

**B-HERT Position Paper No. 2**

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**The Development of Cooperative  
Research Centres**

**A Policy Statement**

**October 1998**

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### **The Development of Cooperative Research Centres**

The Federal Government recently confirmed its continuing commitment to Cooperative Research Centres (CRCs), ending months of speculation and uncertainty as to the future of this program.

This follows a number of reviews of the program over the past two years ending in the one carried out recently by Mr Don Mercer (former ANZ chief executive) and Professor John Stocker (Chief Scientist). The Government adopted a number of key recommendations of the Mercer-Stocker review and will continue to provide Commonwealth funding of \$138m per year for the program. The Government's decision has come as a great relief to those in industry, universities and government research organisations who regard the program as a successful way of bringing research bodies and industry closer together in a productive partnership.

The Minister for Industry, Science and Tourism, Hon. John Moore outlined what he saw as the future for the program:

Research of world class standard;  
Continued focus by CRCs on development of international linkages;  
Greater emphasis on novel technologies which can assist Australian industry to be more innovative and competitive.

#### **Background**

The CRCs were established to foster closer ties between universities, industry and government departments and organisations, such as CSIRO, DSTO etc., in order to bring research closer to commercial realities and provide education and training opportunities. The Program was established to address a number of specific issues among which were:

1. The need to ensure that advances in science and technology were linked to applications in various sectors of the economy.
2. Related to this was the need to improve international competitiveness. The need to ensure that Australia's undergraduate and graduate programs in science and technology were of world class; specifically involving researchers from outside the higher education sector to ensure better quality and performance.

The CRC Program was to play an important role in ensuring that Australia benefited from the strength of its science and technology resources. Specifically, it would help ensure that Australian research and research training remained at the forefront in those areas of specific importance to the country as a whole.

Since its inception in 1991 there have been five rounds of applications called with 67 Centres currently operating, several of which are CRCs from the first round of applications, which were successful in re-bids for another term in competition with new applicants; a sixth selection round is currently underway. The CRCs operate in six industrial areas:

manufacturing technology;  
information and communication technology;

mining and energy;  
 agriculture and rural based manufacturing;  
 environment; and  
 medical science and technology.

It can be said that the advent of the programme has changed the attitudes and approach to research management, and that the boundaries separating government, private and academic research have gradually changed and diminished.

<b>Before CRCs, research efforts were largely:</b>		<b>CRC research is:</b>	
<i>Industry</i>	<i>Research institutions</i>	Market driven	
In-house	Researcher driven	Multidisciplinary	
Short term	Single discipline	Directed to national priorities	Versatile
Ill-equipped	Not always well managed	Focussed on returns	Innovative
Isolated	Frequently not focussed on	Efficient resource utilisation	Attractive to
returns		Collaborative	industry
		Provides trained technologists	Project managed

The CRC program has actively encouraged a “cohesive organisational identity” in CRCs. A number of CRCs are multi-nodal in nature with others single node and co-located into existing or new facilities. Those with multi-nodal locations range from CRCs where research teams are dispersed across one campus to CRCs where teams are geographically separated across a number of states.

The multiple-participant nature of the CRC program has been a new experience for both industry and institution participants. It is difficult to realistically judge the level of success of the scheme given the relative newness of the program. The CRCs from the first and second round are only now starting to develop commercial outcomes. Indeed, Mercer and Stocker noted that there are examples of significant technological developments and of technology transfer in many sectors and some outstanding examples of the commercial benefits of CRC research.

## Summary of Positive Points of CRC Program

Universities/Research Organisations	Industry
<p><b>1.</b> The primary benefit of CRCs is profitable links between research and industry. In addition, the CRC Program has encouraged interaction between university groups and centres that previously did not collaborate. Benefits can therefore be found within universities as well as between universities and industry.</p> <p>New opportunities for researchers to participate in different areas than that in which they are currently involved.</p> <p>Secondary range of activities are now emerging from the shadow of the formal CRC structure.</p>	<p><b>1.</b> Attracts high calibre scientists that industry would not otherwise be able to access and improves access to people and resources and opportunities to work in multi-disciplinary groups.</p> <p>The program also provides a vehicle for applied research which responds to commercial opportunities.</p> <p>CRCs are successfully bringing research and industry together in creative and cost-effective collaborations to develop new products and opportunities of immense value.</p> <p>CRCs are providing a number of benefits to management and other stakeholders and are developing a cadre of outcome focussed researchers, users and managers. They are creating a new breed of entrepreneurs for our future industries.</p>
<p><b>2.</b> Provides researchers with longer term funding than was previously available, enabling a longer term focus for research.</p>	<p><b>2.</b> Higher level of university support and more stable structure than individuals or university centres. Better continuity and more concentration.</p>
<p><b>3.</b> Better opportunities in research education generally - Ph.D students have access to industry partners. Collectively, there are some 1400+ postgraduate students being trained under the auspices of CRCs. Accordingly, the potential importance of the impact of the CRC program in this area is considerable.</p>	<p><b>3.</b> Greater number of Ph.D and other students (summer vacation students etc) now work in industry. These contacts are highly valued by all concerned.</p>
<p><b>4.</b> Interactions between research groups has led in a number of cases to a broadening of research topics.</p>	<p><b>4.</b> Companies are now making funds available for research beyond simple product development. In CRCs, while CRC funds support the research and development phase, industry pays for the commercialisation of products, which may often be 10 to 25 times the cost of the R&amp;D. This investment represents a very significant multiplier on the original Commonwealth funding.</p>
<p><b>5.</b> Researchers undertaking topics that were previously only funded through GIRD grants or research contracts. More cutting-edge research.</p>	<p><b>5.</b> Business is more able to influence direction of research. Involvement in CRCs in many cases has led to direct involvement in direction of program. CRCs create an opportunity for Australian companies and whole industries to carry out their strategic industry research in Australia.</p>
<p><b>6.</b> Researchers given the opportunity to work in a team. In the new mode being developed in the CRC there is a more genuine multi-disciplinary research. Here the leadership function is differentiated into process facilitation and substantive material. The substantive material is much more a shared leadership with all contributing at appropriate times.</p>	<p><b>6.</b> Possibility of spin-off companies developed from CRCs (e.g. Eye Technology, Photonics) - opportunities for smaller high-tech companies to engage in major and multi-disciplinary research. It is estimated that each CRC will spin-off 1-2 companies in a 14 year cycle, on the basis of an investment by the Commonwealth of approximately \$20 million per company. Six companies are already operating as a result of the CRC Program, and nine more are in the process of being established. These technology-based companies will contribute to a growing Australian economy, and provide significant employment and investment opportunities.</p>

<b>Universities/Research Organisations</b>	<b>Industry</b>
<p>7. A number of academics given the opportunity to make a greater number of contacts and interaction with industry. CRCs have exposed researchers, including postgraduate students, to interaction at all levels with industry, from product development through to marketing and commercialisation. This provides valuable training in this area, and is changing the mentality of institutional researchers so that many are now involved in spin-off companies and commercial opportunities.</p>	<p>7. Universities have become more aware of industry's needs and in a number of cases industry staff have been seconded to University partners.</p>
<p>8. For a number of universities the industry culture is pushing project management in ways not seen before. People are becoming more realistic in assessing the time it will take to do things, and used to being held more accountable.</p>	<p>8. Royalties in some cases are already flowing back to CRC partners, and in a number of other cases are likely to flow back sometime in the future.</p>
<p>9. Links between industry and universities are occurring not only in the sciences but also emerging in the social sciences and humanities.</p>	<p>9. Wide range of potential industry groupings are occurring which includes government agencies, which is of benefit to all participants.</p>
<p>10. Universities given a framework within which they can share in the upside potential from the commercialisation of the research. The new mode attaches great importance to utility of the results. This is changing the status of applied work throughout universities and leading to a real change in research culture. Applicability becomes an add on to conventional peer review quality processes.</p>	<p>10. CRCs are enhancing Australia's reputation as a world centre for advanced technology, and are attracting overseas corporations to Australia for commercial and regional development of research opportunities.</p>
	<p>11. Communications between partners are often difficult particularly if dispersed geographically. In some instances CRCs have developed nodes in various states, and have been able to develop tools and practices which make the geographic issues a minimal problem. As Centres mature, key researchers get to know the industry players on a personal basis and so feel part of one team. Teleconferences, emails and regular visits in both directions ensure effective communication.</p>
	<p>12. Intellectual Property arrangements can be problematic because industry feels that universities take an unrealistic attitude. CRCs are addressing this problem.</p>

### Summary of Some Negative Aspects of the Program

<b>Universities/Research Organisations</b>	<b>Industry</b>
<p>1. Administrative and financial arrangements can be cumbersome and slow in many instances, and compliance costs are very high. (One CRC suggested \$1 million per annum per CRC).</p>	<p>1. Formal conditions of joining a CRC can in some instances be too constraining. If the CRC research is too broad there is the problem of having too many applications to pursue. On the other hand, there is sometimes a tendency to fragment research too much.</p>
<p>2. Funding restrictions on university researchers in CRCs. Perception by researchers that being in a CRC program may compromise other sources of funding.</p>	<p>2. In some instances, less freedom for industry partners to contact traditional manufacturers of their choice.</p>

<b>Universities/Research Organisations</b>	<b>Industry</b>
<b>3.</b> Diffusion of research effort. Whilst broadening the areas of research of some academics it could also diffuse the research effort of individuals.	<b>3.</b> CRCs may have some difficulty in attracting the best management because incentives available were not the same as in industry (e.g. stock options etc.).
<b>4.</b> Restrictions on publication for students who are working in confidential areas could be potentially damaging for their future careers.	<b>4.</b> Small companies in particular saw CRCs as a risky endeavour. Larger companies had a problem commercialising technology that did not deal with their core technology.

## **Progress to Date**

The positives clearly outweigh the negatives, and the program should be assessed in that context.

It is clear that the CRC program is having a significant impact on the links between industry and universities. The CRC scheme does have clear advantages. It provides close collaborative links with industry and the facility to maintain those links over a number of years. In many cases the CRCs are starting to attract cooperative links with companies which were not original partners. A number of spin-off companies are also providing further advantages to partner organisations. The program is also seen by industry as a means of influencing the direction of university research and a way of being involved with high calibre scientists to whom they would not otherwise have access. For universities, CRCs have provided innovative ways of engaging research students with industry.

The program has already extracted a significant contribution from both industry and government and a number of peripheral arrangements are starting to emerge. These are extremely valuable but need careful 'nurturing' from both industry and universities. Overall the program has resulted in a strongly positive effect on Australian spending on research and development by government departments, universities, CSIRO and other public R&D agencies and industry. Valuable international linkages have occurred and these need further development and strengthening.

"The CRC scheme should not be judged just on the criterion of whether Australian industrial activity is being created by the investment, but also the criterion whether entrepreneurial activity is being encouraged, particularly amongst the excellently educated young Australian scientists and engineers. In this way Australia can create a paradigm shift towards a constantly regenerating economy, based on the development of embryonic growth industries, which would be the mainstays of its future economic success." (Dr Adrian Hunter, CIBA Vision, USA).

Many CRCs have been successful in acting as foci for public debate on scientific issues. The CRC program provides an important avenue for public education in a variety of scientific and technological areas.

The acceptance of the key recommendations of the latest review of the program (by Mr Don Mercer and Professor John Stocker) by the Minister for Industry, Science and Tourism, indicates that the Government sees strong advantages in the continuation of the program. These advantages include:

- the diffusion of technology,
- the development of management skills, and
- the training of researchers as technologists with a commercial outlook.

A stronger emphasis in the future will be placed on management aspects including more involvement of research users on boards of the CRC such that the research user representatives plus independent members (where possible) outnumber the representatives of the research providers.

This latest review, and the government's acceptance of its recommendations, reflects strongly the support that has been expressed from all sources during the latest review process.

B-HERT also strongly supports the concept and has formulated an Action Agenda to enhance the outcomes of the CRCs.

### **What Needs to be Done - Action Agenda as seen by B-HERT**

1. Continue funding for existing productive CRCs so that the investment to date will bring returns. While CRCs are ultimately designed to become independent, funding must be provided to the point where this is possible. Realising the potential of major research programs and further developing the structural changes needed in the way research is carried out in Australia, requires on-going investment in the CRC system.
2. Invest in successful centres past the second funding contract so that the CRC 'brand' is continued, endorsed and promoted. Clarify what constitutes "success".
3. Fund new Centres in areas of strategic importance to Australia and industry to create major new opportunities for product development and public good, e.g. knowledge-based industries, the environment.
4. Realign the promotional systems in Universities which are still aligned towards the number of publications rather than the relevance of the R&D to industrial/Australia's needs, research outcomes and recognition that intellectual property rights may preclude publication.
5. Streamline the formal processes (i.e. paperwork) deemed as necessary by Government for reviewing and reporting CRC activities to reduce compliance costs. A review and overhaul of the reporting and review processes are warranted.
6. Persuade DETYA and the ARC that bureaucratic policies to obviate perceived double-dipping by CRC program funding are operating contrary to Government policy intentions for change in research and postgraduate education emphasis.
7. Adopt as a policy of the Vice-Chancellor's Committee that institutional assessments should not unreasonably weight, for example, ARC Grants, which are seen to have a unique imprimatur of peer-reviewed competition to an extent that unfairly overlooks the part that similar processes play in getting a CRC up in the first place.
8. Promote University policies that place less emphasis on every academic striving for similar levels in both teaching and research and more on recognising team contributions in either area, so that those with real talent in one are able to concentrate mainly on doing that instead of dividing their time in a way that sub-optimises both areas, and so extract greater value from part-time commitments by academics.
9. Evaluate how much public sector research should be done through the CRC

mechanism.

10. B-HERT, in conjunction with the CRC Association and the PVC/DVC Committee on Research, establish a Working Group to formulate firm proposals for ongoing development of CRCs to present to Government, to industry and to CRCs.
11. B-HERT, in conjunction with the CRC Association and the PVC/DVC Committee on Research to conduct an annual Forum (similar to the Forum in Sydney on 10 August 1998) aimed at bringing more industry participation into the CRC program.
12. Further extend throughout CRCs (to senior CRC managers as well as directors) the "*Achievement Through Teams: Leadership in Innovation*" course (sponsored by B-HERT, CSIRO, BHP, F H Faulding and the Melbourne Business School), which has been important in developing a new culture of research leadership.
13. Develop Technology Transfer plans and strategies for every CRC (as is now being done by some), identifying the key messages from the project, the important audiences to reach, and the means by which they will be reached.
14. B-HERT to invite at least one member university and at least one industry member to quantify costs and benefits of membership of CRCs.
15. B-HERT to commission a paper that details sector-wide quantities e.g. funding, graduates, technology diffusion cases, staff transfers.

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