economics and those sorts of things—but it was never the reverse. The arts based subjects were not required to do science based general studies. It is actually not new, but it would be interesting to look at how widespread that has been in the past and what has happened in more recent times.

**Dr Batterham**—I think that engineers and medical scientists and biologists and so on need exposure to, as a minimum, how to read a balance sheet and, secondly, how commercialisation of new technology is so important and what is involved in it. Elements of that have been around, as you point out, for a long while, but could and should be encouraged even more. Those particularly studying MBAs and the like and in the business schools need to be exposed to opportunities, if only just within their own institutions. That, I think, is the one I am referring to. There are some good signs and this is starting to happen, but I think it could be encouraged a lot more. I would be happy to submit some comments on that.

**Mr LINDSAY**—I would be happy to see the material that you provide. This was in your written evidence and I did not understand it. It was under the heading 'What are the impediments to business investment?' and it is the first point. You stated:

> With a process of employee share ownership that encourages researchers to invest in their own business there will be new sources of available capital. With flexibility in superannuation provisions researchers will not lose their financial base when they pass through a failure ...

What did you mean by that? Could you explain that to me? Where is the link to superannuation?

**Dr Batterham**—That particular dot point has about three lines in it, all of which really should have ended up as separate dot points. The first point I was making was about employee share ownership. That has two things associated: the one that I addressed with options and the taxation treatment of them, which is not spelt out there. That is a real read between the lines. I apologise for that oversight.

Secondly, if you have any of your own capital, depending on how that is treated for a high-growth business, that is a second source of potential capital and need for flexibility. The superannuation one was specifically to ensure that there is a reasonable, if not highly supportive, treatment of people's superannuation entitlements, if they leave an institution or half leave an institution, to go out and work on the commercialisation of something, and then come back full time to the institution. The preservation now works, I might add, but the difficulty some people face is that preservation is fine but it might be that they are doing a halfway house literally of, say, consulting, technical involvement and so on, and as such they drop down from a full salary onto partial and what have you, and that is not necessarily so easily handled on superannuation.

My comment on the failure is just the classic one. This is an area where you expect failures. Not all commercialisations will succeed. The route back is just as important as the route through.

**Mr LINDSAY**—Back to superannuation: we have had a fair bit of evidence that says that academics should go out and work in business and businesspeople should go the other way, perhaps, or there should be no impediments certainly to academics moving backwards and forwards. Your submission to the committee is that one of the things we should consider is the superannuation element of that so that there be no penalty to academics for freely moving. Is that your understanding?

**Dr Batterham**—Correct.

**Mr LINDSAY**—Do you want to offer a comment on investor confidence in Australia? It is probably a little out of the Chief Scientist's view, but you move around Australia. How do you find investor confidence?

**Dr Batterham**—We all as individuals have a lot to answer for. I cannot think of the Latin for mea culpa in the plural. I can think of it in German. We all have a lot to answer for in that we expect very significant returns for our superannuation. We do not like seeing superannuation funds heading into negative territory in any one year—it is not particularly helpful—or retirees, their savings and what have you. I look at this investor confidence as very related to that. There is extraordinary pressure for short-term returns. To answer directly from what I see moving around, there is plenty of confidence to invest, but what is not clear is the classic equities versus property versus whatever—or just holders of cash and the like—where that equation is heading.

**Mr LINDSAY**—I am pleased to hear you say that. You know, more than any of us, just how good Australians are at thinking up ideas and developing things that lead the world. Some people have given us evidence saying we should be out there telling everybody, people should know that Australia is just so good. What should we do? How do we tell everybody that we are so good? How do we get that message out there?

**Dr Batterham**—We can do a lot more in that area and part of it is down to the level of the individuals. Part of it is at institutional level and part of it is also on that company side, in terms of directors and what they look for, and the culture and strategy within companies. When I look at it at the individual level, it seems to me that when you look at something like Science Meets Parliament Day, a couple of years running I have noticed the comments, if I have interpreted it correctly, along the lines of individual politicians saying to the scientists, 'Well, I really didn't know that sort of thing was going on.' That is a bit of a black mark on the scorecard.

If there is not a wide understanding of the exciting stuff that is going on there, then who the heck is going to seize the opportunities, rather than just the limited few who are in there creating the ideas? At the individual level, I think there is a requirement to be out there. It is partly for schools, for the long-term influence that it can have there in students' education. It is partly for the local service groups, the representatives and so on, at local, state and federal level, and likewise for getting the messages across to SMEs who may just simply not be exposed to the source of opportunities.

I am giving you a fairly multifaceted response that says we simply have to be more active in getting the message across about the potential of this base that we have. That does require a certain degree of not so much benevolence but positive direction to the major agencies, the universities and the funding bodies, that talking the talk as to what they are doing is a totally legitimate activity, because it costs. It takes people's time to go out and visit the local school or what have you, and I am using this spectrum of activities that should be happening. You cannot just assume that it is going to happen.

We have to accept some billions of dollars of expenditure on the government's side per annum and we have to persuade people in industry who do take innovation seriously that the spreading of the word here is something which is totally legitimate and should be expected. This is one of these classic things: short-term interests versus long-term interests. Short term says, 'Don't do it because that costs, so why the heck can't you enter productive activity?' Long

term says, 'If you're not doing it, then you don't move the culture fast enough for us to be internationally competitive.'

**Mr LINDSAY**—One more question. I am hearing the scientists say that we should also be very much marketeers and you are very supportive of that. You have talked about how we do that within the country. How do we do it in the world so that we tell all of those investors out there that Australia is a great place, we have the ideas, we have the people?

**Dr Batterham**—I am not expert in the range of schemes we have, including all of Australia's trade network.

**Mr LINDSAY**—Austrade, yes.

**Dr Batterham**—Austrade. I have seen a bit of it first-hand and encourage it. I am not expert to comment on that. I can make a comment, however, from the straight science side. Science itself is international. Science involves the basic stuff getting up there in lights in peer reviews: something like the odd Nobel Prize or Nobel Laureate returning to Australia or the like, the high fliers being very visible. Encouraging excellence would be my rather pointed answer. Encourage excellence, because in and of itself, it shines in the world.

**Mr LINDSAY**—Fantastic.

**Mr FORREST**—This question has probably already been asked in my absence: has anybody asked about the Israel-Finland example?

**CHAIR**—Dr Batterham referred briefly to Finland in an answer, but go ahead.

**Mr FORREST**—You mention that we should carefully target the approach in both Israel and Finland where much of the government assistance for R&D is by direct injection. Could you answer that a bit more fully and, if you cannot, provide us with some information. What do they do in Finland and Israel that is different?

**Dr Batterham**—They have more of an emphasis on start type schemes where part of the incentive flows directly to the end user company. In Finland Tekes is the name of the body that coordinates that and makes a lot of the investment. In Israel it is quite systemic. Perhaps that is specific enough. What I was targeting there was saying that type of scheme has a very good track record in those two countries. Both of those countries sing the praises of it. It is not just my casual observation of it.

**Mr FORREST**—Can we get access to more information about that?

**Dr Batterham**—Yes, I can provide some information or at least point to where it can be easily found.

**CHAIR**—Dr Batterham, if I could just finish with a couple of quick questions. The other hat that you wear is, as you mentioned, with Rio Tinto. The mining sector in Australia is a very big exporter of innovation. Much mining software being used all over the world is Australian. Some of the evidence we have had in the inquiry is suggesting that we could be losing much of our

R&D in the mining area here in Australia as takeovers take place, as smaller mining companies in Australia are being taken up by very large players—South Africa, England et cetera. As a result, there is a need for research facilities here in Australia going offshore. Firstly, I would like your comment as to whether you feel that is really the case. I said we had some evidence but I think there is some conjecture about whether that really is a major danger in the future.

Secondly, if it is, what could we be doing to protect some of that R&D here in Australia? Probably more importantly, what else can we do to encourage some of the multinationals to look towards Australia as a base for research and development? It is quite clear that the really big dollars in research and development are done within those sorts of companies. The more of those that can be doing their work here rather than elsewhere, obviously, the better.

**Dr Batterham**—I have to answer that question from primarily a Rio Tinto perspective. I cannot, as either Rio Tinto or the Chief Scientist, make comment on BHP Billiton or a string of other companies, although of course I have a fair understanding of their workings, but they should speak for themselves.

Firstly, from a single mining company perspective, albeit a reasonably large one, the Rand report—which was part of the roadmapping exercise for the mining industry in the US undertaken by, I think, the Department of Energy—highlighted that the extreme competitiveness of that industry, the increasing regulatory pressures—both environmental and product—the increasing expectation from society as to the benefits that are delivered from mining meant that there was an extreme pressure on costs. R&D of course, whilst it is accepted that it is an investment, is at the same time a cost. Any investment is also a cost.

The consequence is that R&D, particularly in the more basic areas funded by industry, has significantly diminished. That is the information that is available publicly. That is worldwide. There are no significant exceptions to it. That has impacted on the US Bureau of Mines, a whole string of institutions around the world—Imperial College mining not the least. What has come out of that is that the industry is now much more prone to look at early-stage work and tackle it collaboratively than it has in the past. It has a good track record of doing this anyway. The Australian Mineral Industry Research Association, for example, has been a focus. What is happening is that this is now becoming a global focus for precompetitive work.

You have things like the International Network for Acid Prevention, which I am chair of, focusing on world mining activity—over 70 per cent of mining activity—for R&D and technology needs, and doing so in a coherent, collective manner. You have discussions under way or encouragements under way, including from me, for AMIRA and the European and Canadian equivalents to join forces, to the extent that they can, to deliver to the world industry. Those are forces at work which are well beyond Australian shores. What is very clear then is that this global focus for the precompetitive work will focus on those countries that can supply the world-class R&D.

Australia has an excellent track record and is in fact one of the world leaders, if not the world leader. It comes from the Ian Wark Research Institute in Adelaide; the hydrometallurgy CRC, the A.J. Parker Centre in Western Australia; the well-known and long-running Julius Kruttschmitt Centre in Queensland; another CRC, CMTE—the Centre for Mining Technology and Equipment—in Brisbane. These are absolutely world class and they get the support of the

multinationals. CSIRO of course is involved in working with all of those and in its own right in the same way.

I am not too pessimistic about these global trends because quality bubbles to the top and will drag the attention. That said, you cannot guarantee it and you cannot just assume that, because we have had the track record, it will continue. As you are suggesting, we may not be able to perform in the future. Therefore, there should be some encouragement of the focusing efforts, such as CSIRO's flagship projects at the moment, to give them a real chance and to give CSIRO every encouragement to do that focusing, so that resources are brought to bear on some of the longer term strategic issues into which Australia has not put all that much effort, although it does have the capability, such as in developing light metal industries. If I were looking in the mining equipment area, I would say total automation of underground mining. These are areas where Australia can have an impact on the world and we have to ensure that the CRCs and the CSIROs of this world are encouraged, not discouraged.

**CHAIR**—Thank you. We could continue discussion for some time but unfortunately we have run out of time. We very much appreciate the contribution you have made, particularly the comments here this morning as part of this inquiry. We will reconvene the second part of the hearing this afternoon.

**Proceedings suspended from 1.00 p.m. to 4.47 p.m.**

**BANKS, Mr Gary Ronald, Chairman, Productivity Commission**

**LATTIMORE, Dr Ralph, Assistant Commissioner, Inquiry C Branch, Productivity Commission**

**CHAIR**—I welcome representatives from the Productivity Commission. I point out that, while the 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. Would you like to make an opening statement before we proceed to questions?

**Mr Banks**—Thank you very much for the invitation. I am sorry that we were not able to oblige you earlier but we had a clash of diaries. I will make some very brief remarks and then we are both happy to take questions. Ralph Lattimore heads up one of the research branches of the commission and is more expert than I, I would say, in a number of these areas. As you know, and I indicated in my letter, we were not in a position to do some additional research for this review, given the other things on our plate at the time, but what we were able to do was to make available to you a range of relevant studies that both this organisation and its predecessors have conducted over a number of years.

I will briefly mention those. They go back to what was probably a flagship report that the old Industry Commission did in 1995 in its inquiry into research and development, which I still see being cited and which presumably still has some useful contribution to make. That was a very wide-ranging inquiry into all dimensions of R&D, only one of which was business R&D. We did an inquiry into telecommunications equipment in 1997 that Ralph and I both worked on. A particular focus was on the CRCs and the R&D taxation concession and we made a number of recommendations or suggestions for improvement.

Ralph and his team undertook a study entitled *Innovation and Firm Performance in Australian Manufacturing* in 1997, which used the ABS innovation survey to get some insights into innovation and to draw out, in particular, some differences by firm size. That was followed by another report called *Design Principles for Small Business Programs and Regulations*, which is self-explanatory. Another one on *Statistical Analysis of the Use and Impact of Government Business Programs* used the ABS business longitudinal survey, which has been a very useful source of data, to look at the uptake and the effects of programs. Indeed, it finds that small businesses rarely use such programs, but that R&D programs do appear to have significant effects on R&D but unclear impacts on productivity.

The final and most recent—in fact, it is not out yet—is our *Evaluation of the Pharmaceutical Industry Investment Program*, or PIIP, which is going to be released tomorrow. That looks at some of the eligibility issues raised by the present tax concession and their implications for multinational enterprises that wish to retain ownership of their intellectual property abroad.

Looking through some of that over the last couple of days, I thought I would just draw out a few themes and messages that might be relevant to your deliberations. I will go through them very briefly and then I am happy to take questions on these or, indeed, any other matter. One message coming out of the commission's work, which will not surprise you, is the importance of R&D, or technological innovation more generally, not only to the performance of firms but also to the wider economy. A second message is that more R&D is not necessarily better—either better R&D or better for the economy—and how much R&D and how well the R&D is done depends on a range of things, including the incentive to do it, and competition plays a role there; the nature of the activity of the firm and, in a sense, how technologically amenable it is; how well integrated R&D is with the production and marketing activities of the firm, and the quality of people in the firm itself; and, lastly, how the firm perceives the kind of advantage it will get in the marketplace by doing R&D and how durable that advantage might be.

This leads to the broader question of the potential for underprovision of R&D from a national perspective, because of the inability of firms to appropriate all of the returns from that R&D, and you will have heard a lot about this before. We see that still as the main rationale for government intervention and most of the other rationales, or seeming rationales, do not withstand much closer scrutiny.

Another message coming out of all that work is that getting policy right in this area is extremely difficult. I am sure I am not telling you anything there either. If we go back to that earlier Industry Commission report, a theme of that report and a central message was that the uncertainty about the outcomes of intervention mean 'a robust policy for R&D must involve a combination of approaches'. R&D policy is experimental itself and it needs to be carefully designed and periodically reviewed to ensure that we are actually helping.

The commission over time has seen particular value in generally available or contestable programs—programs that have clear criteria, are well targeted, and are designed to get more socially productive R&D, rather than just rewarding what would have been done anyway. That is not easy. Everybody can agree that R&D is a good thing but how to do it and how to prompt it most cost effectively is the trick, especially when you consider that raising taxes is not costless—and we have been hearing a fair bit about that in the papers. Those costs of funding R&D programs are quite significant and, when you take them into account, determining a net pay-off becomes more problematic.

Another key finding over time is that subsidy rates for R&D in Australia are generally comparable or more generous than those overseas, particularly when you look more closely at what looks like a beaut program overseas and you discover that it is quite selective in its application and so on. The lower ratios of business expenditure on R&D that we observe in Australia have more to do with Australia's industry structure being rather less R&D intensive than the industry structures in some other countries. The services sector in this relatively small economy looms particularly large and, while the service sector does much innovation, not a lot of that is technological R&D, although services are big users of technology.

Another point about BERD, as it is called, is that time-series trends can be affected by definition. This has been an issue in the latter half of the nineties. The department of industry, I think, commented that we were seeing a resumption of the previous rapid growth in business expenditure in R&D. Indeed, work that Ralph and I had done about a year or so ago suggested at that time that the setback in BERD spending had more to do with the removal of

unproductive R&D related to core technology and the valuation of feedstock and so on in the R&D syndication program. That was an important part of the story of the dip that we observed in BERD and you could argue that that has shaken itself out and we are now seeing an almost complete resumption of the previous trend.

Most small to medium sized enterprises do not do much R&D and many of them do none. That is not necessarily a problem or a policy problem. It can reflect their environment, the environment in which they operate, and the activities in which they involve themselves. Many of them are service firms, as I have indicated, or contract suppliers, where the need for R&D is much diminished. That also means that most SMEs, as they are called, do not access government programs aimed at increasing R&D. Apart from those other reasons, compliance burdens can loom particularly large for small enterprises.

For those SMEs that are what we call R&D ready, access to finance has been a continued lament, and that is something we have looked at over time. Recent work by the Reserve Bank of Australia suggests that there are no obvious problems in terms of borrowings. The issues arise more on the equity side, as you know, but there again, the venture finance industry has been growing quite strongly but not the so-called angels, and that is the area which small start-ups often depend on for their equity injections of capital.

SMEs often have a lack of knowledge and know-how about where to focus their R&D effort. There can be typically duplication of effort or misallocation of effort. That is another issue that has arisen in that area. Lastly, technological R&D is often less valuable as perceived by SMEs than other forms of innovation; organisational innovation, innovation in terms of the relationships with their customers and so on.

A few comments on policy come out of that. You could say that R&D policy over time, and certainly since the Industry Commission's 1995 report, has evolved in ways that much better meet the needs of small to medium sized enterprises. If you take the R&D tax concession, for example, our concern at that time was that it was not directed at incremental R&D, it was spread relatively thinly, in a sense, and there was a lack of support for firms in tax loss. Two innovations in the R&D tax concession have addressed both of those issues. We now have a higher rate for incremental R&D and we also have up-front support for companies in tax loss.

There are also programs for selective support, as you know and are familiar with, apart from the tax concession: equity finance, commercialisation and, of course, the CRC program still. This is a diverse suite of measures and I guess it meets that principle that we enunciated in 1995, in terms of having a variety of programs coming at the problem from different directions. Many of those programs are still relatively new and we think it is desirable that, in turn, they be periodically reviewed to assess their effectiveness.

The final point that I would end on comes back almost to where I started, and that is that business expenditure on R&D should not be targeted for its own sake. The benefits that we get from it as a society come from its contribution to income and living standards, which manifest themselves through higher productivity. As you would be aware, Australia's productivity performance over the last decade has been exceptional. We have seen multifactor productivity grow at 1.8 per cent on average a year, 2½ times higher than the previous average. That extra one per cent of productivity a year soon adds up. Some back-of-the-envelope calculations suggest that it has delivered an increase of $7,500 per annum in household disposable income.

Much of that has had to do with innovation, of which clearly business R&D is a part, but also other forms of innovation. These have been prompted by increased competitive pressure. They have been facilitated by greater flexibility in work arrangements. Indeed, you could say that all of that process of reform, of innovation in the broad that we have been through in this country, has brought us much closer to the technological frontier. We have caught up, or caught up substantially, from where we were a decade ago. If you look at our adoption of e-commerce and ICT in this country, we are right at the top of OECD countries in adoption rates.

If we are going to stay at the frontier, however, R&D does become increasingly important, and how well we do is also determined by the related issues of the quality of our people in Australian workplaces and also, behind that, our education and training systems. Thank you for allowing me to make those introductory remarks. We would be happy to take questions.

**CHAIR**—Thank you for that. You raise the issue of variability of definitions. A presentation at the Melbourne Institute Public Economics Forum back in 2000 raised it as well. It is a subject that has come up in various submissions and discussions as part of this inquiry. I noticed in your opening words you effectively separated innovation from R&D. I would argue that innovation is research and development. I wondered whether you have looked at overseas comparisons and particularly the BERD comparisons we are making, by saying Australia is well below the OECD average. How do other countries define these things?

**Mr Banks**—I will have a go and then Ralph will probably have a better go. When I was trying to distinguish between research and development, and innovation, I was not saying that they are separate but, rather, one is a subset of the other.

One way of talking about research and development is to talk about technological innovation but there is a lot of innovation that occurs in terms of processes and relationships and interactions and so on in the workplace that is quite productive. You call it innovation because it is new ways of doing things or producing new things. It is quite valuable but it may not have an inventive technological component. It might be using new machinery. The adoption of ICT in the wholesale sector is a very good example, where they have used all sorts of data-processing technology to reduce their costs of holding stock, and so on, to adopt just-in-time methods. That is all innovation and it has been very productive for them. It has gone through into higher productivity, but there has been very little original R&D there. The R&D has been done by somebody, but not in that sector.

The point I was making is that we have a large services sector where there is much more of that bolting-on of technology occurring, and there are great productivity benefits from it, but not so much original technological R&D. The BERD comparisons I do not think are affected by that consideration but I might just pass to Ralph to comment.

**Dr Lattimore**—There are standard definitions. The OECD has a standard definition for R&D. That is widely used as a basis for international comparisons. Nevertheless, unlike something like employment, the fact is the data is compiled from firms who are categorising expenditures as meeting the definition and there will be substantial errors and differences between countries. How big they are is really unknown.

That is one picture of R&D. Another picture is that which emerges from program usage. That will vary substantially, depending on the exact eligibility criteria. For example, Gary talked

about feedstock. There was a time in Australia when an experimental abattoir, a pilot plant abattoir, would have the carcasses going through the plant described as R&D feedstock. They were sold as meat. It would be highly questionable that you would really properly categorise that as R&D but, for the purposes of eligibility for the program at the time, it was.

Similar conditions arose in respect of R&D syndication for aspects of core technology. Core technology valuations are very elastic and yet they can enter the definition or the amount of R&D. When it comes to programs, there is quite a lot of elasticity about the amount of R&D that is taking place and, when you are using program R&D as a basis for comparison, you can end up with very difficult comparisons between countries, and over time.

**CHAIR**—Related to all of that, you have obviously had a close look at the figures for Australia over the last decade, from the comments that you have made. There was a reasonably sharp increase in, I think, the 1994-95 and 1995-96 financial years, followed by a similar decrease which happened to coincide with a reduction from 150 per cent to 125 per cent. Some of the evidence that we got along the way—and I cannot recall exactly from where—suggested that a lot of that sharp increase, because of the allowance of retrospectivity, was simply a case of accountants going through books and finding things that might fit, to then push into those couple of years, so that if you take out the increase and the decrease, you in fact have a reasonably even curve. Do you have any comments on that?

**Dr Lattimore**—That is consistent with what I understand and my expectations, because while of course the reduction from 150 per cent to 125 per cent represents a real cut in subsidy, everything we know about the responsiveness of R&D to subsidies of that kind suggests that what you would see in the macro data would be a small reduction in the amount of R&D that would take place. But, of course, you do not observe that world. You observe a world in which lots of things are changing, so the coincidence of many factors—including retrospectivity—gets confused with the single effect of the reduction in the subsidy rate.

**Mr Banks**—If I could just comment further, I think the point you allude to about discovering claims is a very good one. During that 1995 inquiry there were some people making a very good living as consultants going through the books and finding R&D. From our point of view they are not good discoveries—from Australia's point of view—because they are R&D that has already taken place. What we really want to do when we develop a policy for R&D is to promote or provoke new R&D that would have a pay-off, not just reimburse people for R&D they felt was profitable enough to do anyway.

**CHAIR**—The more I think about it—I think it was Sue Serjeantson who made the comment—in those particular years, where seemingly there was this increase in R&D, there were no extra scientists employed; a lot of accountants were instead. Just taking it as a flow-on from that, you talked about incremental R&D and the higher rate. Other evidence we have been given is that the government ought to look at several levels of tax concessions for incremental R&D, such that in fact the lowest would probably have to drop, if you were going to be revenue neutral. But you would be rewarding companies who increased the amount of R&D, so that it might go up to a 200 per cent level. You might have 115, 125, 150, 175, 200 per cent, et cetera, depending on the increase in R&D. How would you see that operating in a business sense?

**Mr Banks**—I am sure that conceptually you could design a system that would work just right in terms of inducing more R&D at the higher rate that otherwise would not have been induced,

but is still socially beneficial. The trouble is how to determine which categories of R&D you put in which of those particular subsidy rate categories.

That would be potentially quite a difficult thing and there is something to be said for keeping it simple when you are looking at something as pervasive as the tax concession. We are already undergoing an experiment right now with the general tax concession, plus a premium rate for additional R&D, as defined in that particular scheme. There might be a lot to be said for simply waiting to see how that experiment turns out before refining that concept much more.

**Dr Lattimore**—One way you would do such a thing is to have higher incremental rates for higher amounts above a base, so that firms which achieve very substantial growth rates above a base face higher incentives to undertake it. In theory that is a good idea, subject to the complexity of having multiple tiers. When we were floating the idea of an incremental tax concession in the telecommunications inquiry there was some aversion to the complexity of what we were proposing with one increment, so I think you would want to explore how the incremental one has worked earlier.

The other thing is that we have been involved in looking at the tax concession in a variety of forms for quite a while. Every time we have looked at it, people have groaned at the notion of further change because just as they have got used to the existing arrangements they feel that it is about to be transformed again. There is this issue of the planning horizon that businesses have and the certainty they have about the arrangements in place. It may not always be the case that the changes are favourable to them so they factor in a sort of policy of uncertainty into their investment decisions and, if the policy can move favourably or unfavourably, that very uncertainty might reduce their responsiveness to the tax concession. That is just a consideration when you are looking at it.

**Mr Banks**—At the time the Industry Commission was doing the R&D inquiry, Ralph was working for the Bureau of Industry Economics and they had just produced a report which, based on survey information, showed quite a low inducement rate for the tax concession.

**Dr Lattimore**—It was about a 17 per cent inducement rate, so 17 per cent of the R&D that had benefited from the subsidy was truly new. That was one estimate, but in only 10 per cent of cases was the tax concession a critical influence in the decision making of the firms. By and large the evidence seemed to be that most firms regarded the tax concession as something which gave them a little bit more of cash flow but did not really fundamentally affect their R&D decision making. That was at 150 per cent.

**Mr Banks**—What we heard, as part of that, was that the low inducement rate in part reflected the uncertainty that Ralph was just talking about before; that firms, when they were looking forward, thought it would be good if they could get it, but they were not going to bank on it. So it was not influencing or gearing up as much R&D as it would if it was, as we described it, part of the furniture that they could rely on and sit on and make their planning from. That is just a consideration in terms of changes in policy.

**Ms CORCORAN**—You have been very good in that you have answered my question before I even asked it. That was the path I wanted to go down; one of the two things that I wanted to ask. From anecdotal evidence and just from talking amongst ourselves when you were coming in, I am getting different messages. Some businesses are saying to me pretty much what you

have just said. 'Our R&D decisions are made. If we get a tax break, that is good. If we don't, who cares?' I do not know whether that is really the case and how indicative it is of the whole business world. That is the first question; you might like to comment back.

The next point is that we have heard from different people giving evidence that it is just too hard to find out what is around. They go to different web sites or they phone and they just throw their hands up in the end. I am not sure whether that means they do not do it, or they fall into the first category of 'We'll go ahead and do it and if we get something, we get something.' I guess the third category is those who have never even tried; they just do it anyway, without a feel for where that all sits.

My question revolves around red tape. I am talking about small business not big business where you have people you can pay to go away and get lost in the red tape; the small ones do not. I think they are the unknown quantity. My second question is unrelated to that. Am I hearing correctly that you are saying the BERD may be okay? Despite all the rhetoric we get now that it is not, are you suggesting that it might be all right? Is that the message I am getting from what you were saying before?

**Mr Banks**—We will have a look at the first question first and I will make some comments. I am sure Ralph will have more detailed comments reflecting the survey work that we have done. My guess is that if firms are saying that they would do it anyway, that is probably right, in that all the strategic incentives are to probably say how important the subsidy is. The natural inclination generally in surveys of this kind is that you get a higher declaration coming through the questionnaire of the usefulness of the thing, because it is better to do it that way and you are more likely to see maintenance of the program. Those firms that are saying they are doing it anyway are probably being accurate. One of the interesting things about that earlier survey by the BIE was the low inducement rate, given what you would imagine to be the incentives for response bias, to say, 'Yes, this is great and it is helping us, but we want more'; nevertheless, to give a positive response to it.

This question about it being hard to find out what to do, particularly for small enterprises, I think is a very important consideration. That is why these consultants make a reasonable living, because their job as specialists is to come in and do that sort of thing. Small firms cannot afford to employ that kind of person full time. BHP or another large company could have a whole department being responsible for the interface with government on these kinds of subsidies. They are just a couple of points I make on that.

**Dr Lattimore**—The evidence on SMEs and their responsiveness is a little bit more optimistic, in a sense, than what you find across the board. They seem to have a higher responsiveness to the R&D tax concession from what we have seen. That is not surprising either, because smaller firms are more often liquidity constrained. They do not have necessarily all the other sources of finance the larger businesses have. They can use the concession as a source of finance in its own right when they get the money.

Nevertheless, you are correct: from all the evidence we have seen they face greater obstacles in taking up the tax concession. For example—this does not just apply to the tax concession but general business programs—about one in five firms employing under 20 persons sees business programs as generally suitable only for big business. About one in five small firms did not have knowledge of programs at all and 20 per cent thought too much paperwork was required. These

are the high figures. If you go to the bigger businesses, this is not a concern; paperwork compliance is not a concern for taking up programs.

**Ms CORCORAN**—This is one in five small businesses?

**Dr Lattimore**—Yes, these are the ones who employ under 20. These are obstacles that small firms face in taking up programs, and it is not surprising that they face them. These programs do have some eligibility requirements and paperwork compliances for probity reasons, and they are things that small firms have enormous difficulty in meeting. Their story has a plus and a minus. They respond better when they get them, but they participate in them less often and find them harder to get into.

**CHAIR**—And the second question?

**Mr Banks**—The second question is the harder one.

**Ms CORCORAN**—Yes. Maybe I just was not listening properly during your first opening comments.

**Mr Banks**—I invited that question almost by my remarks.

**Ms CORCORAN**—Good, so you didn't answer it. I wasn't sleeping!

**Mr Banks**—No. We might have slightly different answers on this but my judgment would be on the basis of that earlier work and what we have observed since, and taking into account this issue about some of the phantom R&D that was being done, which probably was not being—

**Ms CORCORAN**—Sorry, just to stop you there, this graph we have in front of us is your presentation in 2000, so it is two years ago.

**Mr Banks**—Yes.

**Ms CORCORAN**—That is the beginning of the peak we are talking about.

**Mr Banks**—That is right, but then it dropped off after that.

**Ms CORCORAN**—It dropped off, yes.

**Mr Banks**—It was taking up, but you would have to say that the peak and the drop-off should be discounted and that you should look at the trend line that goes through there. But that raises the point that the rate of growth in BERD is internationally comparable to if not ahead of the pack. I may be wrong about that but my perception is that the rate of growth in the spending was quite high. The work we did is a bit dated now, it precedes that, but when we did it back in 1995 and made allowance for the structural differences between our economy and economies overseas, it did not look too much out of line. I am conscious that individual examples have been given of particular industries where, when you look at a comparable industry with comparable technological capabilities or potential, we do see a difference which is somewhat lower.

Again, I think it would vary from firm to firm. Having just looked a bit at the automotive industry, what we are seeing is quite comparable levels of R&D in the automotive sector; indeed, double the rates of R&D that we see throughout the rest of manufacturing. That is an industry which has really improved its performance in the last five or six years. I invite Ralph to make any comments he likes on that question.

**Dr Lattimore**—It is fundamentally difficult to know what the optimal level is. Australia does have a whole set of arrangements in place that, as we said, are broadly comparable with those overseas. There is something fundamentally wrong with Australia if we have a level which is a long way away from where we should be. It is hard to surmise what that would be. We have seen factors which explain why we might have a low apparent level. Another perspective on this perhaps is a productivity one. R&D is an input and you could measure our R&D productivity. Australia has a high R&D productivity. We get a lot of output for less R&D. That is a more positive way of looking at it. In other words, we get a lot out of what we do. It is not necessarily the case that it is best to increase that input unless you get commensurate returns. It is not clear.

**Mr Banks**—The other point that occurred to me as Ralph was talking, and again it is reflected in that earlier report, is that firms do not suddenly become R&D ready or very good at doing R&D. It is a learning process that takes some time. They have to get the right people, they have to have what are complementary assets in terms of their organisation structures and so on. You could say, and we did say back then, that a lot of the gap in BERD that existed at that time could be explained in part as the legacy of a rather inward looking manufacturing industry in those times—fairly heavily protected and so on—without the incentives to really get their act together and start the process whereby they would move up that learning curve.

I assume by now most of them should have moved up the learning curve but there could be still some residual catch-up going on. To the extent that the rate of growth in business expenditure on R&D is above that in other countries—and I have not looked at that recently—that could partly explain it.

**Mr LINDSAY**—Ralph, you just said that it is not clear if you get more output through more R&D investment.

**Dr Lattimore**—R&D is just one of a number of inputs. If you had more R&D you would get more output but the question you have to ask at any particular time is, 'Is the cost involved in doing that worth the gain you make in output?' We make that decision all the time and in this case businesses are making the decisions about whether a particular investment in R&D has a pay-off for them. We do not necessarily worry about the pay-offs they get from those investments; the issue from a policy perspective is whether there is some sort of national pay-off.

**Mr LINDSAY**—Do you have any view in relation to the reluctance of Australian companies to embrace the global market when they are looking at making the decisions you just talked about?

**Dr Lattimore**—It is a rather broad question.

**Mr LINDSAY**—Are we too inward looking?

**Mr Banks**—Maybe I can comment while Ralph is thinking of a better answer.

**Mr LINDSAY**—Something more productive.

**Mr Banks**—There would have been an easy answer to that question even in 1995 when we did that inquiry. We did not observe firms embracing the global market in a very positive way. In fairness to them, they were not necessarily obliged to do so. Generally they were getting assistance in one form or another which gave them a comfortable buffer. The auto industry, which I mentioned before, is a case in point. When that last inquiry was done back in 1997, we were still observing an industry that was struggling to confront competition. The inquiry that we have just done has revealed an industry that is embracing it, that is exporting 30 per cent of its output, that has developed all sorts of linkages overseas, that is seeing more foreign investment come in and is benefiting in technological terms from those interactions.

It is hard to make a generalisation about Australian industry but certainly the sorts of industries that the commission has been looking at in recent times are showing quite a turnaround in their willingness to be open to the international economy, to look for export strategies and so on. There has been a significant change there. Ralph might have some other comments on that.

**Dr Lattimore**—The only thing I was reflecting on is that some work we were doing on manufacturing showed this increasing and continuing trend for interindustry trade so that you have exports rising dramatically and strongly but imports rising dramatically and strongly too. What seems to be happening is that firms are developing capacities in small areas where they have some advantage, and forgoing other areas, so that you get a greater exposure both exportwise and importwise.

**Mr LINDSAY**—This might be a harder question in relation to the size of businesses involved in embracing the global market. Have you any comment on SMEs embracing the global village or have you not seen any evidence there?

**Dr Lattimore**—Overwhelmingly most SMEs do not.

**Mr LINDSAY**—Should they?

**Dr Lattimore**—The difficulty with the notion is that SMEs are such a heterogeneous group of firms. My local baker certainly will not, yet a lot of SMEs are in that category. There are an awful lot of SMEs, most particularly intensive in the service sector. The group of firms of SMEs which you think might conceivably go global is a relatively small population and very hard to pin down. They can occur in some services and they can occur, obviously, in lots of parts of manufacturing. The evidence is that they are increasingly exporting.

**Mr LINDSAY**—Would it be good public policy for the government to look at embracing SMEs and giving them some sort of incentive to go global?

**Dr Lattimore**—It would involve several dilemmas and challenges.

**Mr LINDSAY**—Was that a yes or a no?

**Ms CORCORAN**—It looked like a nod.

**Dr Lattimore**—It is certainly not an emphatic nod. There are really quite big difficulties in doing so. The question would be, 'Why? What is the fundamental problem that you are addressing here? What is wrong that we need to fix?' Is it that firms are myopic about the advantages they have abroad? That would have definitely been true 10 years ago but it is increasingly unlikely nowadays. It has to be borne in mind as well that there are a variety of options already for firms for assistance, like EMDG and so on.

**Mr LINDSAY**—We are running out of time and the chairman is going to get upset. Let me go to the reverse. We heard evidence today that there should be an increased incentive or tax concession for multinationals investing in Australia, but not available to Australian companies that might want to go the other way. What is your view on that?

**Mr Banks**—I will let Ralph give a theoretical answer to that one.

**Mr LINDSAY**—What would you do?

**Dr Lattimore**—I am thinking of the answer. It is a very tricky area. This is the 'on the one hand, on the other hand' economist speaking here. The fundamental difficulty is that there are projects from which Australia would benefit by having multinational enterprises come here and do them.

**Mr LINDSAY**—Yes.

**Dr Lattimore**—The problem is that there are lots of projects that will come here anyway because it is an attractive place to do business for all sorts of things. We have very substantial advantages in a whole lot of mining and manufacturing areas. We do well in them. The problem of attracting firms at the margin is identifying the projects which are marginal. Who is going to do that? A public official has to do that. They are not trained in commerce. They are not trained in looking at those particular specialisations. Inevitably you end up with the same problem that affects the R&D tax concession—namely, you are saying, 'We'll give you a tax holiday' or something like that 'for a marginal project which is deemed to be marginal.' That is a very difficult task. That does not mean you should not necessarily do it, but it is a very big obstacle.

The other way around, if I favour an Australian company going abroad, what exactly are the benefits I am getting from that? I claim I get benefits from the foreigners coming here—technology transfer, perhaps some lessons in management for my local firms—but my own multinationals get the benefits their shareholders are getting overseas. What they would hope is to get foreign governments to pay them to go abroad. It would seem unfortunate if we had to pay both the incoming and the outgoing.

**Mr LINDSAY**—A final question: in your opening remarks you said that R&D policy is experimental and it needs to be periodically reviewed. How often should it be reviewed?

**Mr Banks**—That is a good question. If I had to go for a rule of thumb I would say probably five to six years would be an appropriate interval to observe these experiments, to collect data and to see how they work. It is not always easy to do that. You often have, in the middle of

those five to six years, some other mini experiments occurring as well. But it is a good discipline in the process to do that about every five to six years.

**CHAIR**—That is a good argument for a five-year federal term.

**Mr ANTHONY SMITH**—I have one question. The chairman and Ann have asked many of the things I was interested in. Just to pick up where Peter left off, you made a couple of points, Ralph, that I would like to draw together. One point was that every time you change things there is a dislocating factor where firms say, 'Oh, gee, we just got used to the way it is.' I can see that. They have to go out and get more advice and talk to their highly paid accountants. The other point was that you both made an analysis of the figures; the fact that there is a lag and they do not account for the structural differences. Does that mean that there should be some caution taken, particularly when you have a graph like that where you are really saying—correct me if I am wrong—that in a short period of time we will have a better idea about exactly what that line looks like in actuality. When will we, by the way?

**Dr Lattimore**—You have less uncertainty as time elapses—never complete uncertainty. But in several years you would, because you would have the current 18 per cent rise, which I am sure will not be repeated permanently. That is a very steep rise. You would also get an impression of whether the same patterns are occurring across sectors. For example, in the last year we have seen a very dramatic rise in mining expenditure. You would not expect to see that repeated in the next few years. The question would be, can you identify a consistent pattern of increase in R&D over the next few years? If you can, it tells you something. But things are lagged, respond to the lag, and there is a lot of volatility in the numbers.

**Mr ANTHONY SMITH**—Your point about the lumpiness, and the fact that it does not account for various other factors, would be a cautionary note in many ways for someone looking at that graph and deciding there needs to be an immediate policy response. You might be responding to something that is not quite as it appears.

**Mr Banks**—That is right. If I did a follow-up talk to that one we would have a bit more on the graph, which would show it jumping again at the same trend rate as it was before a problem was perceived. That might be a one-year wonder but I doubt it. That in itself is reason for watching this a bit longer. I do not think it would be good public policy to make policy on the basis of BERD figures for two or three years where you observe that kind of noise in response to significant changes in the policy environment. It is better to wait and see how that settles down.

**Ms CORCORAN**—I have a final question about the period of review being about five years. We heard in evidence earlier that people like a bit of certainty in this. Is that about the right balance between review and certainty? I guess it has to be or you would not have said it.

**Mr Banks**—You would probably have to ask representatives of firms about that. Five or six years, in our experience, is not regarded as too brief a time by firms in which to review some of the programs. The world moves on. In five or six years you could have quite significant changes in the operating environment. A lot of firms may really welcome an opportunity to look at policy from that perspective.

**CHAIR**—Just before we finish, can I clarify something Ralph said earlier on, going back to Peter's comment about output for R&D expenditure. Did you say that while our BERD level is lower than that of other countries, the output is higher?

**Dr Lattimore**—Output?

**CHAIR**—Output per dollar or per capita or whatever you want to call it.

**Dr Lattimore**—Yes, we are higher on productivity.

**CHAIR**—On what basis did you make that statement? What particular research shows that?

**Dr Lattimore**—It is not so much research. We have measures of GDP, gross product by industry and we have measures of BERD. You can also infer capital stocks of R&D, so you are putting one over the other.

**CHAIR**—It is an analysis of the existing information that gives that indication. That is something that is not concentrated on usually when people talk about R&D.

**Dr Lattimore**—People look at the inverse ratio. It is BERD to GDP, GDP to BERD. We do not do that for people. We do not say employment to GDP is low. We say GDP to employment is high. That is good. That is productivity on the one hand. The other looks at the input side. It is actually worth looking at it from the other side as well before reaching judgment.

**Mr ANTHONY SMITH**—What you are saying in practical terms is that some of the countries, without naming them, that are hailed as the model have lower productivity.

**Dr Lattimore**—Yes.

**Mr Banks**—We know that for sure. We have statistics.

**Mr ANTHONY SMITH**—Some of them have been hailed for some time.

**CHAIR**—Thank you very much for coming today and giving us that insight from your point of view. It is very valuable information for our inquiry.

**Mr Banks**—If we can help \in any other way, if you come across any other work we have done, we would be happy to make it available to you.

**CHAIR**—I will be interested to see the report you are releasing tomorrow on the PIIP scheme. Thank you.

[5.36 p.m.]

**CLARKE, Mr Drew, ex-officio Member, Industry Research and Development Board**

**HAMMOND, Dr Laurie, Member, Industry Research and Development Board**

**NICKLIN, Professor Don, Acting Chair, Industry Research and Development Board**

**CHAIR**—Welcome. While the committee does not swear in witnesses, the proceedings here 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 parliament. The committee prefers all evidence to be given in public, but should you at any stage wish to give evidence in private, you may ask to do so and the committee will give consideration to your request. Would you like to make an opening statement before we have questions?

**Prof. Nicklin**—Thank you for your invitation to the Industry Research and Development Board to appear before this inquiry. I am representing the board today in my capacity as acting chairman of the board, with my colleagues: Dr Laurie Hammond, a member of the board and also Chairman of our Tax Concession Committee; and Mr Drew Clarke, ex-officio member of the board and Executive General Manager of AusIndustry.

In the board's submission to your inquiry we outlined the outcomes that are being achieved by Australian industry with the assistance of a number of Commonwealth government innovation initiatives. In summary, the board noted in its submission that the government's innovation initiatives are assisting Australian business to achieve quite significant outcomes in their R&D and commercialisation efforts. We also note that the range of assistance provided impacts at all stages of the innovation cycle, from early research activities through proof of concept to commercialisation activities, including attracting venture capital. There are four main points I would like to make in this opening address.

First, all of the programs administered by the board are industry driven. Companies are the customers and all of the programs require that the companies involved have their own money at risk in the projects. These programs represent a market driven approach to providing support for the commercial decision making of innovative Australian firms. This is quite a different approach to the support provided by the science programs. It is important that any consideration of Australia's innovation system considers the industry perspective and examines solutions that are industry driven.

Second, these innovation programs are an effective mix of entitlement and competitive programs, a combination of broad based and specifically targeted programs. This portfolio of program types is an important recognition that one program alone cannot address all the areas of need in the innovation cycle. Getting the balance right and ensuring the complementarity of programs is important to the success of government support for industry R&D efforts.

Third, the majority of the programs administered by the board are geared towards Australian small and medium sized enterprises, the SMEs. In 2001-02, 61 per cent of the board's customers had a turnover of less than $5 million. The COMET, BIF and IIF programs are

clearly targeted to early stage start-up companies, as is the new pre-seed fund program. R&D Start is a broad based competitive program with an SME focus. In 2001-02, nearly 70 per cent of Start customers had a turnover of less than $5 million. The tax concession is a broad based entitlement program. The majority of customers accessing the program are SMEs, although the larger companies consume most of the dollar value of the concession.

Fourth, in administering its programs the board takes a holistic approach to the issue of national benefit, recognising the global environment within which our companies operate. The board has regard to whether or not commercialisation takes place in Australia but recognises that benefits to Australia can be derived from R&D efforts that are commercialised overseas. In an increasingly fluid global environment the extent to which benefits are retained in Australia for innovations commercialised overseas is an area of interest and inquiry for the board.

Finally, I would like to confirm Deloitte's advice to you on 2 October, addressing an error in the submission from the Council for Knowledge, Innovation, Science and Engineering. In its submission, KISE stated that the definition of eligible R&D for the purposes of the tax concession had been changed to require both innovation and high levels of technical risk. The definition of eligible R&D has in fact remained unchanged since 1996 and requires innovation or technical risk. This concludes my opening statement. My colleagues and I would be happy to spend the rest of our time discussing the issues with you.

**CHAIR**—Thank you very much for that. Thanks particularly for that clarification with respect to the definitions. It is an area that was raised as if there had been changes which had made things supposedly more difficult to access. Just along those lines of difficulty of accessing programs, we have had a variety of submissions where people say firms either do not even try because it is all too hard or they are forced into a situation of employing consultants to do things on their behalf. Is there a constant review going on to see how we can make these things easier for people? In circumstances where companies feel they are obliged to use consultants to make applications on their behalf, you can get into a circumstance where, if you are good at making an application, you have a good chance of getting funding, whereas if you are not good at making an application—even though you may have a far better case to put for funding—you miss out. Drew, you might like to comment on that.

**Mr Clarke**—Thank you, I will. To clarify, AusIndustry is the program delivery arm of the industry department. We deliver the programs that the board's submission has outlined. There are two aspects to your question: the broad question of accessibility and then the role of consultants.

On the broad question of accessibility, AusIndustry now delivers 25 industry programs from the industry department. Our role has expanded to be the program delivery arm of the Commonwealth industry department. The board programs are about a third of what we do. We also cover just about all of the other ones.

Awareness is a big issue for us, and it is very hard with 25 programs. How do you sell them? How do you make the companies aware? We do it in a couple of ways. First, there is a broad based marketing program where we say, 'If you are a company doing certain kinds of activities, you can come and talk to us at AusIndustry.' We try not to sell the individual programs. In general we say, 'Come to AusIndustry. Tell us about your company and then we'll figure out

whether we've got a program that works for you and fits your circumstances.' That is the overarching approach.

On top of that, each of these programs has some sort of an annual cycle. There are rounds or changes or key dates or whatever. We advertise those in the relevant trade literature, the industry association journals and so on. We try and push that very hard. We track awareness. We track awareness of AusIndustry generally. We track awareness and understanding of the programs in the company marketplace. It is not perfect but it is not too bad.

A specific feature of that is businesses in regional and rural Australia that the government identified had a particular difficulty in accessing those programs. A year ago we set up 14 one-person offices in regional centres around Australia, with the explicit aim of increasing awareness and accessibility. That initiative seems to be going very well.

On the question of consultants, we have looked at consultant data quite heavily. Across those 25 programs the proportion of customers that use a consultant to assist them in either registering or applying varies enormously. It is less than half in the tax concession. It is about half in R&D Start, to use two of the broader based programs. There are both good reasons and bad reasons why our customers would choose to use consultants. A good reason is that they simply do not have the time, as an SME, to do the work themselves. It is basically, 'If I do not use a consultant, it just is not going to happen. I am already working 24/7.' This is just an opportunity-cost issue.

I think a bad reason for using a consultant is because you perceive that the process is too hard and you cannot do it yourself, or because you perceive that you are more likely to succeed. You threw out the prospect about success rates. In the case of the R&D Start competitive program, we went back and did the data and, in fact, companies applying with a consultant are no more likely to receive a Start grant than those applying without. That goes, from our perspective, to the quality of our assessment and our ability to see through the words and extract the real merit of the application. We think we are reasonably good at that.

**Ms CORCORAN**—How did you make an assessment that a company with a consultant had no better chance of getting a grant?

**Mr Clarke**—We went back and analysed the success rates with and without a consultant. That is hard data.

**Ms CORCORAN**—If you had 100 applications, 50 per cent of them were with consultants and 50 per cent of them—

**Mr Clarke**—Yes. The success rates with and without a consultant were essentially the same.

**CHAIR**—Sticking with the Start program, unsurprisingly there has been substantial criticism in submissions of the fact that it was frozen for a period of time because of its great success rate. I notice it was announced last Thursday that new applications are now being called. Some of that criticism has gone as far as saying, 'It's totally thrown R&D out the window,' in some sectors, and it is a major disruption to R&D. What is the board's assessment of the stalling of that program?

**Prof. Nicklin**—How that situation arose has probably been worked to death around this table. The two critical factors, of course, were the huge success of the program and the commitment to the Start program, and the other factor was this absolutely unexpected change in spending patterns within the program which caused a cash flow problem within a program that should operate from financial year to financial year. We very much regret that that situation arose.

We cannot undo the situation that has arisen. What we can do is make certain that it does not happen again, and we must not use a set of corrections that takes the easy way out, of just undercommitting the grant so that there will be a surplus left at the end of the year. That would be an absolute disaster. Within the auspices of the board, we have examined the future with great commitment.

**CHAIR**—Before an application is approved in the future, will you make sure that there is a funding model that fits with the overall budget so that they will not have the capacity to call in funding ahead of what was perceived would have occurred? In simplistic terms, as I understand it before, the applications were there but then all of a sudden companies that had been approved for funding started to call forward their grants way ahead of what would have been perceived, so that effectively they have committed a lot more expenditure themselves. Will future applications have that aspect predetermined before the grant is approved?

**Prof. Nicklin**—The short answer is yes. You are saying, I think, as those who are responsible for administering the grant, that we must have a very well defined model of spending patterns. That was very hard to reconcile with the great flexibility that we have in the past given to the winners of the grant. Anybody who has been involved in research and development knows how difficult it is to anticipate what the result of any one experiment or effort will be and how it will influence the spending patterns, and so on. The step change from 25 per cent to 50 per cent was extraordinarily large and unexpected. It is very hard to model a change of that magnitude. Once it has happened, you can then say, 'Oh, well, that can happen. Now we've got to look for many ways to protect the system.'

**Mr Clarke**—You asked about the impact. It is important to note that the suspension was for new applications and the suspended new application period has now finished. Throughout that period, there were some 650 companies that kept getting the Start grants. The program did not interrupt the companies that had already received grants. The total budget appropriation from the government on Start has continued to be, and will be, fully spent each financial year. Start is still spending between $150 million and $200 million a year on supporting R&D projects in companies.

As Don has said, the suspension was not welcome. How do we manage the cash flow in a way that does not interrupt the new approvals? The issue is having to reel back a little bit on company flexibility. The perverse side of it is that that acceleration that got us into trouble is, in fact, a welcome trend in terms of industry behaviour. It is saying that R&D is less about three-year medium term projects and is something more that you want to knock off in a year or a year and a half, if you possibly can.

**Ms CORCORAN**—How long was the suspension period?

**Mr Clarke**—We have not made any new decisions since the middle of January, so about 11 months.

**CHAIR**—But the actual suspension took place a bit after that.

**Mr Clarke**—It was announced on 24 April.

**CHAIR**—I personally think that criticism of the impact has been overstated, because there is actually more money in there than there was previously. I cannot see how it can be. I think it was more a reaction to what people were perceiving was going to be occurring. It is good that we have sorted out how it will be administered for the next couple of years. It is the certainty aspect which is the problem. One of the things that was raised in the evidence was that a number of the new applicants were also seeking venture finance.

**Mr Clarke**—Yes.

**CHAIR**—One of the conditions of getting the venture finance was the success of a Start grant. That is why, to them, it had the impact that it did.

**Mr Clarke**—Indeed. But, of course, for nearly half the applicants the suspension made no difference because the program was so competitive that they would not have been successful anyway. I know that is cold comfort and I am not suggesting it, but, in the broad, statistically that is the case.

**Mr FORREST**—I have a constituent who has invented a new vehicle suspension system. It is quite innovative and revolutionary and AusIndustry have been really good. He was concerned that if he received all of this assistance it would be spent on consultants giving him business advice. He is only a small operator and really he wants market access and information like that and he needs to get prototypes and access to the car manufacturers around the world and motorbike manufacturers, and so on. There is no requirement, once a grant is made, for reporting on how the money gets spent or where he needs a consultant? Is that the way that COMET program works? He was very critical and did not apply or proceed.

**Mr Clarke**—The COMET program is quite different to Start or the tax concessions. Maybe I should start with what its key features are. COMET is pretty unique in the range of R&D Board programs in that it offers both business advice and some grant funding. It is sometimes perceived in the market as a granting program that comes with a bit of advice. I think it is better characterised as an advice and support program that comes with a bit of grant funding. An applicant for COMET has certain criteria in terms of being a start-up company. If they are successful in getting into the program—again, it is highly competitive—they get a business adviser assigned to them. In the core program the business adviser works with the company to make them an attractive prospect for further investment. In its early design stages COMET was called Investment Ready, which gives you a sense of where it was coming from.

To assist the adviser and the company to make themselves attractive for venture capital, or whatever, there are grants available for up to $100,000—typically more like $50,000—for things like prototype development, market research et cetera. But the whole deal is to get the company where it is attractive to an investor, an angel investor, venture capitalist or whatever, to come into it. There are some entrepreneurs which that design of support really does not fit. They think they do not need the advice, and perhaps they do not need the advice, in which case COMET is not the way to go. They would be better off applying for a small R&D grant under

Start where their management skills might be such that they do not need that advisory support, or it is not investment that they are really looking for.

**Mr FORREST**—There is a difference between saying you do not need it and the reality that you do need it. You are a small player here and there is a big pond over there. I think they do need some assistance. I am just asking the question because he was quite critical of the fact that we, as a government, were wasting money paying other people to give him advice, when he knew what he was doing—he invented the thing; he spent 10 years to develop it and he is ready to manufacture.

**Mr Clarke**—Then COMET is not the right program. For an entrepreneur that believes that it is not commercial advice they need, it is simply a cash flow problem or whatever, then COMET is not the place to be.

**Mr FORREST**—I think he needs capital now.

**Mr Clarke**—Yes. But it is interesting, because COMET's pitch is to make them attractive for people to put capital into them. That is the whole fundamental premise.

**Mr FORREST**—Who appoints the professional financial adviser?

**Mr Clarke**—Business advisers?

**Mr FORREST**—Yes.

**Mr Clarke**—There are 10 business advisers around the country. They have a competitive selection process overseen by the board.

**Mr FORREST**—So the board engages them.

**Mr Clarke**—They are consultants through AusIndustry but, in effect, they are selected under the advice of the board, yes.

**Dr Hammond**—The question might have just been a little different from that, Drew, in that an individual firm has a relationship with one of those 10 business advisers, but that business adviser may help find a specialist to do something for that firm, like a marketing analyst or someone.

**Mr Clarke**—Sorry, yes, in which case that follow-up support is selected by the COMET business advisers themselves. We stay out of that.

**CHAIR**—They might still benefit from the COMET program.

**Mr Clarke**—But they have to perceive that this is what they need.

**CHAIR**—Yes. By the sound of it I think he needs some marketing advice.

**Mr FORREST**—When you talk about a perceptional situation, that is what alerted me to it. I do not think he really understands that this program is exactly what he does need.

**Mr Clarke**—I would be happy to follow up for you, Mr Forrest.

**CHAIR**—You mentioned prototype as well. One of the things that has come out in the evidence as well, and has been raised a couple of times, is that there is possibly still a gap in the programs between the pre-seed fund program and the COMET program for helping to put in place a prototype. The pre-seed fund does not get that far but the COMET assumes it has done so. Is that fair criticism?

**Dr Hammond**—It could be, but where the gap resides for prototyping is a little bit disputable. Some people need half a million dollars for a prototype, not $120,000. Undoubtedly there are still gaps in coverage in the range of government programs. Those gaps are ephemeral—that is not the right word, but the gaps move around. In fact, we have seen in the last year or year and a half the gap between early stage venture capital, which is an area in which I am personally active, and the more mainstream venture capital widening after showing all these promising signs of closing. Gaps come and gaps go, but whether there is a prototyping gap specifically is not necessarily between pre-seed and COMET. It depends on what you need to spend for a prototype.

**CHAIR**—It could also be the way in which you manage that pre-seed and the COMET. If managed differently you could possibly close that gap between the two.

**Mr Clarke**—Remember that the pre-seed has a very significant boundary which is only for public sector R&D.

**CHAIR**—Yes, I realise that.

**Mr Clarke**—It is not broad based.

**CHAIR**—The criticism came from people at that level. It is something that comes out of a university and then is ultimately commercialised. That is where they saw that gap.

**Mr FORREST**—Our inquiry is addressing a really big field of research and development. My observation of life is that real products are developed by mum and dad fiddling around down in the shed and they get a prototype, because it is small and easy to make. My example is one of those: my constituent has a prototype; he has something to show everybody. He wants large-scale mass development. He wants to be able to get the infrastructure and machinery to have it made on a production line. Beyond this there is another gap, there is another weakness. There are plenty of ideas, and there is research that goes on which people are prepared to do and fund themselves, but they are very small. They are smaller than small and medium. It is just mum and dad in the workshop down the back, wanting to get it into production. That is another weakness.

**Mr Clarke**—The scenario you describe really fits COMET in the broad.

**CHAIR**—It is also symptomatic of the venture capital problem we have had, which in fact has improved substantially in the last few years, but there are still problems in getting access to that capital and in getting people and organisations willing to risk it.

**Prof. Nicklin**—That is a very good question: is there at this moment a definable gap? If you plot the introduction of the programs over the five or six years immediately prior to today, you see programs are woven in, and I do not think there is much that is specifically designed to find the most serious gap at that time and then plug it. For the individual, there will always be a sort of a gap. There is always a step, and the next one ahead is difficult. Across the complete spectrum I would have thought that the picture is very good at the moment. If, for example, it is reported that there is a definable gap it means that we failed to plug it in the immediate past. COMET is a great example of a program that came in. Mr Forrest has raised a specific case and we are sitting on this side of the table thinking that COMET should handle a lot of those cases.

**Ms CORCORAN**—I want to change the subject completely to the tax concession. It has been suggested to us on a number of occasions that the tax concession program ought to be adjusted so that it is a sliding scale: the more you spend the more you get. Do you have a comment to make about that? For example, you get a bigger concession if you spend a bigger proportion of your revenue.

**Dr Hammond**—There are those sorts of suggestions. Gary Banks referred to that idea being floated five years to seven years ago, and Jim Fox has also put it to you. There are variants of it around. The common factor is that one should disproportionately reward greater commitment. The premium that was introduced with Backing Australia's Ability was the first attempt to do that. We are only five months into that premium being in effect and we are a long way from having any real numbers to sample. At this stage, 67 companies have registered so far for the premium since 1 July—$49 million worth of R&D so registered. That is just not a big enough sample to draw any conclusions from, and a single year will not be long enough, particularly given the qualification of having a spending history and your increase over the average of that history, or what you get the premium for. It is going to take a little while to learn how that works, so it is a little hard to say whether another variant on the premium would be better.

**Ms CORCORAN**—What is the premium?

**Dr Hammond**—Backing Australia's Ability was the government policy announcement. It was first announced in January 2000 and gradually implemented through legislation in 2001. The first effect was from 1 July this year. For the R&D tax concession premium a company can gain a deduction at 175 per cent concessional rate as opposed to 125 per cent rate. What it can gain it on is constrained by a couple of things. Principally it is for labour and other costs; not for plant, for instance. Secondly, it gains that additional concession for expenditure that is greater than its average expenditure over the previous three years.

**Ms CORCORAN**—On R&D?

**Dr Hammond**—Yes, on R&D. Qualitatively that is the same thing that people are talking about with these—

**Prof. Nicklin**—You are rewarding a defined step change in R&D.

**Ms CORCORAN**—I understand that.

**CHAIR**—There has been some criticism of the difficulty in achieving acceptance for the 175 per cent. Do you think the criteria we have set down are too tough?

**Dr Hammond**—We will need to see a test of that. People have raised concerns. They wanted to see it broader, for instance. The fact that a lot of aspirants for it do not have a three-year history concerns them. I know that requirement was somewhat relaxed in the discussions in the Senate, with the recognition or the allowance that a history of grant funding counted towards part of that three-year history. We have to wait and see. At the moment, as I say, there are so few returns in and so little feedback that we could not offer any significant informed advice on that.

**Mr Clarke**—When the two new features of the tax concession kicked in on 1 July this year—the 175 per cent premium that Laurie talked about and the rebate element—there was a requirement that the government put on the board to monitor the take-up by companies and to keep the government informed about what issues emerged in the marketplace in terms of the rules of accessibility. That is something we have been charged with keeping a very close eye on.

**CHAIR**—The other aspect of it is the fact that it is only for labour.

**Dr Hammond**—Labour and ordinary expenses, not plant.

**CHAIR**—Do you think that is also a bit tough? Would opening it up for plant just make it go beyond what it is really all about and allow in a lot of plant that would be there anyway, irrespective of R&D? Could it be sufficiently fenced such that it could only be that part of equipment that is specifically used for R&D?

**Dr Hammond**—The best answer I can give is that at the time the possibility of a premium was first raised and the policy folk were giving advice to the government there was also a stated intention that they wanted to see a device like the premium have an effect on capacity building in R&D in Australia, and that means people. That was part of the thinking behind that. Beyond that I do not think one can really say whether there is a deleterious effect of the exclusions of certain categories of expenditure until we have seen how it works for a while. If people can show examples where there has been a consequence that one would not have wanted, the debate gets reopened.

**CHAIR**—Would you agree with Gary Banks, who was talking about a five- or six-year period being needed to make any real assessment of some of these measures?

**Dr Hammond**—For brand-new measures like the premium, certainly. You need some length of time to accumulate data. While it is possible to start to make preliminary assessments after two to three years—'Yes, this is what we think now. Maybe we should wait longer'—in general, a five- or six-year period over which new policy initiatives are assessed seems reasonable. Gary, in saying that, made another point, which was that there is a certain resistance in the community to frequent change. We have seen that come to the fore strongly, in fact quite persuasively, in 1998—I think it was—and again last year, when there were discussions about changing the definition of R&D. One of the sentiments expressed frequently was, 'No, we're used to what we've got, thanks very much.' Whether that at times is a discouragement to some sensible

change is worth thinking about, but five or six years sounds sensible. That is a colloquial answer—'sounds sensible'.

**CHAIR**—Do you have a view on the comments from the research that had taken place, admittedly a few years ago, with respect to the use of tax concessions as an incentive for business to do R&D or additional R&D? It seemed to be that it is a fairly small incentive.

**Dr Hammond**—We are not the body who would regard ourselves as having the expert opinion there. There have been several good inquiries. The one that Gary Banks did at the Industry Commission and the BIE work before that both observed what they felt were low inducement rates. But they observed that they were also patchy across the system. Gary and Ralph referred to that today. That did not prevent them from coming out and saying that in general a broadly based R&D tax concession is still a useful part of the armoury for a government to use in its incentive programs. Sure, you can tweak a tool and slightly direct a broadly based program, as we have seen in the last year with both the premium and the offset, but by and large one of the greatest benefits of a broadly based program is that it complements the targeted programs that are competitive.

Sorry, I am using the words 'broadly based'. I should also be using the word 'entitlement'. It is an entitlement program as well, whereas contra to that are the targeted and competitive programs. As best we can see, this is the oldest argument that has ever been had in R&D policy. As best one can tell, when all is said and done, they are useful complements. Governments probably want both types of instrument in their tool kits.

**CHAIR**—They always should be looked at as part of a package, rather than the be all and end all of research and development.

**Dr Hammond**—Indeed. The thing about an entitlement that is as broadly based as the R&D tax concession is that it is one area where governments are not choosing to make bets about sectors of the economy which will do R&D. It is letting it come forward from the productive side of the economy.

**Mr Clarke**—The other useful example of that in terms of targeting was the recent Biotech Innovation Fund that the board now delivers as well. Laurie has talked about the broad based entitlement tax concession. BIF is almost at the complete opposite end. It fits in very nicely where the market failure was perceived to be: how does a start-up biotech actually get itself to the level where it might attract investment? There was a gap in the market for these grants of up to $250,000 to get a project up to proof of concept—'Yes, this is not just a good idea. It's actually got a real chance of working'—then from that point attract other investment. That is an example of a very targeted merit program that plugs a current hole in the marketplace.

**CHAIR**—The IIF has been, in a similar fashion.

**Mr Clarke**—And IIF in the market being the willingness of venture capitalists to invest in early stage high-risk investments. Yes, IIF has two prongs. The companies that get the investment clearly are immediate beneficiaries but the broader objective is about demonstrating to the venture capital market that early stage assets are a class worth entering. One of the performance indicators for IIF is other venture capitalists emerging in the same space without the need for the Commonwealth funds to go through.

**CHAIR**—Has there been good feedback from venture capitalists?

**Mr Clarke**—It got hit by the tech wreck. The timing was not good. You have to look at IIF in its 10-year life. All of the companies that won licences in the two rounds of IIF either have, or are in the process of raising, follow-on funds themselves without Commonwealth support. The speed at which that is happening has been slowed down by the tech wreck.

**Dr Hammond**—You were asking me about time frames for evaluation. We are living in a period with a particular distortion. A lot of activity and a lot of government initiatives that occurred around the millennium change, around 2001, are going to potentially show a signal from the fact that we just had a sharp decline in the amount of investment and a sharp shift away from the asset class that those early stage technology companies were targeting in particular. IIF is one program that is undoubtedly feeling the effect; also the BITS program in Richard Alston's department and others. Doing the evaluation too quickly there would not give you an informed answer.

**CHAIR**—You would agree that the longer some of these things can be in place, not only for assessing their value but also for giving certainty, is really quite vital, isn't it?

**Dr Hammond**—There are two things. There is certainty and if you are the evaluator you want to know you are doing an evaluation over a useful and representative period. It does not mean you cannot take mini evaluations as you go on. Drew has mentioned that the board has been obliged by the government to monitor what happens with the two new tax initiatives. I would say even after this first year we will have a view on some little bits of it but it will not be a comprehensive view. The view will get more comprehensive as time goes by.

**CHAIR**—In respect of distortions, do you agree with the Productivity Commission agreeing with my question about the distortion that took place in 1994-95, 1995-96 with the tax concessions?

**Dr Hammond**—Both Gary and Ralph made the point that with a longer time series that change in the trend may look quite different. We will all look forward to seeing if that is true. His was essentially a good statistician's point: 'Don't get confused by some volatility on the graph.'

**CHAIR**—We have lost a couple of members. There are a lot of committee hearings which are happening at the same time, which is always a problem. Thank you for being here this afternoon.

**Dr Hammond**—Thank you. It was a pleasure.

**CHAIR**—Thank you for your submission. We have had a very productive day in the taking of evidence this morning and this afternoon; we have covered some excellent parts of the whole inquiry. We have talked to a lot of different companies and it was very good timing having you follow them, with the areas you look after.

**Mr Clarke**—The R&D Board's annual report for 2001-02 should be tabled; if not before Christmas, shortly after. That will give you the current stats on take-up and segmentation across the programs. We will make sure the secretary gets a copy straightaway.

**CHAIR**—Excellent.

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

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

**Committee adjourned at 6.23 p.m.**