

Business Commitment to Research and Development in Australia

**A submission to the
House of Representatives
Standing Committee on Science and Innovation**

from the

**Non-Ministerial members of the
Council for Knowledge, Innovation, Science and Engineering
Victoria**

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Introduction

The Council for Knowledge, Innovation, Science and Engineering (KISE Council) advises the Victorian Government on a wide range of matters concerning the pivotal role of science and innovation in the Victorian economy.

The non-Ministerial members of the Council welcome the opportunity to comment on the issues currently being addressed by the House Standing Committee.

Term of reference 1: What would be the economic benefit for Australia from greater private sector investment in R&D?

The question of economic benefits from private sector investment in R&D has been reviewed many times in recent years in Australia and overseas. Australia has been a notable under-performer against the OECD average, although Australia's Business Expenditure on Research and Development (BERD) has been increasing in absolute terms, and all levels of government have provided assistance in various forms. The underlying questions appear to be:

- Why should Australian businesses do R&D?
- Is a higher level of private sector investment in R&D is worth striving for?
- What more should Governments and others do to stimulate and encourage a higher level of investment?

The response to these questions will reflect the kind of Australia we envisage for the future – an innovative competitor in world markets, and also able to meet significant technological challenges at home.

Greater investment will provide greater benefits and returns simply because there is no evidence that Australia is approaching an optimum level of private sector investment in R&D.

The significant benefits of private sector investment in R&D include:

- Elaborately transformed manufactures to world markets, export growth, import replacement, better returns to innovative firms.
- Diffusion of new knowledge, adoption of new technologies, new management and workforce skills, job creation, better paid jobs.
- Capacity to attract and retain international investment including venture capital.
- Stronger, more stable currency.
- Cleaner and smarter production processes.

From the perspective of the investors, the immediate benefits of R&D investment include:

- New products and services, greater knowledge intensity.
- Competitive and entrepreneurial behaviours, innovation culture.
- Capacity to respond quickly and innovatively to new challenges.
- Less reliance on government incentives and subsidies.

From the point of view of role-of-Government and the rationale for R&D incentive programs, Governments generally look for evidence of public benefits and/or collective benefits ('spillovers') that would not otherwise occur.

The magnitude of returns on large-scale or aggregated investments in R&D is impossible to calculate with any accuracy. Some Australian studies have suggested that a well-managed R&D program should return overall about seven times what it costs but the variation between projects is considerable, as is the extent to which research funders can capture the benefits.

Term of reference 2: What are the impediments to business investment in R&D?

Again, this topic has been reviewed from time to time in recent years and various problems identified by business interests and others. Key issues include:

- Lack of skilled workforce; lack of entrepreneurship and communication skills.
- Company structures with overseas-owned firms already having an established research activity elsewhere.
- Lower risks in using established technologies under licence; many major Australian companies (particularly in mineral and agricultural resources) are technology users rather than technology developers.
- Lack of knowledge of markets.
- Time required to bring research to market; the need to prove technology at home first before it can be exported; small size of domestic markets.
- Inability to capture sufficient benefits to justify investment; lack of appropriate finance.
- Government regulations and tax regime; complexity of government programs, unclear eligibility criteria; compliance costs.
- Economic uncertainty.

Government at all levels play an active role in providing incentives, removing or reducing impediments and solving specific problems. However, the list of impediments proposed by business has not varied much over time, perhaps pointing to a deeper cultural problem. No doubt Governments could do further work, but taxpayer-funded incentives programs must deal with genuine impediments and should focus on encouraging private sector R&D that would not otherwise occur.

A problem of note arises in the telecommunications industry sector, probably because of its structure, but not necessarily confined to that sector. The supply chain for the purchase of equipment depends on demand from carriers. The major carriers are all publicly listed companies that get fiercely punished by the financial institutions when they spend money on renovating or extending their networks that causes them to become cashflow negative within a reporting period (six months in Australia, three months in USA).

As a result, Telstra, Optus and their equivalents overseas are committing historically low levels of capital expenditure to infrastructure. This in turn is resulting in disastrously low sales for those major equipment vendors, whose subsidiaries are normally significant investors in R&D in Australia. These companies are in survival mode and no longer have discretionary funds to spend on local R&D. Tax rebates of 200% or more would be required to turn this

situation around. In addition, these firms and Telstra are winding down their existing cash and in-kind commitments to CRCs and other public sector research.

In the case of Telstra, whereas 15 years ago it would have invested in a new national network overlay on a payback period of up to seven years, today it reputedly requires a break-even period of less than six months. Very little R&D can be completed and brought to market in this short period – only design work required for systems integration or minor product adaptation, which generally lacks the level of technical risk that traditionally made R&D investments eligible for tax credits.

This is a major issue for the telecommunications industry sector, with serious impacts on employment and exports.

Australia's BERD performance

Evidence of the problem in Australia is embedded in the statistics provided by the 2002 Institute of Management Development World Competitiveness Yearbook (June 2002) and the World Economic Forum Global Competitiveness Report 2001/2002. See the rankings and conclusions in **Attachment A: Benchmarking Australia's R&D Indicators**. The significant conclusions from both sources are:

- The total number of Australian patents is relatively high (12th rank) but other countries are catching up (Australia ranks 32nd on change in patents granted to residents).
- BERD (17th) lags total spending on R&D (14th).
- The number of R&D personnel in business enterprises (19th) lags the total number of R&D personnel nationwide (13th).
- Business enterprises are not taking full advantage of Australia's world-competitive supporting infrastructure for R&D (6th to 9th on several indicators). Company spending on R&D ranks 23rd, and firm-level innovation ranks 35th.
- There is room to improve the linkages between universities and industry (14th) and technology transfer resulting from foreign direct investment (21st) in order to improve Australia's technological sophistication (16th rank).

The contrast is with OECD leaders where the strength of their national economies is driven by businesses that do R&D. The issue for Australia is whether we want to do better than be tourism operators and miners of raw materials for others to add value.

Forms of Government assistance

In 1994, the Industry Commission assessed the relative cost-effectiveness of competitive grant schemes and tax concessions. It remains a vexed issue as to which broad approach (selection on merit vs. 'as-of-right') has the greater potential to induce the performance of R&D that would not otherwise have occurred.

An Innovation Incentives Working Group prepared a detailed evaluation of options for publicly funded incentives to encourage innovative behaviours by firms, particularly R&D, for the National Innovation Summit in February 2000. A copy of the Working Group paper was attached to the main Summary Report provided for distribution at the Summit. While the Working Group Report is now somewhat out

of date because the range of R&D incentives has changed, it provides some useful analysis of how different types of support could influence R&D behaviour by firms. (A copy can be made available if required.)

The non-Ministerial members of the Council for Knowledge, Innovation, Science and Engineering prepared two discussion papers during 2001 (**Attachments B and C**) which reinforce several key points, *viz.*:

- Incentives for innovation, particularly research and development, must be seen as investments with returns in later years.
- The issue of BERD performance relates to overall industry competitiveness, economic and employment growth, and national prosperity.
- Oversea comparisons indicate the importance of using industrial or business R&D to link strategic industries with public sector research.
- Comparable countries have responded to economic crises with substantial investments in their industry, innovation and research bases.

Both discussion papers consider specific options for improving incentives programs of relevance to firms of all sizes. In the first discussion paper (**Attachment B**), the Council proposed a number of key principles, which should form the basis of a reappraisal of Australia's existing incentives structure. To reiterate:

1. The most important principle is that Australia must urgently lift its level of business investment in R&D. The relative decline is alarming enough; the fact that, at its peak Australian BERD was still well below most of our key competitors is a major concern. Whether or not they have been a major cause of the decline, the eroding value and constant changing of our R&D incentives has created confusion and uncertainty in industry. A further reappraisal must get the mix right for the long term and must create incentives of sufficient value to act as immediate incentives to perform additional R&D.
2. Benefits from incentives should result in equity for all applicants, regardless of company size, tax position, etc.
3. Incentives should be simple in terms of access and compliance for applicants, and also to administer.
4. If there is to be a range of incentives, each must be clearly and appropriately targeted.
5. Incentives should ideally be structured in such a way as to encourage the most valuable R&D activity. Mechanisms such as sectoral targeting, increased incentives for labour (knowledge) inputs or incremental R&D, have been proposed to achieve this (and some are in place under current arrangements). While these can create unintended inequities and complexities, the overriding principle should simply be one of encouraging more R&D by Australian industry. The only qualifiers here are that incentives should be structured to free firms to determine their R&D priorities on a commercial basis (possibly subject to consistency with national research priorities), and that they not be so generous as to encourage non-beneficial or unproductive activity at the taxpayers' expense.

6. Incentives should allow for maximum operational flexibility by firms in undertaking R&D. This could include the option of collaborative activity between industry and the research sector, when commercial sense demands it. It could also include the option of taking part of the incentive in the form of “in-kind” assistance from other organisations.
7. To ensure consistency and certainty for business, incentives should retain their value and eligibility criteria on a long-term basis, as much as possible. In this regard, the recent unforeseen change to the eligibility criteria for the R&D Tax Concession is particularly damaging. Against this principle, mechanisms to insulate tax-based incentives from changes in tax rates could be investigated. There is also scope for improving the certainty associated with granting schemes.
8. Incentives should be structured in such a way as to ensure that the benefits of innovative activity are understood as widely as possible. The Innovation Summit Working Group proposed a number of options that incorporated this consideration (e.g. benefits that could be transferred along company supply chains).
9. R&D Incentives should complement other incentives that encourage innovative and entrepreneurial activity.
10. Finally, Business R&D should be recognised within all relevant areas of Government as an investment rather than a cost and that this attitude be reflected in policy making and incentive structures.

The second discussion paper (**Attachment C**) reviews the Commonwealth Government’s current mix of incentives, offers international comparisons in the use of different types of incentive (Canada, Finland, Ireland, Israel), and considers options for changing the mix and types of R&D incentives programs. It notes:

- a trend towards incentives based on grants and loans, with the opportunity to favour high quality strategic R&D, possibly targeted to specific industry types or industry sectors;
- the use of incentives that target research in priority sectors (of interest given the Commonwealth Government’s process for setting national research priorities);
- the advantages of converting the ‘as-of-right’ tax concession to a tax rebate;
- the success of the Finnish approach to funding its substantially private R&D sector; and
- Israel’s experience with directly funding R&D by SMEs.

Considerable support would exist if a mechanism could be found to disengage R&D incentives from the tax system through, for instance, an expenditure rebate system. This would be simpler than the present tax concession system and would ensure that the benefits received were uniform for all research performing enterprises, not dependent on their tax status or on the need to pay franked dividends.

The national research priorities in science, engineering and technology being set currently on behalf of the Minister for Education, Science and Training and the Minister for Science are expected to impact initially on Commonwealth research agencies and Commonwealth-funded grants programs such as ARC and NH&MRC. Business R&D grants are expressly excluded. However, targeting grants to SMEs and high growth opportunities in the business sector could complement and reinforce other Government investments such as Major National Research Facilities, the Cooperative Research Centre Program and the Victorian Government's Science, Technology and Innovation Initiative – approaches that target clusters of SMEs.

The non-Ministerial members of the Council are convinced that urgent and decisive actions are required beyond those announced in the Federal Government's 2001 statement, *Backing Australia's Ability*. The outcomes of the National Innovation Summit and Innovation Statement process offered a new approach to R&D incentives, but this is not a sign for the debate on this issue to cease. Australia's place as a serious performer of R&D is under threat. The Standing Committee is well placed to influence the next round of improvements.

Stop-start policies and programs

Backing Australia's Ability was an important package for innovation in Australia. It highlighted the widely shared view that "innovation – developing skills, generating new ideas through research and turning them into commercial success – is a key to Australia's future prosperity". The statement provides a firm basis for sustaining a set of policies and programs over at least the next five years.

However, the statement was off the back of the 1996 cut to the 150% tax concession for business R&D, and it was followed shortly thereafter by a budget-driven stalling of the very successful R&D START Program. R&D START is particularly important for small manufacturing businesses in sectors like biotechnology and ICT, and demand for support has clearly been high.

The non-Ministerial members of the Council believe that it is important to maintain consistency and predictability of program delivery to encourage better planning by innovative firms. There is no doubt that Government programs influence behaviours in firms of all sizes. Programs where consistency and predictability are important for effectiveness should be protected from short-term budget pressures.

Term of reference 3: What steps need to be taken to better demonstrate to business the benefits of higher private sector investment in R&D?

Governments at all levels have taken considerable responsibility for encouraging private sector investment in R&D. Programs have been modified from time to time to improve effectiveness, and no doubt further improvements could be made. There is a need for other parties to share responsibility, perhaps in new kinds of partnership across business, with Governments and research institutions. Note that in other parts of the world e.g. Sweden, strong partnerships exist between, for instance industry and universities, without the need for Government incentives.

Analysis of the statistics will reveal sector-specific variations in BERD. For instance, the Industry Commission noted in 1994 the relatively low R&D intensity of Australia's manufacturing sector (attributed to the effects of tariff protection and therefore likely to improve).

Demonstration of the benefits of higher private sector R&D should:

- be sector-specific, based on case studies and strategic importance to the national economy
- be led by sector peak bodies (which could require some partnership support)
- focus initially on sectors with a global outlook where intra-sector cooperation is prospective, and on sectors that are strategically important to the national economy;
- focus on small firms' ability to plan and manage R&D; and
- focus on technology transfer and technical service firms that have a strong incentive to market technological improvements.

As indicated earlier, there could also be merit in aligning some business R&D incentives with national research priorities. While at first sight this could be problematic (involving 'picking winners'), there is the potential to encourage more private sector collaboration with the institutional or public research sector and build cultural change on high growth and high profile research outcomes (e.g. Cochlear).

Australian businesses also will need to be convinced that the costs of registering for the tax concession, applying for grants, collecting the required information and supplying the required reports produces a net benefit. Many businesses, particularly in the small business sector, remain to be convinced that participation is worthwhile. One small positive in this is that there is certainly some under-reporting of R&D expenditure, with many potentially qualifying outlays are being reported as normal operating expenses rather than being segregated as R&D.

Many Australian businesses recognise the importance of long-term basic research normally undertaken in publicly funded institutions. They might be prepared to contribute funds to basic research programs if the Commonwealth Government were to match their contributions or to provide a double tax rebate tied to the level of contribution. The underlying principle here is that the Commonwealth Government should make it very attractive for business to support long-term basic research (consistent with national research priorities and despite uncertain outcomes) as well as applied research with defined outcomes.

This paper has been prepared by the non-Ministerial members of the Council for Knowledge, Innovation, Science and Engineering:

Professor Adrienne Clarke (Deputy Chair of Council)
School of Botany, The University of Melbourne

Dr Robin Batterham
Chief Technologist, Rio Tinto Ltd

Professor Merran Evans
Director of Planning and Academic Affairs, Monash University

Professor David James

(Former Vice Chancellor of University of Ballarat)

Professor Frank Larkins
Deputy Vice Chancellor (Research), The University of Melbourne

Professor Kerry Pratt
Pro Vice Chancellor Research, Swinburne University of Technology

Professor Suzanne Cory
Director, Walter and Eliza Hall Institute of Medical Research

Professor John Funder
(Former Director of the Baker Medical Research Institute)

Dr Bill Schofield
(Formerly Director of the Aeronautical and Maritime Research Laboratory, DSTO)

Mr David Burton
Managing Director, Compumedics Holdings

Dr James Fox
Managing Director, Vision Systems Ltd

Professor Peter Gerrand
Chairman, Telecommunication Society of Australia

Mr John Grace
Chief Executive Officer, iBIO Pty Ltd

Mr Peter Laver
Chairman, Ceramic Fuel Cells Ltd

Mr Douglas Rathbone
CEO, NUFARM Ltd

Dr Jack Wynhoven
(Former Chairman and CEO of Connell Wagner)

Mr John Vines
Executive Director, Association of Professional, Engineers, Scientists and Managers (APESMA)

Dr Michael Panaccio
Investment Manager, JAFCO Investment (Asia Pacific) Limited

Professor Graham Mitchell
Principal, Foursight Associates Pty Ltd

Professor Nick Saunders
Chairman, Strategic Health Research Investment Committee

Further copies of this and other papers prepared by the KISE Council can be obtained from:
Ms Wendy Williams
Manager – Education and Awareness Programs
Science, Technology & Innovation
Department of Innovation, Industry and Regional Development
Tel: (03) 9651 9266
Email: wendy.williams@diird.vic.gov.au

Benchmarking Australia's R&D Indicators

The IMD World Competitiveness Yearbook

The 2002 Institute for Management Development World Competitiveness Yearbook (WCY) was released in June 2002. Each year the WCY analyses and ranks the ability of 49 nations to provide an environment that sustains the competitiveness of enterprises. For each country four main factors are measured - economic performance, government efficiency, business efficiency and infrastructure. In doing this, 314 separate criteria are assessed using a mixture of hard data from 2000 and 2001, projections for 2002 and its own Executive Opinion Survey, with over 3,500 respondents.

Australia has dropped to 14th position in the overall rankings for 2002, from 11th position in 2001. On the specific indicators relating to research and development Australia ranks as follows:

IMD World Competitiveness Yearbook 2002		Australia's Rank
4.3.20	Patent and copyright protection	10
4.3.10	Basic research	11
4.3.12	Scientific articles	11
4.3.07	Total R&D personnel nationwide per capita	12
4.3.21	Number of patents in force	12
4.3.15	Nobel prizes	13
4.3.16	Nobel prizes per capita	13
4.3.06	Total R&D personnel nationwide	13
4.3.01	Total expenditure on R&D	14
4.3.19	Securing patents abroad	16
4.3.04	Business expenditure on R&D	17
4.3.17	Patents granted to residents	17
4.3.22	Patent productivity	18
4.3.02	Total expenditure on R&D per capita	19
4.3.08	Total R&D personnel in business enterprises	19
4.3.03	Total expenditure on R&D % GDP	21
4.3.05	Business expenditure on R&D per capita	21
4.3.09	Total R&D personnel in business per capita	21
4.3.18	Change in patents granted to residents	32

Conclusions

1. The total number of Australian patents in force is relatively high (12th rank) but other countries are catching up (32nd rank for change in patents granted to residents).
2. Business expenditure on R&D (17th rank) lags total spending on R&D (14th rank). Likewise the total number of R&D personnel in business enterprises (19th) lags the total number of R&D personnel nationwide (13th). This indicates that government is currently investing more significantly in R&D than business.

The WEF Global Competitiveness Report

The World Economic Forum, Global Competitiveness Report 2001/2002 compares 75 countries against 174 indicators but only uses only a selection of indicators to calculate its Global Competitiveness Index and Current Competitiveness Index.

The Growth Competitiveness Index looks at the macroeconomic sources of GDP per capita growth and generates predictions about the ability of a country to improve its competitiveness. The index captures: macroeconomic stability, credit rating and government spending, technological innovation and diffusion, ICT, contracts, law and corruption. Australia ranked 5th on this Index in 2001/2002.

The Current Competitiveness Index examines the microeconomic bases of a nation's GDP per capita and provides insights into the level of GDP per capita that is sustainable into the medium term. Unless firms are fundamentally improving their operations and strategies and competition is moving to a higher level, growth will be snuffed out. The CCI is a bottom-up type of indicator that is attuned to the corporate base rather than macro measures of performance and is based on survey data rather than hard data. Australia was ranked 9th in 2001/2002 on the CCI up from 15th in 1998/1999.

The Current Competitiveness Indicator is then split into company operations and strategy, and quality of the national business environment. In 2001/2002 Australia's business environment was ranked in 7th position ahead of company practice in 24th position. On the specific indicators relating to research and development Australia ranks as follows:

WEF Global Competitiveness Report 2001/2002		Australia's Rank
3.08	Tax Credits for Firm-Level Research and Development	6
3.07	Subsidies for Firm-Level Research and Development	8
3.05	Quality of Scientific Research Institutions	9
3.03	Firm-Level Technology Absorption	13
3.09	University/Industry Research Collaboration	14
3.01	Technological Sophistication	16
3.04	FDI and Technology Transfer	21
3.06	Company Spending on Research and Development	23
3.11	Availability of Scientists and Engineers	24
3.02	Firm-Level Innovation	35

Conclusions

3. Much of the supporting infrastructure for R&D in Australia is in place with world class tax credits (6th rank) and subsidies (8th rank) for firm-level research and development as well as high quality scientific research institutions (9th rank).
4. Business enterprises however are not taking full advantage of the supporting infrastructure. Firm-level innovation is very low (35th rank) as is company spending on R&D (23rd rank).
5. There is room to improve the linkages between universities and industry (14th rank) and the technology transfer resulting from foreign direct investment (21st rank) in order to facilitate R&D and improve Australia's technological sophistication (16th rank).

COUNCIL FOR KNOWLEDGE, INNOVATION, SCIENCE AND ENGINEERING

DISCUSSION PAPER ON R&D INCENTIVES (JUNE 2001)

Introduction

The purpose of this paper is to revisit the topic of R&D incentives for industry. This comes in the light of the recent reforms to incentives announced in *Backing Australia's Ability* and ongoing concerns that these changes will not have the desired effects on levels of industry R&D undertaken in this country.

This subject has been debated exhaustively over the past two years. However, in an election year, with both sides of politics highlighting innovation as a priority area, and with industry R&D still declining, the KISE Council does not believe that the issue of R&D incentives should be set aside

The paper briefly:

1. Summarises the rationale for government incentives for industry R&D;
2. Reviews recent R&D incentives and their levels of effectiveness;
3. Critiques the reforms announced in *Backing Australia's Ability*;
4. Identifies some broad principles for R&D incentives that could be considered in future policy development.

1. Rationale for government incentives for R&D

In introducing its analysis of options for future industry R&D incentives, the National Innovation Summit Working Group on Innovation Incentives commented that:

“Publicly funded incentives to encourage innovatory behaviour, particularly research and development, are widely used around the world and are justified on the basis that there are public benefits not able to be captured by the innovator and in the absence of incentives there is likely to be underinvestment. Incentives can be in the form of direct financial assistance (grants, in cash or kind), taxation arrangements or other types of support, here termed ‘encouraging entrepreneurial behaviour’.”¹

The then Industry Commission (now known as the Productivity Commission) conducted an exhaustive study into Research and Development in 1995, and came up with a similar conclusion. The detailed discussion of the rationale for government intervention in this area can be read in the Commission’s comprehensive report on Research and Development (Volume One, pp161-181). However, the following quote is a succinct summary:

“Spillovers create benefits for others which do not figure in the decision making of the originators of the R&D giving rise to them. Where they exist, there is a *prima facie* case that not enough R&D will be performed.

“Tackling this market failure involves, in principle, the creation of an environment in which more R&D will be undertaken. When this is done projects may go ahead which

¹ National Innovation Summit - Innovation Incentives Working Group, *Detailed Evaluation Of Incentive Options*, p1

have worthwhile total returns (benefits to the originator plus spillovers) but which would fail to get approval on the basis of their benefits to the originator alone.”²

The Innovation Summit Working Group also commented in simpler terms on the issue of investment versus cost associated with R&D incentives:

“The Working Group wishes to make one over-riding observation, one that governments all around the world have difficulty in accepting but is aimed at removing the major mind set which impedes rational consideration of incentives for innovation. **Incentives for innovation, particularly for research and development, must be seen as an investment, meaning that funds outlaid will earn an attractive return in later years.**”³

2. Recent Australian R&D incentives

R&D Tax Concession

From its introduction in 1985, until 1997, and the introduction of R&D START, the R&D Tax Concession has been the frontline incentive for industry R&D. It continues today as a major incentive complementing the granting schemes under R&D START, and as such can be considered a long-standing and stable incentive.

The R&D Tax Concession has, however, varied substantially in its actual value since its introduction. Between 1985 and 1996, the 150% Concession was worth between 18 cents in the dollar when company tax was 36% and 24.5 cents in the dollar, when the company tax rate was 49%. Between 1985 and 1996, Australian BERD figures rose from a low base to an all-time high of 0.86% of GDP. Since the reduction of the Concession to 125% in 1996 and the abolition of incentives for R&D Syndication, the Concession has been worth 9 cents in the dollar, dropping to 7.5 cents with the company tax rate reduction to 30%. During this time, BERD has dropped from the 1996 high to 0.67% of GDP in 1998/99 (latest ABS figures⁴).

Whilst it is simplistic to attribute the decline in BERD wholly to the decline in value of the Tax Concession, there is a clear correlation. The Innovation Summit Working Group concluded that for a tax-based incentive to be effective in stimulating additional R&D, it must be set at a minimum value of 15 cents in the dollar.

The other general issues to note about the R&D Tax Concession are:

- Its as-of-right applicability is regarded positively as it provides consistency and certainty which can aid systematic R&D planning. However, when the Concession settings are regularly changed as they have been in recent years, this can have a detrimental effect on the forward planning process;
- Because of its general applicability for all eligible R&D activity, the Concession does not act as an incentive to companies to change the way in which they conduct R&D (e.g. on a collaborative basis rather than alone, strategic rather than tactical R&D etc);
- The Concession is relatively easy in compliance and administrative terms as it is claimed as part of the normal tax cycle. Notwithstanding this, there is extensive

² Industry Commission Report No. 44, *Research and Development*, May 1995, Volume 1, p.178

³ National Innovation Summit - Innovation Incentives Working Group, *Detailed Evaluation Of Incentive Options*, p1

⁴ ABS Catalogue 8104.0, *Research and Experimental Development - Businesses*

anecdotal evidence that the point at which compliance costs exceed the benefits has been reached under the current scheme;

- It is of no benefit to non-taxpaying companies;
- From the Treasury perspective, the Concession is an uncapped scheme in terms of its cost to revenue.

R&D Granting Schemes

R&D Granting schemes have a longer history in Australia than the Tax Concession (the concession's predecessor was the AIRDIS Grant Scheme and a small grant scheme remained for non tax-liable companies at the time of the introduction of the Tax Concession).

However, for the purposes of this discussion, the focus will be confined to the more recent R&D START programs, as well as the other programs with a specific collaborative focus.

R&D START Grants are primarily targeted at SMEs with a turnover of under \$50 million, with funding provided on a matching basis and assessed against the strategic value and level of risk to the firm, together with the likely spillover benefits of the R&D. R&D START Plus caters for larger firms on the same basis. START Graduate provides assistance to small companies to employ graduates on specific R&D projects in collaboration with research institutions. In all cases, these grants are taxable.

Repayable grants and loans are also available in the form of R&D START Premium (provided for strategic, high risk projects involving large companies/consortia, and repayable as a royalty if the project proceeds), and Concessional Loans (for companies employing under 100 to commercialise innovation – the scheme provides 50% of the project costs with interest waived in the first three years and then charged at 40% of the Commonwealth Bank Index Rate).

Finally, the CRC Program and the ARC SPIRT Grants Program can be included as R&D incentives of the grants type. Both Programs encourage collaborative research, the former effectively subsidising research performed on behalf of industry participants or firms contracting the Centres to undertake specific projects, the latter assisting in funding university research in collaboration with industry partners.

The introduction of the R&D START Programs has significantly changed the R&D incentives mix, with the Core START Program now vying with the Tax Concession as the primary instrument for encouraging BERD. Although the additional elements of START funding (START Plus and START Premium) target larger firms, these have not been widely used to date, with the effect that the 80% of recipients of Core START funding has gone to firms with a turnover of under \$5 million.

The Innovation Summit Working Group concluded that the focus on small firms should not overshadow the fact that the vast majority of BERD is undertaken by larger firms on an incremental basis. For these firms, a tax concession incentive was regarded as preferable to competitive grants, as it allows them to make their own decisions close to market, rapidly and frequently, using in-house resources with minimal concerns about the loss of confidential information.

The other general issues to note about the R&D Grant schemes are:

- The competitive nature of such a program promotes quality research, focuses effort and potentially reduces duplication of research;
- From a budgetary perspective, these schemes are attractive in that they are capped and support can be discontinued in the event of lack of progress;
- Such programs involve significant administrative costs as they require skilled and objective assessment and ongoing monitoring, whilst for applicants, compliance costs are high and funding is uncertain. This is particularly the case for larger applicants with multiple R&D projects;
- The emphasis of such schemes tends to be on the merits of specific projects rather than consistent support for firms demonstrating ongoing innovative behaviour.

Incentives encouraging entrepreneurial behaviour

The Innovation Summit Working Group also noted that there is a range of incentives available to encourage entrepreneurial and innovative behaviour within firms. These include COMET, IIF, PDFs, various technology diffusion programs and a range of State-based programs. It is important to note the Group's conclusion that a balanced mix of innovation incentives is necessary to encourage optimal innovative activity within firms. However, as this paper is intended to focus particularly on incentives targeted at R&D, these are not analysed in any greater detail here.

3. Reforms to R&D Incentives announced in *Backing Australia's Ability*

Not surprisingly, given the genesis of the National Innovation Summit out of concern about the decline in BERD and the considerable public debate on that subject, a considerable proportion of the Commonwealth's Innovation Statement reforms (in dollar terms) concentrate on R&D incentives.

Under *Backing Australia's Ability*, R&D START will continue in its current form, with further funding of \$535 million to maintain the program until 2006, in addition to the \$419 million already committed to the program over that period. This will enable grants and loans totalling \$180 million per annum to be funded. The Commonwealth has announced that the Program will be "redesigned to simplify and streamline the program so that it is administered flexibly to meet the needs of innovative firms", essentially acknowledging the significant administrative and compliance costs that have caused underspending on the Program to date. Proposed reforms include: the ability to apply at any time; streamlined decision making which will result in reduced turnaround times; simplified processes to ensure rapid payment and; a simplified agreement which minimises reporting obligations for companies.⁵

The R&D Tax Concession has undergone three more substantial reforms:

Streamlining of the R&D Tax Concession

This reform comprises an amendment to the treatment of R&D plant, including removal of the 'exclusive use' test and introduction of 125% effective life write-off for R&D plant. It has been introduced in response to concerns raised following the Australian Taxation Office draft ruling on R&D Plant, which highlighted deficiencies in the current legislation

⁵ *Backing Australia's Ability*, Fact Sheet - Continuation of R&D START Program, January 2001

for dealing with plant expenditure for R&D. It replaces the accelerated depreciation on plant and equipment for R&D.

The streamlining reform also comprises a significant claw-back of R&D related tax concessions of \$345 million over the five years. The Commonwealth has tightened the definition of eligible R&D, including requiring claims to demonstrate both innovation **and** high technical risk.

175% Concession for additional employment related R&D investment

The Government is enhancing the R&D Tax Concession by providing a higher level of support for those companies that increase their level of R&D expenditure relative to their overall performance (ie. turnover). A company will be eligible to receive the 175% Premium R&D Tax Concession, for labour costs associated with R&D, if its ratio of R&D spending to turnover exceeds the average of the previous three years.

R&D Tax Rebate

This will be available to all companies with an annual turnover of less than \$5 million who spend up to \$1 million per year on R&D. These small companies will now be eligible to receive a Rebate equivalent to the value of the R&D Tax Concession. The Government expects up to 1300 companies will take advantage of the rebate, claiming around \$13 million associated with R&D expenditure of around \$30 million.

Comments

The Council acknowledges that the Commonwealth has recognised the need for change, particularly to the R&D Tax Concession, which was strongly advocated at the National Innovation Summit and at other fora over the past two years. However, we believe the reforms announced in *Backing Australia's Ability* are clearly not the ideal solution and, indeed, raise as many concerns as they solve. The Council sees the principal concerns as follows:

- The continuation of R&D START is a positive development (albeit a somewhat disingenuous means of expanding the size of the *Backing Australia's Ability* funding package by \$500 million). Continuation of the Programs in essentially the same format will at least ensure some stability but will do nothing to address the flaws in their design such as the bias towards small firms. The proposed streamlining may assist in greater uptake of the Program but does not appear designed to enhance the Program's potential to encourage innovation as an integral part of firms' operations. A number of options to do this were proposed by the Innovation Summit Working Group. These have, by and large, been ignored in the Innovation Statement;
- The tightening of the definition of eligible R&D activity was an unforeseen development that was never discussed at the National Innovation Summit. Indeed, the proposed change had previously been strongly opposed by industry when it was suggested two years ago. Commonwealth estimates are that the "streamlining" reforms will claw back \$345 million. The Council is of the view that it will have a considerable impact on firms currently performing R&D that satisfy only one of the "innovation" or "high technical risk" criteria. We are particularly concerned that this development, combined with the drop in the value of the Concession to 7.5 cents in the dollar, will more than offset the increased R&D incentives offered elsewhere in the Statement;
- While the objective behind the 175% Premium Concession of rewarding increased investment in R&D is sound, the Council is concerned that even the large companies

which are the major target of this initiative will not find it easy to access the concession. (ISR estimates are that only 600 companies will access the Premium Concession in 2001/02). Potential recipients must have been registered for the R&D tax concession for three years. While this may increase the number of registered companies, it will restrict the number eligible to receive assistance in the first three years. Moreover, the 175% concession does not apply to additional investment in plant and equipment. In addition, the benefit is only applied to companies that increase their R&D spend as a proportion of turnover, so companies that are moving from the R&D phase into production are likely to fail the test. The flaw in this initiative was borne out in comments from Commonwealth officials to the Senate Estimates Committee that a company whose turnover increases at a faster rate than their R&D spend would not be eligible. The Council notes that tax experts have concluded that companies with falling turnover can in fact benefit from this incentive, in effect being rewarded for failure. In the words of one expert:

“The 175% is tested against turnover, so if you are doing well, you will eventually run yourself out of a claim. Effectively, where your business is failing you can bleed the system dry as you go.”⁶

- The Council acknowledges that the Innovation Summit Working Group supported this type of incentive as one that could be examined further, on the basis that it could be used as a means of “kick-starting” Business R&D over a limited period. However, the concerns that the Working Group expressed about this option appear to have been largely ignored in the implementation of the Premium Concession. The scheme appears administratively complex. It certainly will not reward companies that conduct high levels of R&D in a “lumpy” manner that fits industry production cycles (e.g. automotive). By making the Concession contingent on R&D levels relative to turnover, the Commonwealth has evidently noted the Working Group’s warning that this form of incentive could otherwise penalise companies conducting high levels of R&D,. However, it does not appear that the model being implemented will adequately send the Working Group’s intended message linking high R&D performance with company success.
- While the Council supports the tax rebate for small companies (turnover under \$5 million, R&D investment under \$1 million per annum), we are concerned that the upper limit of a \$5 million annual turnover will result in a further focus on early stage companies, which are strongly targeted in the Innovation Statement. Only 1300 companies will be eligible over the five years of the Program, meaning that assistance will not be available to a significant proportion of established SMEs. The likely result is that the initiative will fail to provide a positive incentive for these companies to increase their investment in R&D.

4. Principles for further action

The previous section has outlined a number of deficiencies in the current raft of R&D incentives. Without restating these concerns, the present arrangements can be summed up as being complex, disjointed and offering minimal incentive to firms to ramp up their R&D activities. Bearing in mind that this is a summation of the state of play after the outcomes of an extremely thorough consultative process, it is clear that, as with many areas covered in the Innovation Statement, an opportunity to take a new, simple and integrated approach has been lost.

⁶ Mr Paul McMullan, PricewaterhouseCoopers R&D Partner, quoted in the *Australian Financial Review*, 22 February 2001.

A range of alternative approaches to R&D incentives was proposed and analysed by the Innovation Summit Working Group. The merits and drawbacks of each were discussed at some length in the Working Group's report, which remains publicly available on ISR's website⁷. Rather than repeat this detailed analysis, the Council proposes a number of key principles, which should form the basis of a reappraisal of Australia's existing incentives structure:

11. The most important principle is that Australia must urgently lift its level of business investment in R&D. The recent decline is alarming enough. The fact that, at its peak Australian BERD was still well below most of our key competitors is a major concern. Whether or not they have been a major cause of the decline, the eroding value and constant changing of our R&D incentives have created confusion and uncertainty in industry. Therefore a further reappraisal must get the mix right for the long term and must create incentives of sufficient value to act as immediate incentives to perform additional R&D;
12. Benefits from incentives should result in equity for all applicants, regardless of company size, tax position etc;
13. Incentives should be simple in terms of access and compliance for applicants and also administratively;
14. If there is to be a range of incentives, each must be clearly and appropriately targeted;
15. Incentives should ideally be structured in such a way as to encourage the most valuable R&D activity. Mechanisms such as sectoral targeting, increased incentives for labour (knowledge) inputs or incremental R&D, have been proposed to achieve this (and some are in place under current arrangements). However, it is evident that these can easily create unintended inequities and complexities. As stated above, the Council, therefore, believes that the overriding principle should simply be one of encouraging more R&D by Australian industry. The only essential qualifiers here are that incentives must be structured to free firms to determine their R&D priorities on a commercial basis, and that they not be so generous as to encourage non-beneficial or unproductive activity at the taxpayers' expense;
16. Incentives should allow for maximum flexibility by firms in undertaking R&D. This could include the option of collaborative activity between industry and the research sector, when commercial sense demands it. It could also include the option of taking part of the incentive in the form of "in-kind" assistance from other organisations;
17. To ensure consistency and certainty for business, incentives should retain their value and eligibility criteria on a long-term basis, as much as possible. In this regard, the recent unforeseen change to the eligibility criteria for the R&D Tax Concession is particularly damaging. Against this principle, mechanisms to insulate tax-based incentives from changes in tax rates could be investigated. There is also scope for improving the certainty associated with granting schemes;
18. Incentives should be structured in such a way as to ensure that the benefits of innovative activity are understood as widely as possible. The Innovation Summit Working Group proposed a number of options that incorporated this consideration, (e.g. benefits that could be transferred along company supply chains);
19. R&D Incentives should complement other incentives that encourage innovative and entrepreneurial activity;

⁷ The report can be viewed at: http://www.isr.gov.au/industry/summit/scwg/innovation_incentives/index.html

20. Finally, the Council would like to see Business R&D recognised within all relevant areas of Government as an investment rather than a cost and that this attitude be reflected in policy making and incentive structures.

The Council stresses that even though the outcomes of the Innovation Summit and Innovation Statement process have just delivered a new approach to R&D incentives, this is not a sign for the debate on this issue to cease. Australia's place as a serious performer of R&D is under threat and we are convinced that urgent and decisive actions are required beyond those announced in *Backing Australia's Ability*.

This paper has been prepared by the non-Ministerial members of the Council for Knowledge, Innovation, Science and Engineering:

Professor Adrienne Clarke
Director, Plant Cell Biology Research Centre
The University of Melbourne

Dr Robin Batterham
Managing Director, Research and Technology Development
Rio Tinto Ltd

Professor Merran Evans
Director of Planning and Academic Affairs
Monash University

Professor David James
Formerly Vice Chancellor of the University of Ballarat

Professor Frank Larkins
Deputy Vice Chancellor Research
The University of Melbourne

Professor Kerry Pratt
Pro Vice Chancellor Research
Swinburne University of Technology

Dr Colin Adam
CSIRO

Professor Suzanne Cory
Director, Walter and Eliza Hall Institute of Medical Research
Royal Melbourne Hospital

Professor John Funder
Director, Baker Medical Research Institute

Dr Bill Schofield
Director, Aeronautical and Maritime Research Laboratory
Defence Science and Technology Organisation

Mr David Burton
Managing Director, Compumedics Holdings

Dr James Fox
Managing Director, Vision Systems Ltd

Professor Peter Gerrand
Chairman, Telecommunication Society of Australia and
Executive Director, Photonics Research Laboratory, AP-CRC

Mr John Grace
Chief Executive Officer, iBIO Pty Ltd

Mr Peter Laver
Chairman of Ceramic Fuel Cells Ltd
and Chancellor, Victoria University of Technology

Mr Douglas Rathbone
CEO, NUFARM Limited

Dr Jack Wynhoven

Chairman and CEO, Connell Wagner

Mr John Vines
Executive Director, Association of Professional, Engineers, Scientists and Managers (APESMA)

Dr Michael Panaccio
Investment Manager, Nomura/Jafco Investment (Asia) Limited

Professor Donald Metcalf
Carden Fellow, Walter & Eliza Hall Institute of Medical Research

Dr Graham Mitchell
Principal, Foursight Associates Pty Ltd

Professor Nick Saunders
Dean of Medicine, Monash University

COUNCIL FOR KNOWLEDGE, INNOVATION, SCIENCE AND ENGINEERING

DISCUSSION PAPER (SEPTEMBER 2001)

PROPOSALS FOR REFORMING AUSTRALIA'S R&D INCENTIVES

Introduction

Governments generally accept that those sponsoring R&D do not capture all of the benefits from the outcomes and that there is an element of public good in private R&D expenditure. Therefore, some form of subsidy is justified to address the resulting under-investment.⁸

Research and Development incentives for Australian industry have been much debated in recent times. The National Innovation Summit of February 2000 was initially conceived as a forum at which mechanisms to halt the decline of Business Expenditure on Research and Development (BERD) could be halted. The Summit eventually addressed far more topics than this, but it nonetheless started a process of review of incentives that resulted in the reforms to industry R&D assistance contained in the Innovation Statement, *Backing Australia's Ability*. More recently, the *Knowledge Nation* report prepared for the Federal Opposition has identified the need for additional support for R&D in priority sectors and where R&D is conducted on a collaborative basis.

In spite of the extensive time and effort put into this review process, the Government's recent reforms to R&D support continue to attract criticism from a number of quarters for being complex and providing little if any additional support in real terms. The Opposition has not yet responded to the *Knowledge Nation* recommendations with any detailed policy position on R&D incentives. Meanwhile, BERD levels in Australia continue to fall. The recently released figures for 1999/2000 show that BERD has fallen to 0.64% of GDP, down from the 1995/96 high of 0.86%, and well below most of our OECD competition. It is of course too early to know whether the Innovation Statement reforms to incentives will be effective in halting this decline or indeed what the Opposition's policies in this area might contain. However, the steady drop-off of BERD over the past four years clearly warrants serious and urgent attention.

This paper presents some recommendations for reforming R&D incentives. These draw on analysis of international models of R&D support and target areas of relative weakness in existing Australian incentives, rather than adopting a "clean slate" approach. We recognise the benefit of stable incentives and that a further round of change may create further disruption in the short term. However, Australia's Business R&D base is approaching a crisis and may be irreparably damaged unless decisive action is taken.

The importance of maintaining our industrial R&D capability was well summarised by the National Innovation Summit's Working Group on Innovation Incentives as follows:

"The Working Group wishes to make one over-riding observation, one that governments all around the world have difficulty in accepting but is aimed at removing the major mind set which impedes rational consideration of incentives for innovation. **Incentives for**

⁸ For examples of the rationale for R&D incentives, see the National Innovation Summit - Innovation Incentives Working Group, *Detailed Evaluation Of Incentive Options*, p1, or the Industry Commission Report No. 44, *Research and Development*, May 1995, Volume 1, pp.161-181.

innovation, particularly for research and development, must be seen as an investment, meaning that funds outlaid will earn an attractive return in later years.”⁹

Current Australian R&D incentives

Tax incentives

From its introduction in 1985, until 1997, and the introduction of R&D START, the R&D Tax Concession has been the frontline incentive for industry R&D. It continues today as a major incentive complementing the granting schemes under R&D START, and as such can be considered a long-standing and stable incentive.

The R&D Tax Concession has, however, varied substantially in its actual value since its introduction. Between 1985 and 1996, the 150% Concession was worth between 18 cents in the dollar when company tax was 36% and 24.5 cents in the dollar, when the company tax rate was 49%. Between 1985 and 1996, Australian BERD figures rose from a low base to an all-time high of 0.86% of GDP. Since the reduction of the Concession to 125% in 1996 and the abolition of incentives for R&D Syndication, the Concession has been worth 9 cents in the dollar, dropping to 7.5 cents with the company tax rate reduction to 30%. During this time, BERD has dropped from the 1996 high to 0.64% of GDP in 1999/2000 (latest ABS figures¹⁰).

Whilst it is simplistic to attribute the decline in BERD wholly to the decline in value of the Tax Concession, there is a clear correlation. The Innovation Summit Working Group concluded that for a tax-based incentive to be effective in stimulating additional R&D, it must be set at a minimum value of 15 cents in the dollar.

The other general issues to note about the R&D Tax Concession are:

- Its as-of-right applicability is regarded positively as it provides consistency and certainty, which can aid systematic R&D planning. However, the Concession’s direct link to the tax rate means that settings regularly change, which has a detrimental effect on the forward planning process;
- Because of its general applicability for all eligible R&D activity, the Concession does not act as an incentive to companies to change the way in which they conduct R&D (e.g. on a collaborative basis rather than alone, strategic rather than tactical R&D etc);
- The Concession is relatively easy in compliance and administrative terms as it is claimed as part of the normal tax cycle. Notwithstanding this, there is extensive anecdotal evidence that the point at which compliance costs exceed the benefits has been reached under the current scheme;
- For public companies a tax concession for R&D could at times restrict their ability to pay fully franked dividends;
- It is of no benefit to non-taxpaying companies, although the introduction of a Tax Credit for a limited number of non-tax liable companies has in part addressed this;
- From the Treasury perspective, the Concession is an uncapped scheme in terms of its cost to revenue.

⁹ National Innovation Summit - Innovation Incentives Working Group, *Detailed Evaluation Of Incentive Options*, p1

¹⁰ ABS Catalogue 8104.0, *Research and Experimental Development - Businesses*

R&D Granting Schemes

R&D Granting schemes have a longer history in Australia than the Tax Concession (the Concession's predecessor was the AIRDIS Grant Scheme and a small grant scheme remained for non tax-liable companies at the time of the introduction of the Tax Concession).

The major current granting scheme is the R&D START Program. Core START Grants are primarily targeted at SMEs with a turnover of under \$50 million, with funding provided on a matching basis and assessed against the strategic value and level of risk to the firm, together with the likely spillover benefits of the R&D. R&D START Plus caters for larger firms on the same basis, but with total assistance amounting to 20% of total project costs as opposed to 50% for Core START. START Graduate provides assistance to small companies to employ graduates on specific R&D projects in collaboration with research institutions. In all cases, these grants are taxable.

An additional repayable grant component is also available under R&D START Premium (provided for strategic, high risk projects involving large companies/consortia, and repayable as a royalty if the project proceeds). This funding can top up START grants to 56.25% of total project costs (36.25% for START Plus grants).

Concessional Loans are also available for companies employing under 100, to commercialise innovation and provide 50% of the project costs, with interest waived in the first three years and then charged at 40% of the Commonwealth Bank Index Rate.

Finally, the CRC Program and the ARC SPIRT Grants Program can be included as R&D incentives of the grants type. Both Programs encourage collaborative research, the former effectively subsidising research performed on behalf of industry participants or firms contracting the Centres to undertake specific projects, the latter assisting in funding university research in collaboration with industry partners.

The introduction of the R&D START Programs has significantly changed the R&D incentives mix, with the Core START Program now being promoted by the Commonwealth as the primary instrument for encouraging BERD. The START Plus and START Premium elements have been less widely used to date, with the effect that the 80% of recipients of Core START funding has gone to firms with a turnover of under \$5 million.

The other general issues to note about the R&D Grant schemes are:

- The competitive nature of such a program promotes quality research, focuses effort and potentially reduces duplication of research;
- From a budgetary perspective, these schemes are attractive in that they are capped and support can be discontinued in the event of lack of progress;
- Granting programs involve higher administrative costs than an as-of-right concession or rebate scheme, as they require skilled and objective assessment and ongoing monitoring, whilst for applicants, compliance costs are high and funding is uncertain. This is particularly the case for larger applicants with multiple R&D projects;
- The emphasis of such schemes tends to be on the merits of specific projects rather than consistent support for firms demonstrating ongoing innovative behaviour.

(Note: the last two of these factors are less of an issue, the more funding there is for grants).

International Comparisons

In considering possible changes to current R&D incentives, it is worth reflecting on what similar countries are doing to ensure that their business R&D bases are remaining competitive with the global giants. Much was written in the lead-up to the National Innovation Summit and in the Australian Science Capability Review about these international success stories and the levels of investment they are making to innovation and research generally. However, it is worth re-visiting some of these cases to examine the specifics of their Business R&D policy settings and identify the implications for Australia. For the purposes of this paper, Canada, Finland, Ireland and Israel have been studied. The key issues are discussed here whilst details of the incentives each country offers are contained in Appendix A.

Incentive types

Three major kinds of incentives are generally offered for BERD: tax-based incentives; grants, both repayable and not, and; loans. Although as-of-right tax-based incentives are more common around the world than the study sample indicates, it is evident that there is a trend towards project-based grants and loans. The advantage of this approach is that it allows jurisdictions to allocate high levels of funding for high quality, strategic R&D (the definition of which depends on the country's strategic objectives), which may also be targeted to specific company types or industry sectors.

The major tax incentive offered within the sample group is the 20% tax credit offered in Canada, which appears to be the model for the new Australian tax credit for non tax-paying companies. Much has been made in policy debates of the inherent variability of tax-based incentives when tax rates change. It appears that the countries studied are keener to promote low tax rates as a general incentive to investment than to encourage R&D activity by offering high concessions against high tax rates. Ireland's 400% tax concession for companies eligible for the 10% tax rate is an exception, but one applied only to a select group of firms.

R&D Activity supported

As mentioned above, there is a distinct trend towards incentives that focus on supporting strategic R&D projects, although most of the countries studied have large budgets for supporting BERD, meaning that assistance is relatively easy to access. This approach also allows differing levels of support depending on whether the project involves radical or incremental R&D.

R&D projects focussing on new product development or existing product improvement account for the bulk of assistance, but it is worth noting that these countries also offer substantial support for:

- R&D infrastructure;

- R&D projects that focus on the development of strategic or generic technologies (ie. technologies for wide industry use rather than for the competitive advantage of one firm);
- Improving firms' performance and ability to plan and manage R&D (through training programs etc).

Targeting of Incentives

Although the jurisdictions covered all demonstrate a broad commitment towards the building of extensive and diverse research and industry capabilities *per se*, all use some form of targeted R&D incentives. These involve higher or specific levels of support for:

- Companies performing R&D in identified priority sectors;
- Companies at the start-up phase or defined as SMEs (especially when the R&D project is likely to “kick-start” a firm’s R&D program);
- Collaborative R&D involving public sector research institutions;
- Strategic R&D programs involving industry and research networks (especially for the “generic” projects mentioned above);
- International collaborative projects.

In other words, all jurisdictions studied have developed targeted incentives in accordance with their strategic objectives, in addition to more generally available R&D support.

Implications for Australia

Based on this admittedly small sample of international competition, some implications for Australia are:

- R&D incentives are moving towards a grants-based, project-specific approach, enabling high levels of support to be allocated to approved activities. Australia has followed this approach with R&D START, whilst also retaining a broad-based Tax Concession. However, the latter has been allowed to decline in real value;
- The sample countries range quite markedly in their geographic, political and economic circumstances. Yet all have specifically targeted priority sectors for additional R&D support. Australia has not followed this approach for R&D incentives;
- A number of the sample countries have identified small, growing companies as specific targets for support, recognising both the financial constraints they operate under, and also their potential to develop into the next generation of large companies. Australia has to some extent targeted SMEs under R&D START and has addressed the issue of non tax-liable companies through the R&D tax credit. However, for the most part its incentives have remained fairly widely applicable;
- All sample countries recognise the importance of using industrial R&D as a mechanism to link their industry bases with their public sector research institutions, and offer various incentives to stimulate such collaboration. Australia does not offer any additional incentive for BERD undertaken by a research institution on behalf of a company;
- Some countries studied make a distinction between the type of R&D activity undertaken (generally the difference is between R&D leading to “radical” or “incremental” innovation), and offer higher or lower incentives accordingly. Australia

has recently tightened the definition of eligible R&D activity for the Tax Concession, and also focuses on high-risk, strategic R&D projects under R&D START;

- Some countries provide incentives for “generic” R&D that is undertaken on a collaborative basis by companies and public research bodies. This is, in part, replicated in Australia through the CRC Program, although the contestable nature of the Program limits the areas of research that can be assisted. There is no incentive for smaller generic projects, which could have considerable benefits in developing intra-industry cooperation and building critical mass;
- Some countries offer incentives to companies to improve their R&D management (through training programs etc). This is not a strong focus of Australia’s R&D support regime, and yet Australian industry is often criticised for not having a good understanding of the value of a strategic approach towards undertaking R&D;
- A number of countries recognise the importance of pursuing international R&D collaborative efforts and have various bilateral agreements and programs in place to facilitate these. Australia has signalled its recognition of this issue as an important one through the introduction of the Innovation Access Program, but this represents a small measure of support by comparison.

Policy Recommendations

The above discussion of international R&D incentives indicates that Australia is lagging compared with a number of the more dynamic of its international rivals in terms of the nature and level of Business R&D support it currently offers.

Some recommendations, and their implications, that would bring Australia better into line with international best practice are discussed below. These comprise recommended reforms to existing incentives as well as some additional measures that could be adopted, in the light of the above findings.

A. Retain and refine existing grant incentives

The R&D START Program marked a shift from tax-based to grants-based incentives for Business R&D in Australia. Although it was slow to gain acceptance, there is now an increasing uptake of the program funding across its various elements. The Program allows a high degree of flexibility for companies seeking to undertake strategic R&D projects, and it caters for large scale projects as well as those conducted by SMEs. Furthermore, there have been recent efforts made by the Commonwealth to streamline the processing of START Grants, through simpler contracts and quicker turnaround times.

In the light of best practice initiatives examined, it is considered that R&D START should be retained as the principal granting program for R&D. Although the general principles of the Program are considered sound, there is scope for refinements to broaden the scope of eligible activity under the Program and offer additional incentives to companies undertaking R&D regarded as strategic against particular criteria.

The following refinements or enhancements could be undertaken:

- Higher levels of incentives for SME projects that seek to launch or significantly expand the company’s R&D effort;

- START Plus could be refined to allow for higher levels of support for large scale projects involving industry/research collaboration;
- The principle of additional support (START Premium) for high quality projects is endorsed, although the additional level of support could be higher. Moreover, it is not clear why projects that rate highly on the merit criteria of the Program should have to repay additional funding;
- The START Graduate element could be overhauled and expanded to include other forms of industry/research networking and R&D management training included as eligible activities.

B. Abandon the Tax Concession and apply the funds saved to an expanded START Scheme

Many believe the existing tax concession provides little incentive to undertake research and claimants would probably make the same level of investment with no concession in place. The option exists of transferring the quantum of the tax concession into the START Scheme, which would probably reduce the number of research performing companies but improve the quality and relevance of the work undertaken.

The problem with such a concept is that if existing START rules were to be applied there would be a very large increase in the administrative cost and lead to bureaucratic delays and inefficiencies. Some consideration could be given to a self-assessment element for claiming grants that amounted to less than (say) 20% of the total planned budget. Such applications would need to follow strict eligibility guidelines, should require an independent accountant's verification of their validity and be subject to a random audit process with substantial penalties for misuse of funds. A scheme like this would have some appeal in that it could be capped, with self-assessed grants reduced proportionately in the event that demand exceeded the available budget allocation.

A scheme that provides immediate (same year or even same quarter) grants could particularly benefit companies (particularly ICT companies post the dot com crash) that are under pressure to demonstrate positive cashflow on a quarterly basis, with a consequent inhibiting effect on their Boards' willingness to commit to high levels of R&D.

C. Convert the R&D Tax Concession to a rebate scheme

Although the R&D granting schemes should be regarded as the "flagship" incentives for R&D, and should be applicable to the most meritorious and strategic projects, there remains a role for an "as-of-right" incentive for ongoing R&D activity, currently performed by the R&D Tax Concession.

A number of the problematic elements of the Tax Concession cited above would be eliminated if the Concession were removed from the tax system. A straightforward solution would be to transform the Concession into a rebate. For every dollar spent on recognised R&D, registered R&D investors would be entitled to a fixed (say 15 cents in the dollar) rebate, paid after provision of evidence that the investment has been made.

Such a scheme would –

- be solely administered by DISR, not involving Treasury or the Tax Office.
- require potential claimants to register with the IR&D Board as at present.

- require claimants to lodge an annual R&D investment budget, briefly indicating how and where the money is to be spent.
- allow immediate rebates to be paid on submission of receipts from approved research providers (universities, CSIRO, CRCs, research institutes etc.)
- pay rebates on designated internal outlays on R&D for which adequate evidence can be provided, the adequacy confirmed by random audits periodically.
- allow the rebate to be tax-free and also allow standard tax deductions to be claimed on all outlays as normal business expenses.
- reduce the outlays from existing grant schemes such as START with the 15 cents counted as part of the government contribution.

The option also exists for the rebate payment to be shared by the Commonwealth and the State where the investment is made.

The benefits of this reform would be that:

- The rebate is independent of the company tax rate, and therefore the value of the scheme is the same for all, regardless of tax position, and not subject to changes to the tax rate.
- Although an increased rebate could be offered for specific types of activity (e.g. additional R&D, R&D conducted collaboratively – see C below), it is a simple scheme compared with the recently reformed tax concession.
- The need for franking credits would not be a consideration in R&D investment decisions.
- The rebate could be adjusted, up and down, for fine-tuning of its effectiveness. (History indicates that incentives do not induce more R&D investment until they reach at least 15 cents in the dollar, whilst the recent values of the Tax Concession have virtually been cancelled out by compliance costs. A higher rate could apply for additional R&D as is provided for in the current 175% tax concession for incremental expenditure over a defined base.)
- The discipline provided by the need to submit budget estimates should improve the quality of R&D planning, improve planning by R&D providers and make government budgeting more realistic.
- Businesses would still need to find 85 cents of every dollar they spend on R&D, so are not going to embark on trivial outlays just to get a rebate, an assertion frequently made about the former 150% tax concession scheme.

The cost to Government at 15 cents in the dollar would be higher than the existing tax concession – probably about \$700 million per annum at current levels of BERD as against around \$400 million. The potential would remain for Government to reduce the level of the rebate, if necessary, although the rebate has particular appeal in that it could be promoted as a long-term, predictable benefit at a specific level.

D. Offer additional incentives for R&D conducted by public research institutions.

The international comparisons discussed above indicate a consistent focus on R&D incentives that seek to strengthen the linkages between the publicly funded research sector and industry. The rationale for this is that such linkages enhance the performance of the innovation system by ensuring that research institutions are better aligned with industry R&D priorities and encouraging industry to make better use of existing public research

expertise where it is sensible to do so. In addition, it helps create relationships and linkages that facilitate exploitation of public sector research.

In Australia, the CRC Program has been effective in strengthening research/industry links in specific areas. However, an option exists under the above rebate arrangement to encourage widespread industry support for publicly funded R&D institutions by allowing a higher rebate for work performed with them – say 20 cents in the dollar.

The advantages of such an arrangement would be similar to those outlined under B. above. In addition, this approach could increase the pool of funds available to public sector research institutions, increase the industrial relevance of their work.

E. Incentives targeted at priority sectors.

The approach of offering greater incentives to priority industry sectors, whilst common around the world, has not been favoured by Australian policymakers, either in structuring R&D incentives or in industry policy generally. That said, biotechnology and ICT have been identified as priorities in *Backing Australia's Ability* through initiatives such as the Centres of Excellence, and it would therefore not be too big a step to offer additional R&D incentives for sectors targeted for their high or emerging economic significance to Australia.

An alternative approach at a time when the impact of proposed tariff reductions is a critical issue confronting Australian industry, might be developing a form of R&D incentive linked to the tariff system, targeted at those sectors most directly affected by tariff reforms. Recent Australian corporate history has shown that Australian companies have tended to regard R&D as expendable at times of financial hardship. A scheme that linked R&D performance with a lessening of the impact of tariff reform could assist in ensuring that R&D was less of a casualty from the adjustment process.

E. Incentives targeting generic R&D activities.

Two of the countries studied, Finland and Israel, both have specific incentives (grants) that encourage collaborative R&D programs, typically involving numerous companies and at least one public research institution, that aim to develop pre-competitive technologies or achieve similar outcomes that have an industry-wide benefit. The potential that such programs (Finland's Technology Program and Israel's MAGNET Program) have for fostering cooperation and enhanced knowledge across industry sectors is very great.

Although there are substantial differences in the business culture and economic fundamentals of countries like Finland and Israel compared to those of Australia, we are nonetheless faced with a similar challenge of developing new and emerging industries. Incentives of this kind would therefore be well worth considering. There is an issue as to how such a program would link with the CRC Program. The main apparent difference between the CRC and overseas programs is that CRCs are funded for long-term research programs, as opposed to short-term R&D projects. There is consequently greater complexity involved in forming the CRC and competing for funding, which in turn limits the number of research sectors or industries that can participate.

Conclusion

Although there is an unquestionable immediate budget cost to Government associated with these recommendations, the seriousness of a situation, in which Australian BERD is

declining when our competitors are increasing, should not be underestimated. It is not simply the need for Australia to be higher up the international BERD league table that is at issue here, this issue relates to our overall industry competitiveness, our future economic and employment growth and our prosperity. As indicated earlier in this paper, BERD must be regarded not as a short-term cost but as a long-term investment.

Similarly, although the international comparisons cited in this paper may not entirely reflect Australia's economic, geographic or political circumstances, the fact remains that the countries studied have faced economic crises of various sorts and have all responded with substantial investments in the development of their industry, innovation and research bases. This approach has invariably been successful.

Appendix A: International Comparisons

A number of countries have significantly improved their performance of BERD in recent years. In seeking to recommend some sensible and workable reforms to Australian R&D incentives, several countries of comparable size, which have been successful in lifting their recent performance of BERD, were briefly profiled in terms of the range and focus of their R&D incentives for industry. It is worth noting some of the features of their support systems for R&D and innovation.

Canada

In some respects similar to Australia in size, economic structure and in the predominance of public sector R&D performance, Canada has invested substantially in support for industry R&D in the face of strong competition for capital and people from the US.

The primary fiscal incentive for BERD is a 20% tax credit scheme, which is universally applicable to industry, regardless of size, sector or tax-paying status. The cost of this scheme is about C\$1 billion per annum. R&D is further supported by a substantial array of granting and procurement programs, provided at both the Federal and Provincial levels, with much support being sectorally targeted and/or encouraging collaboration with the public sector. As a result, Canadian industry outsources about 5% of its total R&D to universities, the highest rate of any G7 country.

Finland

By contrast with Canada and Australia, Finland's R&D performance is dominated by the private sector, which accounts for about 70% of the nation's R&D spend. Finland's total R&D accounted for 3% of GDP in 1998 and has grown by 15-20% throughout the 1990s.

R&D incentives are largely provided through The Technology Development Centre (TEKES), which serves as the program delivery arm of the Ministry of Trade and Industry. The bulk of TEKES budget of about \$650 million per annum (in 1999) is directed towards industrial R&D grants, applied technical research and capital loans for R&D. Projects are funded on a 50:50 basis at the enterprise or university unit level, but with strong emphasis placed on issues such as networking and project planning.

In 2000, TEKES provided funding for 2297 research or product development projects mounted by companies, research institutes and universities. The total budget for these projects amounts to EUR 740 million (FIM 4.4 billion) and TEKES is providing half of it, EUR 370 million (FIM 2.2 billion). Around EUR 230 million of this funding in the form of grants and loans was aimed at company research and development projects for 1012 companies, and about EUR 140 million at university and research institution projects. The proportion of small and medium-sized enterprises receiving product development funding grew considerably on the previous year. Altogether, 56% of TEKES product development funding went to SMEs and 71% to enterprises with fewer than 500 employees.

Technology Programs are also used to promote development in specific sectors of technology or industry, and to pass on results of the research work to business in an efficient way. These have proved to be an effective form of cooperation and networking for companies and the research sector.

The Programs are planned in cooperation by companies, research institutes, and TEKES. Planning takes place in workgroups and open preparatory seminars with the decision of launching a program made by the board of TEKES. Each program has a steering group, a co-ordinator and a responsible person at TEKES. The duration of the programs ranges from three to five years; their volumes range from EUR 6 million even to hundreds of millions of euros. TEKES usually finances about half of the costs of programs. The second half comes from participating companies.

Many of the completed programs have been assessed by foreign evaluators. The main benefits lay in the close cooperation between research institutes and industry, the widespread involvement of small and medium sized companies, and the high level of international cooperation.

Currently, a total of about 50 extensive national technology programs are underway. In 2000, TEKES provided EUR 157 million to financing technology programs.

Ireland

Ireland is renowned throughout the world for its dramatic economic turnaround, which has been based on the development of world class communications and information technology export industries.

Ireland's most recent emphasis in R&D has been on the development of outstanding public sector research strengths in ICT and Biotechnology, through its E635 million Technology Foresight Fund. However, this is part of a larger (E2.5 billion) R&D initiative that forms a central plank in Ireland's National Development Plan for 2000-2006.

Under the Plan, the following measures are open to all firms, but with emphasis on SMEs:

- Grants (non-competitive) awarded to firms making a large-scale strategic step-up in their R&D function in terms of facilities/capability and strategic importance.
- Grants (competitive) part funded from EU Structural Funds for high quality, high risk R&D projects leading to sustained R&D investment. The scheme is particularly targeted at SMEs and is designed to overcome their inability to commit sufficient resources to R&D to allow them to become and remain globally competitive.
- Grants for the provision of training in R&D management to assist firms achieve greater returns on their R&D investment.

A number of grants are also provided to public sector research bodies to carry out industry-related R&D, the results of which may then be publicly disseminated for widespread industry use.

Ireland also offers a tax concession for eligible R&D of 400%. This concession applies only to those companies eligible for the concessional corporate tax rate of 10% (largely manufacturing and financial services enterprises), meaning the concession is worth the equivalent of 40%. The concession is valid only for incremental R&D over a three year period over the base year R&D.

Israel

In terms of its support for innovation, Israel is best known for its incubator program and its measures to allow the free flow of venture capital funds, especially US pension funds. However, Israel has also extensively supported Business R&D through the Office of the Chief Scientist (OCS) within the Ministry of Trade and Industry. OCS has an annual budget of about US\$400 million, of which the majority is spent on R&D support and its technology incubators program.

Business R&D was, in the past, supported through a mixture of loans, grants and repayable grants where R&D was commercialised. However, since 1998, support has moved entirely under the repayable grants regime, on the basis that Government is sharing the risk with firms. These grants (worth 30, 50 and 66% of the project value, depending on the nature of the R&D and the size of the company) are allocated on a per project basis with repayment made on a royalty basis when the project is successful. Royalties start at 3% of revenues in the first three years and move to 3.5% thereafter, until the original value of the grant is repaid. In some cases 150% of the project value will be repaid, generally when approval of the transfer abroad of some production rights is given.

Financial assistance is also offered for the beta-site stage of the innovation process (between R&D and full commercial production and marketing).

For strategic R&D projects, which involve the introduction or development of key generic, pre-competitive technologies, OCS introduced the MAGNET Program, which supports collaborative R&D involving a public research institution and up to 15 firms per project. A non-repayable grant of 66% of the project value is provided. The rationale is that in a small country cooperation is the key to building critical mass in key technologies, and that Israel's public sector research expertise is a key strategic advantage that the country needs to exploit.

A similar scale of grant is available for joint venture R&D projects between entrepreneurs and established business entities, where the experience and support of established companies is vital for the success of the proposed R&D activity.

Finally, Israel is also renowned for its extensive bilateral collaborative R&D programs, in which both countries contribute to a central funding pool which is then used for joint venture projects involving partners from each country. BIRD-F is the most famous of these initiatives, in which Israel undertakes joint activity with the USA, but a number of other similar agreements have been concluded with other countries in recent years.