Queensland Government Submission to the Commonwealth Inquiry Into Business Commitment to R&D in Australia

Queensland Government

September 2002

Contents

1.0 Terms Of Reference

The Terms of Reference are:

- International comparisons indicate that while the public sector in Australia supports R&D at an impressive level, business investment is less impressive;

- With particular consideration of:

  i the R&D drivers in small and medium sized business
  ii the needs of fast-growing companies
  iii the considerations by which major international corporations site R&D investment

  the Committee seeks to address three questions:

  i What would be the economic benefit for Australia from a greater private sector investment in R&D?
  ii What are the impediments to business investment in R&D?
  iii What steps need to be taken to better demonstrate to business the benefits of higher private sector investment in R&D?

2.0 Executive Summary

This submission supports the need for a review of business commitment to R&D: a key indicator of innovation in Australia. It argues however that the Inquiry must consider a range of innovation indicators in addition to business expenditure on R&D (BERD) if it is to formulate initiatives that are to have the impact required.

The submission urges the Inquiry to report to the Commonwealth Government on the importance of making changes to the existing Australian taxation system to support business investment in R&D and to reinstate the R&D Start program as a matter of urgency. In summary, the submission identifies the following factors that influence business investment in R&D:

- An internationally competitive taxation environment (business and personal);
- Industry structure/industry composition and the high proportion of Small to Medium Sized Enterprises (SMEs);
- Technology Diffusion capacities and preferences;
- A commercial and entrepreneurial business culture;
- Appropriately targeted, client focussed and integrated government funding programs and support services;
- The level of outsourcing of R&D by multinationals; and
- Recognition by industry and business of the benefits of investment in R&D.

3.0 Recommendations

This submission recommends the following:

Recommendation 1

The Commonwealth Government establish with the States and Territories a joint taskforce of officials to develop contemporary innovation indicators that provide international and domestic comparative quantitative and qualitative data sets.

Recommendation 2

The improved competitiveness of the Australian taxation system is crucial to encourage business commitment to R&D. The Commonwealth Government review:

- its definition of eligible R&D activity for taxation concession arrangements to include commercialisation, plant and technology costs;
- treatment of CGT application to venture capital investments and to the timing of payment of CGT on intellectual property; and
- treatment of key staff engaged in R&D or in venture capital firms under employee share taxation.

Recommendation 3

The Commonwealth Government work with States and Territories to review existing innovation programs (eg Innovation Awareness) in order to promote a business environment more conducive to entrepreneurship and commercialisation.

Recommendation 4

The Commonwealth Government:

- work closely with industry and the States and Territories in identifying gaps and avoiding duplication in the support programs to encourage business investment in R&D; and
- re-instate the R&D Start program as a priority.

Recommendation 5

The Commonwealth Government to target barriers to Foreign Direct Investment (FDI) in R&D in Australia.

Recommendation 6

The Commonwealth Government work with the States and Territories to develop a national econometric model to estimate the impact of increased R&D expenditure in selected industries.

Recommendation 7

The Commonwealth Government should work with business leaders to demonstrate the benefits of business investment in R&D. Businesses will principally be interested in demonstrations of four things:

- How impediments to investing in R&D have been overcome;
- What benefits to expect and how to measure benefits;
- The factors that have influenced the degree of benefit obtained from R&D investment; and
- The type of assistance available from government to invest in R&D.

The case studies prepared and disseminated should demonstrate how the following potential impediments to business commitment to R&D have been overcome for positive results:

- Taxation and financial issues;
- Collaboration/partnership options;
- Technology Diffusion opportunities;
- Lifting R&D Skills;
- Achieving management and financier support for R&D;
- Accessing Government support services; and
- Outsourcing R&D and/or obtaining outsourcing opportunities to perform R&D.

4.0 Overview

The Queensland Government is committed to the development of Queensland as the *Smart State* - a place in which ideas are encouraged and where innovation is used to create new jobs and opportunities for all of its people. Investment in innovation including R&D is central to this. In support of this, the State Government in Queensland has consistently supported R&D in this State significantly above the national average and much above Commonwealth Government investment in this State as can be seen in Figure 1.

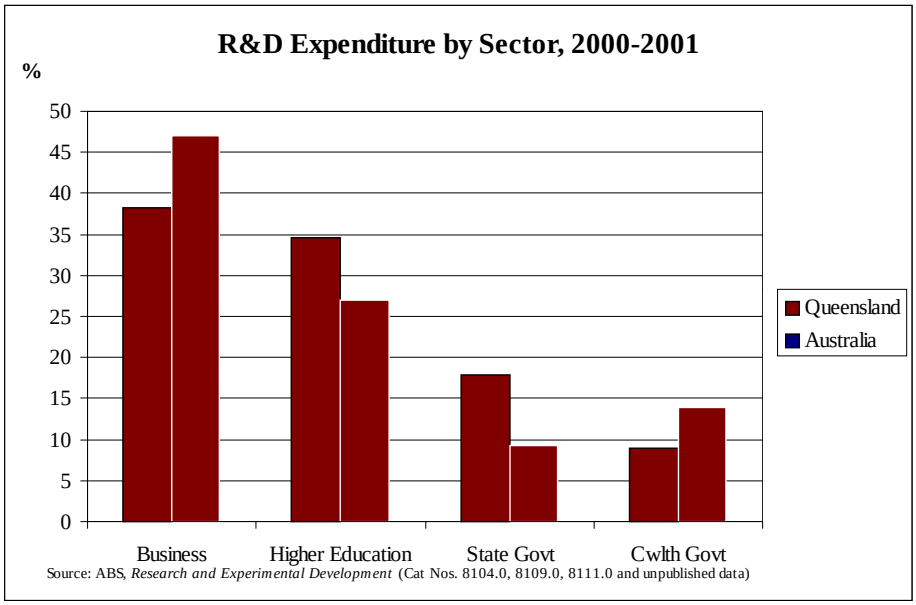

Figure 1

There is strong support for a review on business commitment to invest in R&D and innovation more broadly that will address the following issues:

- the negative impact the recent freeze on the R&D Start and related programs is having on Queensland businesses;
- the negative impact of certain aspects of the Commonwealth's taxation regime is having on business investment in R&D;
- the lack of streamlined, easy access, integrated government service delivery programs to support business investment in R&D and innovation;
- uncertainty regarding the reliability of government assistance to business; and
- lack of consistency in regard to government research priorities.

4.1 Investment In R&D - Comment On Terms Of Reference

The need to lift Australian business expenditure in R&D (BERD) is clear. It is important however that this Inquiry look beyond R&D expenditure to more fully understand the reasons for, and context within which low BERD occurs. R&D is part of a larger innovation process that relates to investment in a range of areas each addressing aspects of innovation pathways. The Queensland State Government has attempted to collect a range of indicators to identify those areas in which support by government could encourage greater business investment in R&D and innovation.

It is suggested that the Commonwealth adopt the same approach however the following points highlight the difficulty in obtaining broader innovation indicators in Australia. These include:

- There is no agreed conceptual framework governing the collection of data on innovation. As a result, data is often selectively and/or inappropriately used;
- There is a lack of readily available comparative data on innovation measures available in Australia;
- When figures are available, their validity and inaccuracy hinders the degree to which they can be used in evidence-based policy development;
- Historical measures of innovation tend to focus on the manufacturing sector. As such, they provide a less accurate measure of innovative capacity in an economy like Queensland's, where resource and services industries are more dominant. Queensland's high productivity growth and stronger performance in some 'new economy' indicators suggest that innovation is occurring more broadly across all sectors of the economy;
- The ATO definition of R&D specifically excludes humanities and social sciences, effectively marginalizing much investment in the creative industries and in multi- and trans-disciplinary R&D, areas of rapid growth in Queensland[1]; and
- In addition, the ABS statistics on business R&D expenditure are incomplete as they do not include agriculture, forestry and fishing business expenditure.

A broader look at outcome, output and input innovation indicators as part of this review would serve to:

- Provide balanced coverage of all the important elements of the innovation system, including its structure as well as the production process employed in generating outcomes;
- Accurately reflect the theoretical basis and empirical evidence for the factors driving innovation;
- Recognise the breadth of the innovation system, covering all industries (and not just, for example, manufacturing and ICT) as well as social factors; and
- Permit cross-jurisdiction comparisons, while reflecting differences in innovation systems across jurisdictions and over time.

[1] Cunningham, Stuart "Social and Creative Disciplines in Ascent" *The Australian* newspaper, 10 July 2002. Pp33.

In particular a recent assessment of a useful collection of indicators to measure R&D has recommended that the following indicators of innovation be used[2]:

- Indicators currently available including:
    - total factor productivity;
    - indicators of IP including royalty receipts, spin-off enterprise generation and patenting activity;
    - business expenditure on research and development; and
    - involvement in entrepreneurial activity.

- Additional indicators (where relevant to particular policy concerns) for example, availability of research staff.

- Additional indicators to be collected on product and process changes in business and the community and community attitudes to innovation, including the impact of the education and training system.

Recommendation 1
The Commonwealth Government establish with the States and Territories a joint taskforce of officials to develop contemporary innovation indicators that provide international and domestic comparative quantitative and qualitative data sets.

4.2 Current R&D Policy Framework In Queensland

Recently released data by the Australian Bureau of Statistics (ABS) shows that in 2000-01, the Queensland Government spent $240.3 million on research and development[3]. This represented 25.5% of all State Government expenditure on R&D in Australia, well above the State's proportion of national population, which for the same year was 18.7% of all Australians and growing.

To maximise the impact of the State Government's investment in innovation programs[4], a *Queensland R&D Strategy*[5] is being developed with principal aims of better leveraging the State's investment in R&D and encouraging further collaborative R&D investment by all sectors in Queensland through local, national and international partnerships. As a first step towards the development of the strategy, a *Queensland R&D Strategy Issues Paper* and *Background Report* were released by this Government for comment in April this year.

In total 140 submissions have been received and can be viewed at http://www.iie.qld.gov.au/research/strategy.asp Comments have been received from all stakeholders and are currently being considered in detail as the drafting of the strategy continues. The Paper sought comment on issues of private sector investment in R&D in Queensland. The advice received in the submissions is incorporated in this submission.

[2] Department of Innovation and Information Economy, Innovation Indicators – Paper for Commonwealth State and Territory Advisory Council on Innovation, May 2002, Unpublished.
[3] Australian Bureau of Statistics, R&D Government and Private Non-Profit Organisations, Catalogue Number 8109.0 2000-01
[4] A full list can be found at www.iie.qld.gov.au/innovation/start-up/grantsummary and http://www.iie.qld.gov.au/grants/ and http://www.sd.qld.gov.au/dsdweb/htdocs/global/content.cfm?id=108
[5] Queensland R&D Strategy Issues Paper, April 2002 .

4.3 Investment In Innovation - The Bigger Picture

Queensland's economic policy stance continues to develop and evolve in line with, and in response to, changes in the state, Australian and world economies. Queensland's industrial structure has evolved over the 20th century, from an economy heavily dependent on agriculture and mining at the time of Federation, to a modern service economy a century later. The Queensland economy has moved strongly into services over the past 40 years. For example between 1961 to 2001 employment in Queensland in entertainment, public administration, community services, finance, property, retails and wholesale services grew from 40% to 78% of the total workforce[6]. Over the past five years, employment growth has been strongest in service industries, including business services and tourism related industries (Figure 2). While traditional industries and commodities will continue to make an important economic contribution to the State and the nation, in particular through strong exports performance, much future employment and income growth will come from service industries. The pace of economic change in the State continues to be rapid.

Queensland Employment Growth by Industry Sector: 1996 to 2001

Source: ABS 6203.0

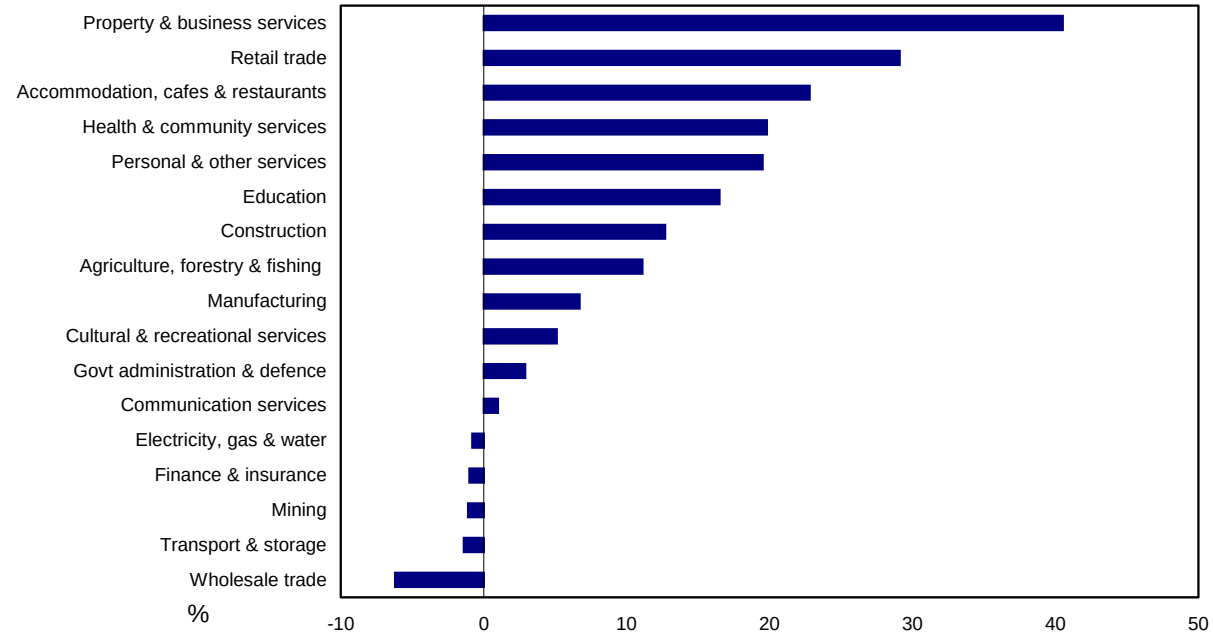

Figure 2

[6] Sources: Office of the Government Statistician, "Queensland Past and Present", Queensland Government, 1998 and ABS 6203.0

In particular, some salient points on innovation and R&D in Queensland are summarised below.

- The share of national BERD carried out in Queensland rose from 7% in 1990-91 to almost 11% in 2000-01. However despite strong growth in the 1990s, Queensland still has a relatively small share of BERD, in a country which has a low share of BERD by OECD standards. In 2000/2001, business expenditure on R&D in Queensland at $141 per capita remained below the national average at $249 per capita.

- R&D expenditure by government and educational institutions relative to the size of the economy is above the OECD average. Queensland's and Australia's relatively low expenditure on R&D by business needs to be redressed to optimise returns from R&D investment more broadly..

- The ratio of R&D expenditure to GSP in Queensland in 1998/99 was 1.2%, compared with 1.5% for Australia, an average of 2.2% across OECD countries, and 3.1% and 2.9% for world leaders Japan and Finland respectively.

- Nevertheless, the latest ABS figures show a 17% increase in expenditure by Queensland businesses on R&D between 1998/99 and 2000/2001.

- Business access to a computer is higher in Queensland (86%) than in Australia (84%) in 2000-01.

- Queensland had only 7.2% of national venture capital assets as at June 2001.

- A key outcome indicator of innovation, Total Factor Productivity, show strong comparisons for Queensland against the rest of Australia (Figure 3).

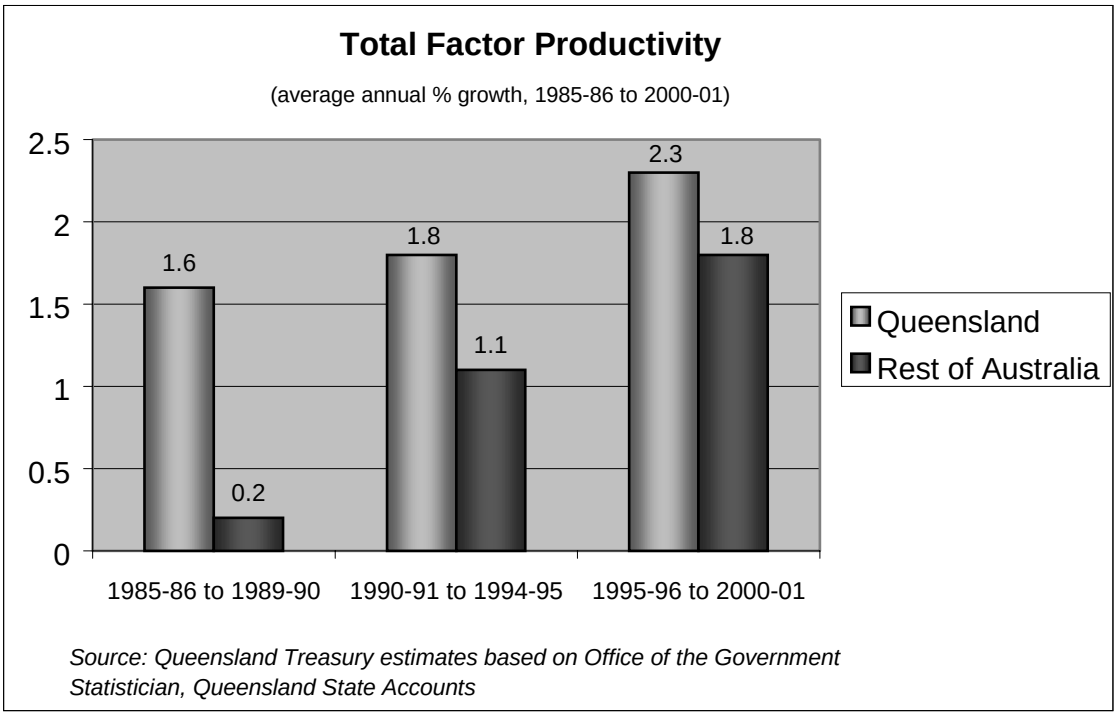

Figure 3

5.0 Inquiry Context

5.1 R&D Drivers In Small And Medium Sized Businesses

Trends in highs and lows of R&D investment in Australia have traditionally followed trends in the expenditure invested in business generally. At the highest level, Australian business investment decisions are influenced by a range of key drivers that include:

***Environmental Trends*:** Growing environmental consciousness, sustainable development, global warming, alternative energy;
Social Trends: Population growth (developing world), under-population (developed world), agequake (aging population in developed world), urbanisation, empowerment of women, cultural diversity;
Economic Trends: Globalisation of finance systems, the network age, electronic commerce, value chain management, knowledge as competitive advantage;
Political Trends: Growth of democracy, war and peace, growth of international law, changing national sovereignty; and
Technology Trends: Innovation and advances, biotechnology, nanotechnology, information and communication technologies, sensor technology, technology convergence.

Based on an understanding of global trends an industry can then work to identify its key drivers. For example in regard to the food and fibre industries in Queensland industry-wide issues identified are:

International and Domestic Environment: The WTO and international trade, exchange rates, market access;
Demand Pull Drivers (International and Domestic): Population growth, income growth, changes in consumer tastes and preferences;
***Natural Resources**:* Government policies that shape natural resource access and pricing;
Supply Push Drivers: Declining terms of trade but increasing productivity, long-term productivity trends, biotechnology, nanotechnology, education and training, e-commerce, supply chains;
The Institutional, Social and Legal Framework: Natural resource management vs production management, quarantine protection, biosecurity, international trade policy, support infrastructure for food and fibre industries, larger farming enterprises; and
Climate: Short-term outlook, longer-term climate change.

At the business level, in terms of constraints to business investment, these factors commonly translate into limitations on businesses in regard to access to product components, infrastructure, equipment, skills, expertise, finance, time, business tools and collaboration partners. Specific recommendations on impediments to business investment in R&D for consideration by the Commonwealth Government is at Section 6.

Responses to the *Queensland R&D Strategy Issues Paper* questions seeking advice on factors that influenced SME business investment in R&D included the points listed in Figure 4.

Factors suggested that influenced SME business investment in R&D[7]

Business/Government/Research Sector interactions:

- SMEs require more efficient and effective access to all levels of government and University equipment, infrastructure, people and assistance programs.
- Business would contract more research to universities if the universities could respond within the quicker timeframes required by business.
- Avenues for business to invest more in R&D include sponsoring research positions in Universities.
- Innovation uptake within industry is through R&D, training and technology diffusion particularly for process improvement.
- There is a major opportunity for industrial designers and contract researchers to play a greater role in facilitating SMEs to invest in R&D.

Government's role

- Suggested Government could assist establish collaborative investment in R&D by SMEs.
- Government investment in enabling technologies (eg. Biotechnology and ICT) will encourage business investment in the application of new technologies to different sectors.

In relation to funding assistance programs:

- Suggested there is too many government programs aiming to support R&D investment mystifying the processes that happen everyday in industry.
- Many companies never seek government assistance for R&D investment – they see it as too cumbersome or time-consuming.
- New government assistance programs are required which are better attuned to the needs and processes of knowledge based industries. Existing programs are largely designed to support R&D in business into proven technologies particularly in traditional sectors.
- Businesses seek more consistency from government in support programs to justify long-term investment on its part.

Business culture issues

- SMEs are more interested in technology diffusion.
- Businesses won't invest in R&D if it could result in benefits for competitors.
- Business needs new managerial, legal and governance tools to manage research and development in today's technology and information based environment particularly in regard to understanding and dealing with IP and partnership arrangements.

Figure 4

5.2 The Needs Of Fast Growing Companies

With regard to the needs of start-ups and fast growing SMEs, the following issues are provided for the Committee's consideration:

- Lack of availability of capital to fund expansion of fast growing companies;
- Time delays associated with development approval systems;
- Need to further refine guidelines for new technologies used by fast growing companies;

[7] Source: Submissions to Queensland R&D Strategy Issues Paper, April 2002 at http://www.iie.qld.gov.au/research/submissions.asp

- Inadequate levels of Community awareness and support established;
- Delays due to need to resolve policy and regulatory issues;
- Lack of suitably designed and affordable facilities for emerging and/or fast growing companies. The Queensland Government is establishing a "BioAccelerator" facility with flexibility to accommodate space requirements of fast growing biotechnology startups; and
- Lack of effectiveness of government support programs for new areas of R&D.

It has been argued that existing programs favour support R&D involving improvements in existing technologies rather than "proof of concept" for new products. Many of the new breakthrough areas of R&D in rapid growth, are based on multi- and transdisciplinary research including humanities and social sciences which are disciplines not explicitly supported by such programs and not recognised as eligible for tax concessions.

5.3 Attracting Major International Corporation Investment In R&D

In a globally competitive environment, the R&D investment decisions of multinational companies can be made based on short to medium term timeframes. All other factors aside, the investment decision in these stakes is essentially based on the excellence of the research and the calibre of the researchers involved.

Considered more broadly, efforts to attract major international corporate investment in R&D need to consider a wider spectrum of factors depending on the type of R&D envisaged. These include country sovereign risk, availability of appropriately skilled labour, relative value of the exchange rate, geographical location (eg. proximity to markets), and the availability, quality and price of other production components including resources such as water, energy, minerals, biodiversity and human health systems. The intensity of the local R&D effort may be a contributing factor in some instances.

Two key approaches to increase international investment in Australian R&D could include:

- Building on, and enhancing where appropriate, the characteristics of the national research systems. In a collaborative research environment, involving many smaller investment decisions on an ongoing basis, opportunities can be tapped through greater networking between researchers worldwide. In addition, more interchange of students through universities globally and multi-national funded research could catalyse significant international investment in Australian R&D.

- Targeting Foreign Direct Investment (FDI) in Australia's economy by directing some of that investment into the local R&D base. The Queensland Government's Biodiscovery Policy encourages firms, which are seeking access to the State's biological resources, to invest in R&D in Queensland. For example, AstraZeneca has invested over $47M in research infrastructure at Griffith University.

It is important to note that Australia is a relatively small economy in global terms which accounted for around only 1.2% of total global economic activity in 2001 (based on Gross Domestic Product estimates of 58 countries)[8]. This equates well with the fact that Australia generated 2% of international patents in 1999. Against this backdrop, it should not be surprising that around 98% of new technologies introduced into the Australian economy are developed overseas[9]. This underlines the importance of technology diffusion to building globally competitive businesses.

In 2001-02, Queensland represented 20% of patents granted in Australia. This was above the States its national population share of 19% (Figure 5).

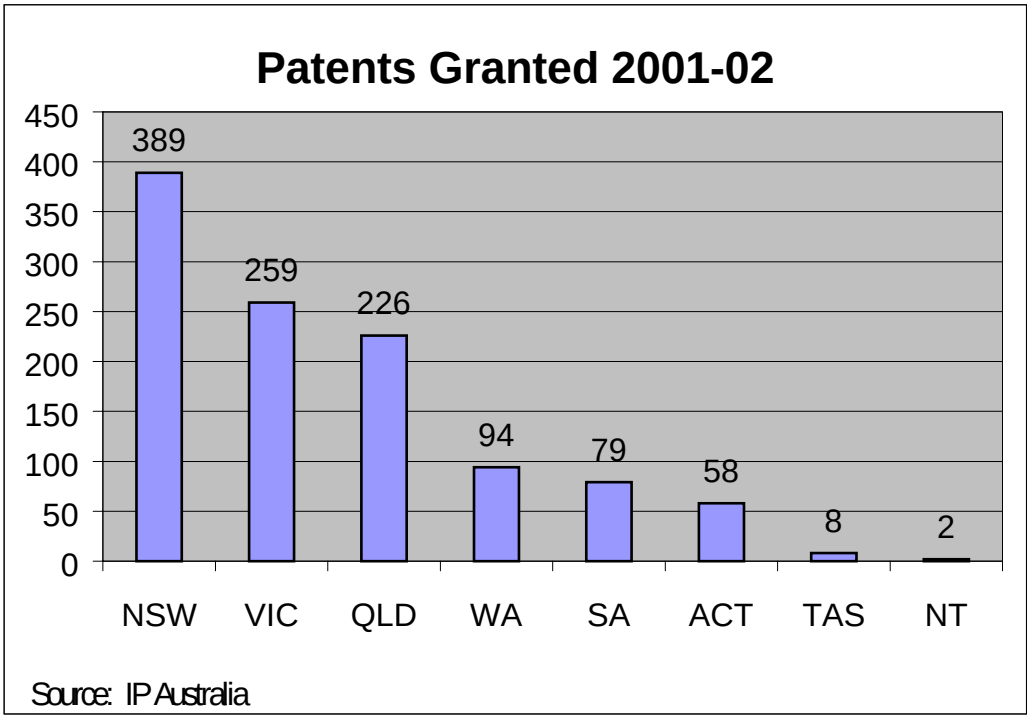

Figure 5

[8]IMD World Competitiveness Yearbook 2002, Pp 449.
[9] World Competitiveness Year Book 2001.

6.0 Committees Questions

6.1 What Would Be The Economic Benefit For Australia From A Greater Private Sector Investment In R&D?

Recently the OECD (2001) found a strong correlation between GDP per capita and formal R&D and a similar link between increases in BERD) and increases in Multifactor Productivity (MFP), with most (but not all) of those countries having the highest rate of growth of BERD (as a proportion of GDP) also having the highest rate of growth of MFP.

Some of the countries that increased BERD experienced declines in MFP, emphasising the fact that increases in BERD funding are, by themselves, insufficient to drive improvements in MFP and economic growth. Aside from quantity of expenditure, crucial elements include:

- the institutions to which R&D funds are directed (e.g. universities or Government laboratories);
- the fields of science and industry to which funds are directed (e.g. to defence or non-defence fields);
- the kinds of financing mechanisms used;
- the size of the economy measured;
- the intensity of R&D effort made in the economy measured; and
- the (multiple) channels used for commercialising and diffusing technology and knowledge.

The OECD[10] analysed 16 OECD countries during the 1980s and 1990s and found that increases in private sector, public sector and foreign R&D all contribute to increases in MFP, but by different amounts and according to the elements outlined above. On average:

- **A 1% increase in private R&D coincided with a 0.13% increase in MFP**. This effect increased after 1980 and was larger in more R&D-intensive countries. The effect of BERD on MFP was lower where the share of Government in funding was larger, most likely because Government expenditures on defence R&D made a smaller contribution to MFP;
- **A 1% increase in public R&D coincided with a 0.17% increase in MFP**. The effect decreased after 1980 and was larger in countries in which the share of universities (as opposed to Government laboratories) was higher. The effect was also larger in countries with lower shares of defence R&D and higher levels of R&D intensity;
- **A 1% increase in foreign R&D coincided with a 0.44% increase in MFP**. This effect was essentially stable since 1980 and was larger in R&D-intensive countries, suggesting that the size of the domestic R&D base influences the rate of technology adoption from abroad. The impact was somewhat larger the smaller the size of an economy; and
- **the contribution of all forms of R&D is higher in more R&D-intensive countries** (as domestic R&D increases the absorptive capacity of an economy).

Government strategies to encourage increased business commitment to R&D must therefore be integrated with complementary initiatives involving other R&D sectors if the full potential beneficial outcomes of investment are to be achieved.

[10] Organisation for Economic Cooperation and Development *Science, Technology and Industry Outlook – Drivers of Growth, Information Technology, Innovation and Entrepreneurship* Special Edition 2001 p54

In addition, it is important that the Commonwealth Government to recognise that the policies which underpin productivity growth, and therefore future economic growth, in the services sector are less to do with the provision of traditional "hard" infrastructure, such as roads and dams, and more with the provision of "soft" infrastructure, such as education and information and communication technology. With service industries being generally labour-intensive, the keys to productivity growth in these industries include both investment in people and fostering technological innovation. Government policies aimed at encouraging higher business commitment to R&D must therefore focus on both "hard" and "soft" infrastructure support if increased investment in all industry sectors is to be encouraged.

Queensland Government research has identified a number of factors which contribute to productivity improvements and economic growth (Figure 6). Investment in innovation, of which R&D is a key part, is identified as a significant factor in this regard.

***Drivers of Economic Growth*[11]**

Queensland Treasury, through its office of economic and statistical research, established the drivers of economic growth project in March 2000, working in a collaborative research partnership with senior academics at the University of Queensland and Griffith University. The key objective of this research project was to identify the fundamental factors that have resulted in Queensland having a higher rate of economic growth than the rest of Australia, with the objective of identifying those factors which may impact on Queensland's economic growth in the future.

The first stage of the research into the drivers of economic growth in Queensland is now complete, with the results of the analysis soon to be published. The research indicates a clear role for the State Government in underpinning economic growth in Queensland, by promoting strong productivity growth in the state. The key areas identified whereby productivity growth can be supported by State Government policy are:

- By improving the quality of the state's human capital, through appropriately directed education and training programs, increasing labour productivity;
- By fostering innovation, supporting research and development, and encouraging the adoption and adaptation of new technology by new and existing industries, improving total factor productivity; and
- By maintaining the strong fundamentals of the Queensland economy, for example, through periodic review of the regulatory environment, reducing unintended impediments to business growth and development.

The challenge now is to integrate the results of this research into focused economic policies for Queensland. The research points to some clear areas for policy development – innovation, research and development, industrial development, the labour market and education.

Figure 6

[11] Queensland Government State Budget 2002-03. Economic and Revenue Outlook. Budget Paper Number 3. www.budget.qld.gov.au

A major study of 14 OECD countries by Stern, Porter and Furnman (2000)[12] found that the composition of R&D spending was important, with the share of R&D funded by industry and the share performed by universities both having a positive impact.

At a minimum, greater private sector investment in R&D in Australia will assure this country an ongoing place of significance in the world economy. At worst, static or declining levels of investment in R&D in Australia will enable competitors to relegate the nation to a lesser place in the world economy, leading to lower standards of living and lesser prospects for future generations. Australia's international competitiveness depends on its long-term capacity to make and exploit discoveries and innovations in critical areas and to maximize opportunities for technology diffusion in all existing and emerging sectors.

Given the observation that the returns from R&D for business and society as a whole come from the opportunity for its exploitation in the innovation process, and that ***innovation*** developed from R&D breakthroughs is the key driver for continued improvements in living standards and economic growth, the following outcomes are considered to be likely from increased business investment in R&D:

- Sustainability of Australian businesses, communities and environments through improved, triple-bottom line benefits and increased business productivity
- Increased globalisation of the Australian economy
- Increased opportunities for employment - greater in response to increases in private sector R&D than Government R&D.
- Increased wage levels leading to increased spending and stimulation of the economy
- Increased skills levels
- An increase in exploitable IP
- A positive impact upon Australia's balance of payments
- A positive impact on reversing to some extent the "brain drain"
- A positive impact on investment
- An increase in competitive advantage in vertical industries and/or integration
- Strengthening of the local technology base with improved prospects for future R&D expenditure.

6.2 What Are The Impediments To Business Investment In R&D?

There is great pressure for Australian companies to innovate in order to remain competitive, to develop new products and services and enhance the attractiveness of existing lines to differentiate themselves from overseas manufacturers of lower technology goods, produced at lower cost. The following points provide an overview of some of the reasons suggested as impediments to business investment in R&D in Australia and Queensland.

Commonwealth Taxation

The Commonwealth Government is responsible for company and personal income tax regimes that can lift or lower Australia's attractiveness as a R&D investment destination.

[12] Stern, S, Porter, ME & Furman, JL (2000), *The Determinants of National Innovative Capacity*, NBER Working Paper 7876, Cambridge MA.

Both nationally and internationally, business expenditure on R&D (BERD) peaked in 1996-97 and has declined somewhat since then. This pattern was exaggerated by changes to R&D taxation concessions in 1996-97, including the cessation of the R&D syndication scheme. It appears that the changes account for part of the subsequent decline in recorded R&D expenditure, and it appears that some R&D expenditure was brought forward in anticipation of the changes. The decrease in R&D tax concession from 150% to 125% in 1996/97 coincided with a major decrease in R&D investment in Australia. This was followed by an increase in BERD and then levelling off back to 1996-97 levels (Figure 7). Although the maximum rebate has been lifted to 175%, the tightening of the Commonwealth Government's definition of eligible R&D activity for taxation concession arrangements, which exclude commercialisation, plant and technology costs, has received criticism from business groups and should be reviewed.

Australia requires an internationally competitive taxation environment. There is potential for some changes in the Commonwealth's taxation regime that could further facilitate this. For example, consideration could be given to more favourable treatment of Capital Gains Tax (CGT) application to venture capital investments and to the timing of the payment of CGT on commercialised IP. This could include:

- CGT exemption where an investor disposes of an investment after having held the shares for five years;
- rollover relief, whereby CGT realised on the disposal of an investment held for less than five years may be deferred to the extent that funds are reinvested in another eligible venture capital investment; and
- provision of more general relief from income tax on eligible investments up to an agreed total would be another possible approach.

In regard to the appropriate time at which the Commonwealth Government should seek CGT on commercialised IP, it should be noted that returns on IP do not eventuate prior to commercialisation. Despite this, under the current tax regime, CGT is often incurred prior to any resultant cash-inflow.

Consideration could also be given to more generous treatment for key staff engaged in R&D or in venture capital firms under employee share taxation than for more established businesses. In the current situation, employees are taxed on the options at the point of issue rather than disposal and the amount is calculated at income tax rates and thresholds rather than by capital gains tax methodology. This subjects these employees to the undue burden of paying substantial tax before any cash flow is realised and in some cases, the risks of the options becoming worthless despite having paid the tax previously.

Business expenditure on research and experimental development, Queensland, 1990-91 to 1999-2000[13]

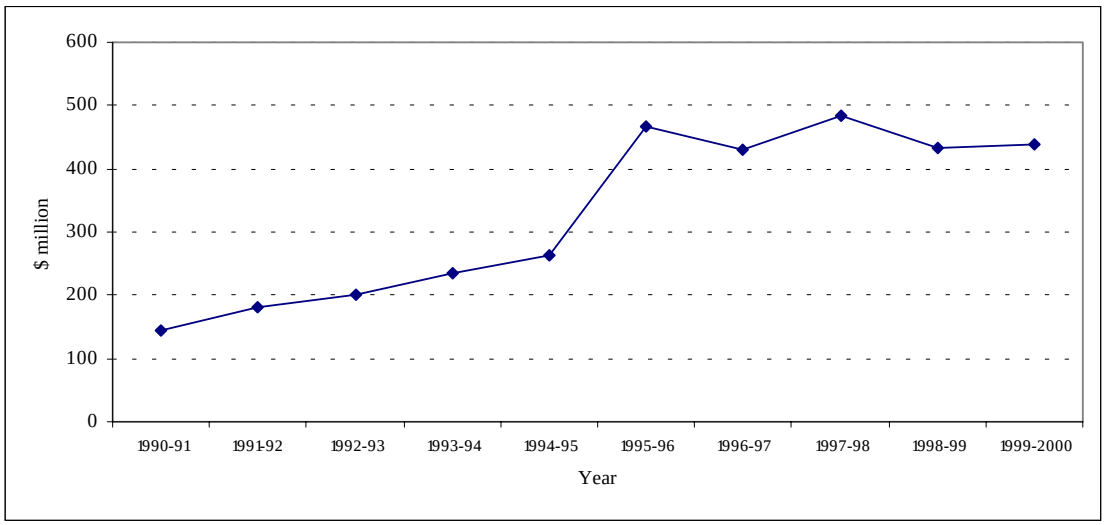

Figure 7

Recommendation 2

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- treatment of key staff engaged in R&D or in venture capital firms under employee share taxation.

Industry Structure

According to a recent study by the OECD[14], the composition of Australia's industry structure explains much of the deviation from the cross-country average R&D intensity. Whilst evidence provided by this study is in many ways preliminary, it is sufficient to support the need for further investigation into developing indicators of R&D effort that take differences in industry R&D needs into account. Based on this research, the smaller Queensland share of national BERD could be explained for example Queensland's relatively low share of manufacturing in Gross State Product (GSP). However, manufacturing is a relatively small part of all modern economies, and the share of manufacturing in GSP can account for only a small part of the differential. The current Queensland share of manufacturing in GSP is about 13% against an OECD average of around 18-19%. Differences may be due to different R&D intensity of different countries, or to local industry being less focussed on markets for R&D intensive products. The percentage breakdown of BERD by industry in 1999-00 is shown here in Figure 8.

[13] Source: ABS, Research and Experimental Development, Businesses, Australia (Cat. no. 8104.0 and unpublished data).
[14] OECD *Employment Outlook 2002.*

Business Expenditure on R&D (BERD) by Industry, 1999-2000

Sector	Queensland	Rest of Australia
Manufacturing	40%	52%
Mining	16%	6%
Other	44%	42%

Source: ABS, *Research and Experimental Development, Businesses, Australia* (Cat. No. 8104.0 and unpublished data)

Figure 8

High Proportion Of SMEs

As with other States in Australia, Queensland has a very high proportion of SMEs at 99.7% in 1999-2000 (Figure 9). In total approximately 75% of Queenslanders are employed in SMEs, above the national average of 74%. Small firms rarely engage in basic research and lack the resources to engage in product development. Because larger firms and institutions are better able to handle risk, they have a much greater level of representation in R&D projects than SMEs. Many SMEs see the expense of R&D as non-viable due to its long-term nature and inability to generate a sufficient return on investment over the short to medium term. While all recommendations in this submission are relevant to SMEs, the particular needs of SMEs must be taken into account in the delivery of government assistance programs.

Small to Medium Sized Enterprises
(small 0-19 employees, medium 20-199 employees)
1999-2000[15]

	Percentage of all employees in SMEs	Number of SMEs as a percentage of total number of businesses
NSW	*72.6%*	*99.8%*
Vic	*71.7%*	*99.7%*
Qld	*75.2%*	*99.7%*
SA	*75.3%*	*99.6%*
WA	*76.5%*	*99.9%*
Tas	*82.8%*	*100.0%*
NT	*86.9%*	*100.0%*
ACT	*83.9%*	*100.0%*
Australia	***74.0%***	***99.8%***

Figure 9

[15] Australian Bureau of Statistics, *Small Business in Australia*, Cat. No. 1321.0. Excludes: Agriculture, forestry and fishing, public service workers

Technology Diffusion As The Preference

As a generalisation, SMEs are more attracted to introducing proven technological innovation to their businesses because the risks inherent in taking this route are much lower. In terms of manufacturing companies, the latest ABS statistics (2000-2001) show that firms favour funding R&D at the experimental development end of the spectrum over basic R&D as it is seen as a less risky investment. In addition, manufacturers supply 94% of R&D funds themselves with the remainder sourced from the Commonwealth Government (2.4%), State Government (<1%) and overseas funds (2.8%)[16]. This suggests that further business investment in research and in the application of research could be fostered through government policies and assistance programs that assist business investment in technology diffusion.

Culture For Business Investment In R&D

It is often argued there is a lack of technical expertise, and insight into the role, process and impact of R&D among business managers and members of company boards. Business enterprises tend to view R&D as expenditure rather than investment. Exposure to international markets (and therefore global competition) can serve to develop a sense of urgency for improvement which can lead to R&D investment to remain competitive.

Australian industry and financiers are conservative in accepting risk in R&D to improve capital equipment and internal processes. Market acceptance in Australia is mainly about having a proven product. The commercial risk associated with developing an Australian alternative to an imported product (that has already been accepted) is deemed too high. In addition, Australian companies have difficulty with collaborative R&D and businesses shy away from investing in areas where they cannot control the outcome and/or where positive outcomes from the research could benefit their competitors as well. The Cooperative Research Centre program has provided a platform for increased collaboration amongst R&D sectors. This program should be further developed to provide a vehicle for business collaboration in R&D, especially amongst SMEs.

Recommendation 3
The Commonwealth Government work with States and Territories to review existing innovation programs (eg Innovation Awareness) in order to promote a more conducive business environment to entrepreneurship and commercialisation.

Appropriately Targeted, Client-focussed and Integrated Government Support Services

It is important the Commonwealth and the States and Territories work closely with industry in maintaining appropriately targeted government R&D support programs in order to identify gaps in support and avoid duplication. Ideally, a 'seamless' system which guides the client from the initial entry point to full commercialisation is required. A lack of consistency and clarity on the part of the Commonwealth Government can seriously impair business R&D investment efforts. This is demonstrated in the impact of the recent hold on the **R&D Start** program. After a rapid uptake of start-up support funds through **R&D Start**, the hold on this program has exacerbated the difficulties in encouraging business investment in R&D and greatly undermined business confidence in working with governments in building R&D investment in Australia. This situation has led to market failure with corporates and other investors unable to fill the gap formerly filled by **R&D Start**.

[16] Australian Bureau of Statistics, *Research and Experimental Development All Sector Summary*, Catalogue Number 8112.0, July 2002.

As a result of the hold, as one typical example, a young, start-up nanotechnology company within Queensland, a recipient of earlier R&D Start funding, has had to withdraw from potentially lucrative negotiations with both Japanese and US organisations. The injustice is that this company was initially encouraged to submit a further application for funding, was then advised by AusIndustry that the application was successful subject to certain conditions being met, and was subsequently advised by letter dated 24 April that financial assistance could no longer be offered. The same letter indicated that "over 80% of R&D Start companies recently surveyed reported that the program has had a major positive impact on their competitiveness". It is not difficult to understand how perplexing this appears to people – the Federal Government stopping a program in the same breath as reporting how successful it is.

Many Queensland businesses proposing to invest in R&D cannot proceed because of the hold on the **R&D Start** program. It is incredulous that such a worth while program should be shut-down mid stream and it is essential that the **R&D Start** program be reinstated by the Commonwealth Government urgently.

Recommendation 4
The Commonwealth Government:

- work closely with industry and the States and Territories in identifying gaps and avoiding duplication in the support programs to encourage business investment in R&D; and
- re-instate the R&D Start program as a priority.

Outsourcing Of R&D

The growing trend to outsource R&D appears to provide opportunities for Australia to secure increased levels of Foreign Direct Investment (FDI). However, there is limited data on the extent to which this is occurring. There is a need for further investigation into this to target barriers to FDI in R&D in Australia.

Recommendation 5
The Commonwealth Government to target barriers to Foreign Direct Investment (FDI) in R&D in Australia.

Other Key Messages From Queensland Industry On R&D Investment

Initial analysis of the 140 submissions received on the Queensland R&D Strategy Issues Paper has identified a number of additional key messages from industry about constraints to investment in R&D including:

- The need to open R&D facilities, equipment and staff of State agencies and universities to business (including SMEs);
- The need to pass on the results of public sector research to Australian industry. Technology diffusion is crucial. Roll-out plans for the outcomes of R&D and the application of new technologies should be part of all R&D funding proposals put to government;
- Industrial designers and contract researchers could play a greater facilitating role in business investment in R&D;
- SMEs need more assistance in understanding IP management; and

- The long timeframes required by Universities to deliver on research are a major barrier to business investment in R&D through commissioning universities.

6.3 What Steps Need To Be Taken To Better Demonstrate To Business The Benefits Of Higher Private Sector Investment In R&D?

Disseminating Information on industry impacts of Business Investment In R&D

To address the shortfall in recent information regarding the extent and results of R&D activity, the Queensland Government is planning to undertake an econometric modeling exercise in certain priority industry groupings. The study will be designed to demonstrate the benefits to be expected from increased R&D expenditure in selected sectoral industries. It is recommended that a similar approach be implemented nationally[17].

Recommendation 6
The Commonwealth Government work with States and Territories to develop a national econometric model to estimate the impact of increased R&D expenditure in selected industries.

Demonstrating Benefits - Who Should Do The Demonstrating?

The benefits of higher private sector investment in R&D in Australia can be demonstrated in a number of ways. The success of demonstration programs seems to rest more in "who" is demonstrating rather than "what" is demonstrated. Communication strategies aiming at clearly articulating the benefits to business of investing in R&D must be lead by business leaders. Such a program should be supported by research and case studies that demonstrate how barriers to investment have been overcome and the positive results that emerged.

Demonstrating Benefits - What Should Be Demonstrated?

Two sorts of business investment in R&D exist. There is linked investment in R&D where an organisation invests to meet specific business needs. The second is non-linked investment where the motive from venture capital investment is profit generation from the discovery and commercialisation of R&D. The different requirements of both these types of investors will need to be addressed in case studies as will the distinctions between the unique requirements of SMEs, fast-growing businesses and international investors in R&D.

Recommendation 7
The Commonwealth Government should work with business leaders to demonstrate the benefits of business investment in R&D. Businesses will principally be interested in demonstrations of four things:

- How impediments to investing in R&D have been overcome;
- What benefits to expect and how to measure benefits;
- The factors that have influenced the degree of benefit obtained from R&D investment; and
- The type of assistance available from government to invest in R&D.

[17] The findings of the Industry Commission in 1995. Research and Development. Report No 44, AGPS: Canberra. are noted.

The case studies prepared and disseminated should demonstrate how the following constraints have been overcome for positive results:

- Taxation and financial issues;
- Collaboration/partnership options;
- Technology Diffusion opportunities;
- Lifting R&D Skills;
- Achieving management and financier support for R&D;
- Accessing Government support services; and
- Outsourcing R&D and/or obtaining outsourcing opportunities to perform R&D.

ADDENDUM

Complementary initiatives: Queensland Manufacturing Strategy

In February 2002 the Queensland Minister for State Development, the Hon Tom Barton MP, established a Manufacturing Leaders Group (MLG) made up of senior figures in industry, the unions, academia and government under his chairmanship, to advise on the preparation and implementation of a Queensland Manufacturing Strategy. This will focus policy and prioritise resources to help remove constraints to improved manufacturing performance. A draft strategy is due to be submitted to the Queensland Cabinet by November 2002.

The MLG has identified a number of key factors affecting the prospects of the manufacturing sector and established Working Groups to investigate these issues as a matter of priority. These include the take-up of innovation and participation in R&D, as important drivers of growth and greater competitiveness. The Working Group on Innovation and R&D is drawing up proposals for initiatives to be considered by the MLG in a number of areas relevant to the Federal Government's Inquiry, including:

- promoting awareness of the benefits of innovation and encouraging take-up of new technologies and processes;
- preparing companies for innovation and R&D, and facilitating projects;
- promoting research partnerships; and
- improving data collection in relation to R&D activity.

In parallel, the MLG's Working Group on Investment and Venture Capital is examining possible means of increasing the availability of funds to underpin development activity, including R&D projects.

The MLG is broadly representative of Queensland's manufacturing industry and major union and academic stakeholders, and would be a useful reference group for the purposes of further consultation if the Standing Committee intends to undertake a hearings process in Queensland.