



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, 9 DECEMBER 2002

CANBERRA

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

**Monday, 9 December 2002**

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

**Members in attendance:** Mr Martyn Evans, Mr Forrest, Ms Grierson, Mr Lindsay, Mr Nairn, Mr Ticehurst and Dr Washer

**Terms of reference for the inquiry:**

To inquire into and report on:

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

With particular consideration of:

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

the needs of fast-growing companies; and

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

the committee seeks to address three questions.

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

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

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

**WITNESSES**

**COOK, Mr Grahame John, Group Manager, Science Group, Department of Education, Science and Training .....505**

**HANLEY, Mr Denis, Member, Cooperative Research Centres Committee .....505**

**VAUGHAN, Dr Geoffrey Norman, Chair, Cooperative Research Centres Committee.....505**



**Committee met at 5.38 p.m.**

**COOK, Mr Grahame John, Group Manager, Science Group, Department of Education, Science and Training**

**HANLEY, Mr Denis, Member, Cooperative Research Centres Committee**

**VAUGHAN, Dr Geoffrey Norman, Chair, Cooperative Research Centres Committee**

**CHAIR**—I declare open this public hearing for the House of Representatives Standing Committee on Science and Innovation inquiry into business commitment to research and development in Australia. I welcome representatives of the Cooperative Research Centres Committee. I point out that, while this 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. The deliberate misleading of the committee may be regarded as contempt of the parliament. The committee prefers that all evidence be given in public but, should you wish at any stage to give evidence in private, you may ask to do so and the committee will consider the request. Would you like to make an opening statement before we proceed to questions?

**Dr Vaughan**—I would like to make a very brief opening statement and I would ask that Mr Hanley support the statement with a brief comment as well before we go to questions. First of all, let me table some key documents. The *2002 CRC compendium* lists all of the current CRCs and statistics and data about the program. The *Review of greater commercialisation and self-funding in the Cooperative Research Centres Program* is the most recent review carried out by Mr Don Mercer and Professor John Stocker. There are three publications from the CRC Association, which I think you may have received from the association, giving an idea of the achievements of the CRC Program to date: *CRCs—capturing creativity through people, ideas and enterprise*; *Building on Australia's skills*; and *Triumphs of technology transfer: recent highlights of the Cooperative Research Centres Program*. Finally, the *Guidelines for applicants—2002 selection round and general principles for centre operations* deal with a number of issues related to commercialisation and involvement of industry and companies in the selection process. Let me now turn to the terms of reference. The first question the committee wanted to address was:

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

I suspect that you have heard very clearly from other contributors that there is undoubtedly innovation, employment, return on investment and, hopefully, national benefit. The second question was:

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

It would be very easy to say that they need greater assistance programs—and many people have made comment about financial assistance from the Commonwealth—but I believe it also goes further. Some of these impediments can be overcome by greater communication from organisations like the CRC Committee and better education of people who are going to be responsible for commercialisation in industry in the future. The third question was:

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

Here, I believe, there need to be more case studies, hopefully showing how government assistance, together with leverage which brings in industry money, can give benefits to the private sector through investment in R&D. Your terms of reference also refer to giving particular consideration to three issues. The first is:

- the R&D drivers in small and medium sized business ...

The CRCs have very strong contact with both SMEs at one end and national and multinational companies at the other. Undoubtedly we will cover some of that in our discussions. The second issue was:

- the needs of fast-growing companies ...

What are the needs? Undoubtedly, they are such things as seed capital, venture capital and mature capital but also the development of spin-off companies and start-up companies. Your third issue for particular consideration was:

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

This will undoubtedly be through government assistance on the one hand, but it also bears on the cost of carrying out R&D, where Australia does have an advantage with the current level of the dollar and the availability of expertise. Australia has a growing expertise in R&D available for industry, and the CRC Program has added quite a bit to that.

We have made a formal submission to you which covers the history of the CRC Program. It started in 1990, it has been running for 12 years and it covers six industry and related sectors. To date, there have been seven selection rounds, and 123 centres have been established. We are just at the very end of the eighth selection round, and the minister will soon be announcing the successful applicants. That will be an exciting time as far as innovation in Australia is concerned. Those who have been through the selection round have been covered by the eighth selection round guidelines—one of the documents I tabled earlier—and I would draw your attention to how industry participates in the selection process.

Industry is very heavily involved in cooperative research through the CRC Program. Hopefully, through cooperative research, we find that the outcomes of research are greater than the sum of the parts, so there is a benefit in people working together in R&D and innovation. The funding of the program has been substantial through government policy over the last 12 years. To date and with forward estimates and forward commitments, \$1.8 billion of Commonwealth money has been put into the program, allowing for a total expenditure in the program of \$7.3 billion. That means that every \$1 from the Commonwealth has generated \$3 from other parties. One of those parties has been industry, and the program has been very successful in attracting industry funds.

If we go back to the first selection round in 1990, industry put in 12 per cent of the total funding of that round. In the seventh round, industry put in 24 per cent of the funds. Over that period of 12 years, industry has doubled its commitment to the CRC Program. In the *CRC compendium* you will see that the total expenditure by industry in the program is 17 per cent, but that happens to be an average of the 12 per cent at the lower limit and 24 per cent at the other end. Even in recent years, while there has been a certain downturn in BERD, business expenditure on R&D, in comparison to GERD, government expenditure on R&D, the CRC Program has been the reverse of that—it has seen a steady increase in expenditure by industry through the CRC Program.

One particular area of strength of the CRC Program and of benefit to industry in Australia and commercialisation is our education program. The education program is primarily directed

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towards PhD students and postdoctoral students. In some part we have reversed the brain drain, because there is more provision for PhD students to carry out their studies in Australia and also provision for Australian students overseas to come back to Australia as postdocs to participate in R&D through CRCs. The other thing that happens with our PhD program is that there are supplementary courses within the CRCs on communication, commercialisation, intellectual property management, research management, research funding and human resource management. There is a whole array of programs which prepare our students to be what we call 'industry ready'. There has been a big change in the qualities of PhD students coming through programs of recent times. There has now been a group of people who have come out with their main aim to go into industry whereas, if you go back 10 or 20 years, the tradition of a PhD was to return to academic activity.

Industry has also participated very strongly in CRCs as research users. Within CRCs there is a whole amalgam of people from universities, CSIRO, industry, state and federal agencies, research institutes et cetera, but we insist that industry, as a research user, take majority positions on the boards of CRCs. We insist that the industry participate very strongly in creating the strategies, policies and priorities of CRCs so that the research being carried out through a CRC is indeed directed towards the end user, and in the commercial type CRCs that involves industry from all sectors.

We can show that there has been economic benefit from the CRC Program to date. The Mercer-Stocker report, which was a tabled document, has some case studies which clearly show that. The CRC Association publications show that, and in 2003, through the department, we will carry out an evaluation of the program to date where we will quantify further the economic benefit resulting from the CRC Program. In finishing, I would like to turn to Denis and he can make some comments specifically on SMEs and industry.

**Mr Hanley**—I will be brief. As a former chairman and chief executive officer of a company called Memtec Ltd, I saw an Australian company start off with four people, of which I was one, and grow to 1,700 people. When I left, the market capitalisation was about \$900 million. It is interesting to have gone through a commercialisation process with technology that came out of the University of New South Wales. During the evolution and development of that company we were associated with a couple of CRCs. One of the great features of the CRC is that it brings together into a centre of excellence people interested in a particular industry setting. Therefore, by association, you are working with the best academic minds in the country in a particular field and we were certainly able to maintain a leadership position on a global basis with my company.

Regarding the employment of graduates, because they become involved in programs that are associated with industry during their evolution and development, by the time you are ready to hire them you can put them straight into the field. Certainly, we were able to hire people and within a week have them in either the United States or the United Kingdom working on projects and programs. It helped that company grow into an international company.

With regard to the current program, there are a couple of things I would like to say. One is that I do not believe the program regarding SMEs works as well as it could. Speaking from the point of view of an SME, I do not know whether any of you have tried to raise money for a small business in the last 12 to 24 months but I can tell you that it is very hard. The hurdle rates for venture capital are about 50 per cent IRR per annum and it does not take very long to realise

that long-term commitments such as a seven-year R&D program are just not something you are going to get involved with in that sort of a company.

However, a lot of the SMEs that are research based are typically working at the cutting edge of a particular type of technology and it would be very useful for them to be associated with the academic institutions that are also at that cutting edge. The big issue is that they cannot put in the money that Dr Vaughan refers to as the industry contribution. They can make contributions of kind, and I believe they are willing to do so. My suggestion is that a percentage of the Commonwealth money be granted only in relation to SME programs. In other words, if there were a significant amount of Commonwealth money going into a program, some percentage, best determined with regard to each particular program, ought to be set aside for an SME program, where there would be a relationship established with a number of SMEs working at the cutting edge to bring them within the fold and to help them. I think it would mutually benefit the CRC academic program and the SMEs.

There is another issue. I do not know how many of you are associated with large companies but certainly with a number of technologies it is even difficult for large corporations to make seven-year commitments. If you know what the life cycles of certain technologies are, you will note that even organisations like Telstra are not committed to particular R&D programs for seven years. It is typically an annual budget and therefore it is somewhat difficult for these folk to sign up to seven-year programs. I think there needs to be some flexibility within the evolution of the CRC Program to have people work for different lengths of time. It is not to say they will not contribute for seven years; they just will not be able to make a commitment for seven years. I can tell you from my life in business that I did not know what I was going to be doing seven years from a given point in time, and certainly no-one would ever approve an allocation of money seven years ahead. I think there just needs to be flexibility. The actual CRC has to stay attractive by managing the various programs with these people and getting the contribution on a more flexible basis.

**CHAIR**—Thank you for that. I will continue on the point you were just making. I am aware the minister is making some announcements tomorrow with respect to the latest rounds. I understand that in relation to those rounds there has been a better focus on the SME area. There have been some changes to the rules, and I am certainly aware of at least one application whereby quite a number of small businesses—and I would say ‘small’, not even ‘medium’—would be able to participate via an industry body. Isn’t that one way, particularly with the CRCs—

**Mr Hanley**—Yes, indeed.

**CHAIR**—I read the application of this particular one, which is in the area that I used to be involved in myself before parliament. It would allow small businesses to possibly just be involved in the CRC for a period of time and then pull out and another one might replace it et cetera. So the new rules have allowed that type of flexibility, which I know received a fairly good response from small to medium businesses.

**Mr Hanley**—I am sure you were going to say this, but where there are industry associations and where there are multiple participants that are doing something similar—for instance, in agriculture or in various other industries—I think there have been significant advances. The problem comes now more in the area of patented developments, where people are working in

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intellectual property areas from which, really, the industry associations are not able to share the outcomes as well as you might hope. For example, Memtec went from a start-up company to \$900 million and generated significant value for the community. That was on the basis of a series of proprietary patents and it is bit difficult to work through an industry association on something like that.

**CHAIR**—Point taken.

**Mr Hanley**—The committee is trying very hard to figure out ways for the SMEs to do things and I think we have made advances. We are talking about the next set.

**Dr Vaughan**—In fact, in Backing Australia's Ability, the Prime Minister's innovation statement of January 2001, the CRC Program received increased funding, which I believe recognised and reflected the success of the program to date. Part of that increased funding had some things tied to it, one of which was the greater involvement of SMEs. It allowed for mechanisms for greater SME involvement overall and also for greater international associations to hopefully give Australia a better look at the global situation with regard to industry and R&D in industry. But there was no question that, in the Backing Australia's Ability funding, there was to be new emphasis on SMEs. That is one of the reasons I tabled the guidelines: that is reflected in the guidelines as well.

**CHAIR**—Do you have any data on industry involvement in CRCs that indicates that companies that had not invested much in research and development in the past are now effectively investing in research and development through their participation in CRCs? Or are the majority of companies involved in CRCs the sorts of companies that always had a reasonable R&D portfolio or budget anyway, and this was just another way for them to spend their money?

**Dr Vaughan**—The only statistics I can give you are from the compendium. If you look at the industry participants in the compendium you find that a bit more than 200 industries are involved. Breaking them down roughly, you would classify 100 of them as SMEs and 100 as nationals or multinationals. All the multinationals and nationals have track records in industry; none of them came in because of the CRC Program. But, while the 100 or so SMEs may well have had R&D under their own roofs, I believe that without question it was expanded through their participation in the CRC Program. That is one of the things we want to get better handle on through the 2003 evaluation the department will be carrying out through next year.

**CHAIR**—That sort of information would be very useful to this committee, but we will probably not have it in time. If that is a way in which private enterprise is expanding research and development investment, it seems that it is something to be further encouraged.

**Dr Vaughan**—The figures I gave you were just out of the current compendium, which means they cover the 63 or so CRCs in the compendium. Although there have been 120 successful applications, in any given steady state about 60 CRCs are alive and active. If you go over the whole of the program, something like 600 companies have been in the compendia since the start of the program.

**CHAIR**—Your submission mentioned 62 active CRCs, but the compendium talked about 64.

**Dr Vaughan**—That is only because, by the time the compendium came out and I wrote my letter, two CRCs had closed down.

**CHAIR**—Okay.

**Dr Vaughan**—They come and go. Their close date depends on when they started; the number varies day by day depending on which ones have closed down.

**Mr FORREST**—Do they close down because they have fulfilled their tasks or because they have failed?

**Dr Vaughan**—Every CRC initially gets a seven-year life. Some in the early rounds got shorter lives—some got four and five years in the very early days, particularly in the IT field—but overall 95-plus per cent of CRCs have had the seven-year life span. They are able to apply for renewal when their time comes up, and quite a number of CRCs have successfully applied to be renewed. So if you go through the selection rounds 123 CRCs have made successful applications, but of those I think 83 are actual new CRCs, so about 40 or so have been renewed. In the current selection round some applicants are coming up for their third run, but we will not know which ones they are until tomorrow. But, as I said, because CRCs close down and new ones start up, there is a steady state of about 60 to 70 at any given time.

**Mr Hanley**—Any continuation CRC has a new program, so one of the key things is that if you get an academic centre of excellence or a group of institutions it is not unremarkable that they would have the ability to go on past the first group. They do not continue to do what they have done before. Any second CRC is basically looking at new research.

**Dr Vaughan**—They are not still doing what they were doing seven years before that.

**Mr Hanley**—On the other point you asked about a little earlier, if you look at the spin-off companies, it is obvious that they would never have come into being if the CRC had not been there, because they spin out of the CRCs. There might be some data available on the spin-off companies out of the CRC Program. None would have occurred if there had not been a CRC Program.

**Mr LINDSAY**—In relation to the contributors, you talked about 100 SMEs and 100 nationals.

**CHAIR**—Or multinationals.

**Dr Vaughan**—Yes. There are a number of companies that you would call multinationals, particularly in the drug area, where you have the Astras, the Glaxos et cetera. In the mining area you have Rio Tinto, BHP Billiton—

**Mr LINDSAY**—Are there any impediments to attracting multinationals to Australian CRCs?

**Dr Vaughan**—No, I do not think there are impediments. I think the CRC Program has been successful in actually bringing multinationals into Australian R&D.

**Mr LINDSAY**—Are there any impediments in the reverse direction in that, whatever research is completed, the multinationals take some advantage of that research and perhaps some of that technology is exported? Are there any impediments there?

**Dr Vaughan**—I do not look on that as an impediment. I would say there would be a difficulty if that were to happen. Hopefully, all the outcomes of CRCs are going to be of national benefit to Australia rather than of overseas benefit. We might have had the definition reversed there but—

**Mr LINDSAY**—But multinationals do not invest if there is not going to be a benefit for them. How do they get that benefit? Are there any impediments to taking that benefit?

**Dr Vaughan**—I do not think there are impediments. The CRCs themselves have had licensing arrangements, are selling intellectual property or are going into joint ventures through start-up companies, and so that is how the national benefit has been maintained, even though it may be an overseas company doing the commercialisation.

**Mr LINDSAY**—I just want to go back to the ratio of 100 SMEs to 100 major companies. I guess that for SMEs in the marketplace out there in absolute numbers the ratio would be 80 or 90 per cent SMEs. Why is that ratio not reflected in CRCs?

**Dr Vaughan**—It comes back to Denis's comment.

**Mr Hanley**—I think also it is what the chairman mentioned. For instance, there are thousands of farmers in cotton but they go through an industry body, and it is the same with wheat. The numbers would be skewed by the way the data is collected in the sense of there being one industry partner for something like that. But your point is still right. The main impediment for SMEs is money—they have not got a lot.

**Mr LINDSAY**—In your opening statement you talked about the need for greater communication—communication from whom to whom? What can we do—

**Dr Vaughan**—The minister presently has asked the CRC Committee to look at the issues related to communications for the program, to advertise the program and to specifically direct it to potential users, to SMEs. We have had one meeting in the department to start a working party on how this can best be done. We are working very closely with the CRC Association in developing a communications program. We get a report back at the next meeting of the CRC Committee of the first six months of that program to see the impact of it and where it should head from that point onwards.

**Mr LINDSAY**—If this committee were going to make some kind of recommendation to the government about that, what recommendation do you think we should make?

**Dr Vaughan**—I think some funding should be available to the CRC Association to publicise the program and to communicate the program perhaps in a stronger way than is happening at the moment. The department already supports the association with some funding to supplement the CRC Association funds in running their publicity campaigns. The CRC Association has a levy on CRCs to run their publicity and communications program and that fund gets some supplementary funding from the department as well.

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**Mr LINDSAY**—In your opening remarks you talked about greater financial assistance from government but that was a fairly nebulous concept. What were you talking about?

**Dr Vaughan**—I think it is too easy to say, ‘Let’s get more money from the government.’ I think the CRCs have done very well through Backing Australia’s Ability. We got an extra \$55 million for the next financial year and that is how the current selection round is being funded. That was lifted to \$57 million the following year, allowing presumably for a bit of creep. In the following year, again we will get an extra \$112 million, signalling that there will be yet another selection round. That is the way I look at it. Having that money, which represents an 80 per cent increase on our current total, means that the government is already putting a fair slab of money into CRCs. That is appreciated very much. I think it is now a matter of seeing that there is a real return on investment for that money—a return to Australia and a return to the participants. Hopefully through that success it can generate further funding.

**Mr Hanley**—I would like to pick up on the communication issue. My perception, as an industry person on the board, is that the program is thought by industry to be academic. I think that is a communication problem in terms of the commercialisation facet of it. It is something which is pretty much run from the academic side and part of the improvement in communication would be to get industry more involved in the allocation of funds. I think that could improve it, whether through the SME program, as I described, or just finetuning how industry came about it.

**Mr LINDSAY**—You said that Australia has a comparative advantage because of the cost of R&D here. How can we capitalise on that? What are your recommendations?

**Dr Vaughan**—I think it is well known. I do not think that you need to tell the research community any more about it.

**Mr LINDSAY**—What about internationally?

**Mr Hanley**—It is not well known. It is 50 per cent of the cost on the West Coast. There are VCs in Australia who are building programs in Australia and at Australian universities based on the fact that it is less than half of the cost on the West Coast of the US.

**Mr LINDSAY**—What can we do to spread that message?

**Mr Hanley**—It comes back to the communicator who drives it. If it is an academic program, nobody will note it. But bringing skilled people back or keeping them in Australia will involve interfacing with West Coast VCs or American VCs. They have had a problem investing in Australia because of the fact that most of them are limited partnerships and there are tax rules that flow through for limited partnerships whereas investing in Australia really exposes them to Australian tax. It is more complicated than just the CRCs.

**Dr Vaughan**—I would like to add that there is a case study in the CRC you visited. You visited Eye Research and Technology. That is very heavily supported by the overseas multinationals—Johnson and Johnson, Ciba Vision, and Bausch and Lomb—because they are the big international manufacturers of contact lenses. They put a pretty large share of funding into that CRC. But the CRC has tightly tied up the intellectual property to get royalty payments back from those companies which are taking up the technology.

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**CHAIR**—We were very impressed there. That was a good example of where they had to show something new for the future. They gave us a run down on what they were and on their vision—excuse the pun—for the future of a refunded CRC.

**Dr WASHER**—Dr Vaughan, you identified a couple of impediments here. One was the seven-year funding term. The second was the marketing problem. The other was the lack of capital for SMEs to participate in these programs. Are there any other major impediments you can see in the CRC model? What would you do to improve this model beyond those things?

**Dr Vaughan**—Some of those impediments are strengths, of course. The seven-year funding model might be hard for some to sign up to, but one of the really bright parts of the CRCs when they were developed—and this goes back to the Hawke government; they were the brainchild of the then Chief Scientist, Ralph Slatyer—was to give a seven-year funding cycle. Up until then, most of the public R&D funding was short term; here was a seven-year program where people could genuinely sit down and plan strategically with good policies and priorities in their research budgets. That could be seen as an advantage, but for some it is an impediment because, as Denis said, it is hard for small companies to sign up for seven years. Hopefully we have overcome that by allowing SMEs to come and go depending on their circumstances and needs. I must admit I cannot, off the top of my head, think of any real impediment to the program. I think that both of the two large reviews that have been carried out—one was carried out by Sir Rupert Myers in 1995 and the other was a tabled document, the Mercer-Stocker review in 1999—looked for impediments in the program and could not find too many that I can recall. It was from those reviews that the government elected to continue with the program.

**Dr WASHER**—What part do you feel our universities in Australia are playing in this, and is it significant enough? Can you discuss that a bit? What would you like to see our universities do differently?

**Dr Vaughan**—They play a key and critical role because we do insist there be an innovative education program in every CRC. It is part of the selection criteria and to do that you have to have a university. One of the strengths of the program has come through the provision of excellent PhD programs. There are something like 2,000 students at any given time in training for PhDs within the CRC Program. We have had a bit under 2,000 graduates through the program to date, so we are a mini-university if you put it together in that fashion. One of the delights of a CRC review is to hear the students tell their stories as to how they can participate and to see how they have gained a lot from being a student within a CRC. That is one part that universities play.

The other role the universities play is to provide funding. Generally this is out of their private moneys rather than government allocations but the universities do put in cash and a lot of in-kind, because some of their senior research fellows and professors participate in CRCs. Some still have to fulfil their teaching roles and other roles within the universities. Some are seconded 100 per cent to show the support from universities. Indeed, in quite a number of CRCs the chief executive officers are people from the university sector, either having been seconded to the CRC or having resigned and taken the CRC position. The universities always complain to me that they have to put in too much money for research in CRCs, but that is up to them. As I have explained to them, it is a competitive application and if universities do not want to put any money in that is their prerogative. But the first ones who are going to break that rule are the universities themselves to make their application more competitive.

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**Dr WASHER**—Is the level of excellence you would anticipate existing in our universities there? I ask that because you are seeing the products of them.

**Dr Vaughan**—Yes, I believe so. Virtually every university is in a CRC in one way or another. The only university that is not is the Australian Catholic University, because it does not have a strong science, engineering and technology program. It is interesting that, if you look at the compendium and go through and count each time a university is mentioned, you come out with 198 universities. There are only 36 universities participating, which means that, on average, every university is in six CRCs. Some of them occur more and some of them a lot less but, if you count each time ‘university’ is mentioned, there are 198 in the latest compendium.

**CHAIR**—That is a good example.

**Mr FORREST**—One of the things that have always impressed me about the CRC model is the capacity to bring in a lot of diverse players. I have got one project that is for freshwater research for ecology along the Murray River. It has even got all the water boards along the Murray River making contributions. The one that I am hanging out my hat for tomorrow is for titanium. I do not expect you to comment on that but, in your process where you advise or oversee the selection of new CRCs, clearly the more players who are making financial commitments the more attractive it is. Is that a deliberate process and policy you have in any recommendations you make?

**Dr Vaughan**—Again, it is in the selection criteria. There is one on collaborative arrangements where we are looking at the commitment and number of participants. Strategy utilisation and commercialisation research outputs is another one which covers the involvement of participants with regard to commercialisation technology, transfer and utilisation. One does take into consideration the number of participants, the type of participants and their activities within the centre. You can overdo it, obviously. You might have a case where you have too many participants. In some CRCs, you may not have as many. In particular, if the medical participants are going along with a new drug development, generally they want to get it locked up with one multinational. The track record in drug research is that people very jealously guard intellectual property. Some CRCs have a very small number of participants; some have more. If you take tourism, there are not too many interests in Australia left out of the CRC.

**Mr FORREST**—It seems to me the more players there are, the more trouble there is. But the more players there are, the more opportunity there is to pick up diverse groups of industry players.

**Dr Vaughan**—It depends which area you are in. Certainly there have been some successful outcomes, and freshwater ecology is a very typical case.

**Mr Hanley**—Where there is a degree of science involved, there is a very heavy criterion that the science should be world class. That impacts very heavily on the discussions. You often have situations where the topic is pretty interesting but the science program has not gotten together properly. That would be the biggest problem for the very heavily scientific organisations. That goes to the point that you have to be world class; otherwise you do not get the funding.

**Mr FORREST**—Intellectual property is going to be an issue right from the start, so if players get together and say, ‘We’re going to commit ourselves to X amount of money,’ clearly

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the proposal has to come to you with a clear agreement between all of them about what will happen when they invent something, how it will be protected and how they will share in the future benefits of that.

**Mr Hanley**—Typically, there would be a company formed by the CRC that would control the intellectual property and then, depending on various subprograms within the CRC, certain organisations contributing cash would have rights to the base patents. Some would have more rights than others on different projects. Typically, that is how the intellectual property gets carved up. But you are right: it initially goes to the CRC and then the CRC has a commercialisation process where it has relationships with the contributors to have various levels of access to the intellectual property generally.

**Mr FORREST**—To me, that is a much better way to do it than for the parliament to try and prescribe in a legislative way how—

**Mr Hanley**—That is typically how it is done.

**Dr Vaughan**—It is done through centre agreements. In setting up, the centre has two agreements. The first is the centre agreement, so the participants get together and work out how they are going to work as a CRC. The second is a Commonwealth agreement, which those people sign off, which states that they will be abiding by the rules and regulations of the program, that they will participate in reporting requirements and everything else. But we insist that they have a centre agreement. Within the centre agreement there is a commercialisation and an intellectual property management arrangement. Until recently, the CRC Committee required that it hear about all of the arrangements for commercialisation and management of intellectual property—any agreement for licensing, any sale of intellectual property, development of a spin-off company et cetera. We wanted to hear about it and give our approval. When we started to get people coming in with the information we found that we did not have the skills to do it, because they were the experts and we were a committee of laypeople in most areas trying to give them advice as to whether they were doing the right thing or not.

The committee itself reviewed its intellectual property rules. Although we have to be assured in the centre agreement that there is a statement that they will manage their intellectual property for the benefit of Australia in accordance with the agreement et cetera, we only want to know whether they are going to deviate from that broad statement in the future. So we have left the management of intellectual property back out at the centre, and I think that is where it should be. Please remember that these CRCs are managed by boards. There is no bureaucracy or committee running them. Once a CRC is established, it sets up a board which is run on corporate lines. Indeed, some of them are incorporated ventures. We leave the management to those boards and, as I said before, the boards have to set the policies, priorities and strategies. Within those strategies are the commercialisation and intellectual property management strategies.

**Mr FORREST**—How are the Commonwealth's interests represented on those boards? Do you nominate somebody? Who nominates—

**CHAIR**—A division has been called.

**Mr FORREST**—The division will probably take about 15 minutes. Perhaps you could take that question on notice.

**Mr Cook**—To answer your question quickly, the Commonwealth does not have representation on the board.

**Mr FORREST**—It doesn't?

**Mr Cook**—No.

**CHAIR**—I have another couple of quick questions, so I would appreciate it if you could wait until the division is over. I will suspend the hearing for the duration of the division.

**Proceedings suspended from 6.21 p.m. to 6.36 p.m.**

**CHAIR**—We will reconvene the hearing. I have a couple of things I want to clear up. You mentioned the increases in industry percentage of funding from 1990 to the latest round—not the one to be announced but the last one—from 12 to 24. The state research bodies in that have also had an involvement in the CRCs. What has their investment done in that same period?

**Dr Vaughan**—I will get that out of the compendium.

**CHAIR**—It is there, is it? Okay. There has not been much focus on investment in R&D at a state government level. Some of the data that I have been given, in a general sense, has actually shown their commitment dropping as a percentage of outlays over the last few years.

**Dr Vaughan**—This is brought out every two years. I have only given you that latest one, the 2002 edition. The states are quoted as \$800 million in that \$7.3 billion overall, so it is a bit over 10 per cent. It is in appendix 1 of the compendium—and if you can have a look at those: there is industry and there are the states. So the states are two-thirds of the contribution for industry.

**CHAIR**—But you do not know what that has done over a period. What was it 10 years ago?

**Dr Vaughan**—I have the copy, if you give me half a second.

**CHAIR**—We will come back to that while you look for it. I have a couple of other questions for Denis.

**Dr Vaughan**—I am sorry; I have not got it. I did have some copies of earlier CRC compendia but I have not got them now, so I cannot answer it.

**CHAIR**—We can probably track down that data. The Academy of Science in their submission commented that they were concerned that maybe the selection criteria is overreliant on industry partners and that might have some sort of limitation on stimulating new emerging industries. Do you have any comment on that?

**Dr Vaughan**—I think the Academy of Science are somewhat university focused and, in my opinion, they would have a biased outlook on that.



**Mr Hanley**—I agree with them, speaking from an industry point of view. It goes back to the SME issue. The only players in the start up industry are SMEs and they have not got access to funding to put into this. So you typically tend to have the older industries that have large players with more cash. So it is an impediment at the moment, I think, to very cutting edge type industries because you are only just spurning, in some cases, the potential industry players. They are in the future, not the past.

**CHAIR**—You might be agreeing with the Academy of Science for a different reason, though.

**Mr Hanley**—Yes, I probably am.

**CHAIR**—I would have to check but I suspect they have made their comment and use the term ‘industry’ right across the board, meaning that it should be a stronger research-academia.

**Dr Vaughan**—That is the way I took it. I would see the Academy of Science position as one where there should be a higher component of pure research in CRCs in comparison to strategic or applied research. They would suggest that there was a case for more money from the CRC pool going to the university rather than spreading across the participants. Personally, I would disagree with that.

**CHAIR**—Personally, I do as well. The CRCs are what the terminology says; they are cooperative research centres. It is all about stimulating collaborative research between industry and—

**Dr Vaughan**—My view is that the universities already have the wealth of ARC funds and NHMRC funds. In ARC funds there are industry partner awards as well, so they can have a pure component with an industry partner through the ARC program. I forget the name of the actual grant but it is a combination grant where industry and a university are joint participants in ARC funding.

**Mr Hanley**—Going back to my experience at Memtec, we absolutely had a cutting edge technology. We sold it all over the world. It was purchased by an American company in the end but we built the thing up to a worldwide business because the technology was novel, and the technology came out of Australian universities. We did not have the money to invest in a cutting edge technology. Therefore, it was difficult for us to be a major industry sponsor. I think that is not irrelevant to almost any Australian cutting edge technology, because there is not an industry. Typically, the industry is growing out of the research and that means, somehow or other, facilitating those start-up situations-being able to stay associated with the CRC that spawned them. Otherwise, I think it is pretty difficult for them. As you say, I agreed with their comment from a different point of view. It just springs from my practical personal experience that it is quite difficult to get cash to put a seven-year commitment in when you have not got enough money to last for 18 months and you are worried about the payroll.

**CHAIR**—I understand. Finally, there have been great successes in the CRCs but there have also been some—I do not know whether you would say failures—

**Dr Vaughan**—Mediocre performances.

**CHAIR**—Mediocre performances. Is there anything in common with those that do have mediocre performance? Is there something that stands out that is in common with those?

**Dr Vaughan**—I think the one thing that stands out is that they are not as good as the other ones. I feel that there have been very few failures in the CRC Program. There have been a couple. In all these things you have a spectrum of activity, so you are going to have some very good ones and you are going to have some lesser ones. I equate it to the final of the 100 metres at the Olympics. You have the best runners in the world but only three of them get gold medals.

**Mr Hanley**—Only one, actually.

**Dr Vaughan**—Only one gets a gold medal.

**Mr Hanley**—Three get a medal.

**Dr Vaughan**—But the ones who are lesser are still the best runners in the world.

**CHAIR**—I cannot recall who it was from now but we had some evidence—it may have been an informal comment—that part of the problem with some of them that do not do all that well is that there is usually a bit of a personality mismatch—

**Dr Vaughan**—The cooperation did not work.

**CHAIR**—between the different organisations. It is not really anything to do with the actual research and what they are trying to achieve but the chemistry just is not there amongst the players. Is that a fair comment?

**Dr Vaughan**—I think that is a fair comment and I think it can be any player—it may be a university, CSIRO or an industry participant. In any of these joint ventures you can always have a clash and that can lead to disharmony. Those centres without question are not going to be as successful as the ones that are much more coherent, combined and working in a cooperative spirit.

The other thing, of course, is that if you are not performing well you will not get renewed. Most centres, not all, do go for a second run. In the first round, there were 15 centres and only 10 were renewed, so there were five which were not as good as new applicants against the funds available. In the second round, out of 19 centres, only 12 were renewed, seven fell out. That gives you a measure that some perform worse than others.

**Mr Hanley**—I would not categorise it so much as being about cooperation per se. I would focus on the management of the centre. I think the academic skills are there or they would not get it and the programs are there or they would not get the grant. The one thing you do not really know about until it happens is the management and how good the people are who are responsible for the integration work. I think the degree of success or failure is driven by the quality of the management performance—it is no different from anything else in life. I do not think there are inherent difficulties in people getting on. These are all fairly interesting people, if you know what scientists are like. They are at the cutting edge and they are basically gods in their own field. They are not the easiest bunch; it is like herding cats, in some respects. The

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people who are good at it and who understand those sorts of issues tend to build very good outcomes.

**Dr Vaughan**—The CEO is critical and there have been some outstanding CEOs who have been developed through the program. Their role is different from anything that has been there before. It is different from being a dean of a faculty or the head of a CSIRO division. You have to be able to manage and work with cooperative research. Some of these people have this latent ability which CRCs have brought out of them and they have had outstanding records as CEOs.

**CHAIR**—Does the review process help to sort some of those sorts of problems out?

**Mr Hanley**—Yes.

**Dr Vaughan**—Yes.

**Mr Hanley**—There are even suggestions made that some people are not cutting it. There is a visitor who goes to every CRC who is a quasi-adviser and comes in when the CRC is formed. They are involved in helping mentor. The CRC Association have meetings where they try to educate people in managing these sorts of activities. There is no great model for them to learn from anywhere in the world. It is a matter of learning it themselves. You are going to end up, no matter what you do, with better ones and worse ones.

**CHAIR**—Thank you for your time. We really appreciate it. We will all look forward to the announcement tomorrow from the minister. You will get a copy of the transcript for checking.

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

That the committee receive as evidence and include in the committee's records as exhibit No. 29 the *Review of greater commercialisation and self-funding in the Cooperative Research Centres Program*, as presented by the CRC Committee.

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

That the committee receive as evidence and include in the committee's records as exhibit No. 30 the *Guidelines for Applicants—2002 selection round and general principles for centre operations*.

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

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

**Committee adjourned at 6.49 p.m.**