Final
21/12/06
(as revised)

Productivity Commission Research Study on Public Support for Science and Innovation

Supplementary Submission by the Department of Industry, Tourism and Resources

December 2006

Executive Summary

Overview

The Commission was to report on the following Terms of Reference (ToR):

1. All key elements of Australia's innovation system, including the economic impacts of public support, its impact on Australia's recent productivity performance and arrangements to benchmark outcomes from publicly supported science and innovation.
2. Impediments to the effective functioning of the innovation system and any scope for improvements.
3. The decision-making principles and program design elements that influence the effectiveness of Australia's innovation system, any scope for improvements and implications of change to the current support.
4. Broader social and environmental impacts of public support for science and innovation in Australia.

In reviewing public support for science and innovation, the Productivity Commission has focused mainly on those areas that are currently funded by Government. This does not address the issue of adequacy of the current system to solve future issues and needs.

The final report should make an explicit reference to the impact that framework conditions like taxation, regulation, education and gaps in the supply of venture capital and skilled labour can have on the capacity and performance of Australia's innovation system.

As evidence suggests that the current R&D Tax Concession regime is working, and given the new elements have been operational only 4 years, DITR does not support change to an incremental only scheme.

The repayable grant option for support of business R&D has significant problems and would be better considered in a whole-of-government context, as the Productivity Commission did in its 2001 Inquiry into Cost Recovery by Government Agencies. (PC 2001)

This response by DITR draws on extensive contact and interaction with industry in delivering programs and identifying market needs. The Department expects in this regard that this response will be an important complement to the Research Study.

Key points

DITR's comments on the draft report (the Report) are in two parts:

- The focus and depth of the report; and
- The report's draft findings and commentary.

Part I – The focus and depth of the Report

- The Report is incomplete in addressing ToR No.2 - impediments to Australia's innovation system - and ToR No. 3 - decision-making principles that influence the effectiveness of Australia's innovation system.
- It needs to assess the functioning of innovation system as a whole, and of interactions within it. For example, links between public sector research and firms, particularly SMEs, remain poor, and Australian industry's relatively low presence in global supply chains limits access to the 98% of R&D undertaken outside Australia.
- It lacks a global perspective on innovation. Globalisation and the continuing growth of services are having substantial impacts on innovation policy in other countries.
- It needs to consider, in a global market, the issue of where the innovation will take place and the fact that countries are vying to attract R&D and MNEs to gain maximum spillovers.

Framework conditions

- The Report needs to give greater attention to the impact of framework conditions like taxation, skills and regulation on the Australian innovation system. It should recognise the role of Government in setting these framework conditions.
- It should make reference to the impact that education has on the capacity and performance of Australia's innovation system.
- The regulatory environment is also an important influence that can impede or speed up innovation.
- An appropriately framed research exemption can strike the balance between public benefits from the dissemination of knowledge and protecting the rights of patent owners. More should be made of this research finding in the final Report.
- More attention should be given to innovation governance arrangements in the final report given that other countries and research identify its importance in effective delivery of outcomes.

Non-R&D innovation

- Recognising that the nature and benefits of non-R&D innovation are not as well understood as innovation based on R&D, the final report should identify options for research and data collection to ensure Australia is well equipped in this area.
- While the marginal benefits of subsidies per firm may be smaller for non-R&D innovation activities, there may be a role for government in terms of market failures in information asymmetries and skills especially for SMEs.

Information failure and lack of skills

- Global integration places new and increasingly complex demands on Australian firms for new knowledge and skills. Issues for firms, especially SMEs, include recognising new needs for improved management, technical and investment skills, and addressing these efficiently in terms of time and other costs.
- Many Australian enterprises do not operate near best practice, in particular in the incorporation of new technologies.
- Economic returns from the Australian Government's investment in R&D will continue to be sub-optimal if the Australian business sector lacks the capacity to commercialise the results of publicly funded basic research.
- Given that 98% of R&D by OECD countries is undertaken outside Australia, businesses will increasingly source many of their ideas, technologies and new process approaches internationally.

Intermediaries

- DITR supports the role for government support for intermediaries. These can address information failures and build successful collaboration skills. Additional support may be required until the intermediary market matures.

Capital market failure

- DITR programs including Innovation Investment Fund, Early Stage Venture Capital Limited Partnership, Pre-Seed Fund and COMET support capital market failure and skills gaps faced by SMEs at early and high risk stages of their development.

Part II – The draft findings and policy discussion of relevance to DITR programs

R&D Tax Concession

- It is too early to move to an incremental only R&D Tax Concession given that the existing element has been in place a short time and the first evaluation of the new elements is still underway.
- An observation that Australia is only marginally below the OECD average is no rationale for arguing that support for BERD is about right and hence that the system does not require change to support increased business R&D. Neither is it a rationale for complacency or removal of the 125% R&D Tax Concession or other business R&D support.
- Industry supports an R&D Tax Concession that is simple and predictable so that it can be factored into company investment decisions.
- The 125% base concession provides an incentive for firms to undertake more research and development by reducing the after tax cost of R&D to the firm.
- The Tax Offset has led to an additional 1,000 firms using the concession in Australia – doubling the number of smaller firms using the concession. Elimination of the 125% rate would likely remove around 90% of firms accessing the tax offset.

Considering an Incremental Only Scheme

- The first 4 years of registration data on the 175% Premium suggests that it has stimulated additional R&D expenditure in a select group of mainly larger firms, and that it has provided protection of revenue because of the three-year averaging and company grouping provisions.
- The proposal to give immediate access to start-up firms may provide opportunities for firms to artificially structure their R&D to establish a lower base.
- The proposal to base additional R&D on R&D intensity rather than volume was announced in *Backing Australia's Ability (2001)* and subsequently dropped following strong industry representation.
- Given that R&D expenditure by SMEs is unpredictable and sporadic, and that external factors can impact on sales, it is not appropriate to use an incremental scheme based on research intensity in Australia.
- Incremental only tax schemes assist few firms. The 175% Premium assists around 1,000 firms. And these are predominately large firms. The US scheme is accessed by 0.2% of US firms. Frances's largely incremental scheme is only accessed by 4,000 firms. Should Australia only retain the 175% incremental regime, only around 1,200 companies could be assisted by the R&D Tax Concession. This would be contrary to the Government's objective of promoting business R&D expenditure. (*Industry Research and Development Act 1986*)

Beneficial Ownership

- DITR sees merit in the Productivity Commission's recommendation to enable firms that hold their IP offshore to receive support only for incremental R&D.

Commercial Ready and other Programs

- DITR does not agree that competitive grant programs such as Commercial Ready provide greater scope to target socially valuable R&D projects that would otherwise not proceed. Nor does it see such schemes are compromised by an undue focus on commercialisation objectives.
- The focus of Commercial Ready is to support R&D, proof-of-concept and early stage commercialisation, and support does not extend to later stage commercialisation activities such as sales, marketing or promotion, the benefits of which are more easily appropriated by the firm.
- Commercial Ready provides benefits to the economy by supporting projects of Australian SMEs which have the potential to successfully bring their product to the market but which also demonstrate their need for funding to satisfactorily progress their project.
- In its overview, the Report uses the Commercial Ready Program as an example for a focus on later-stage commercialisation. DITR believes this is an inaccurate characterisation and recommends the removal of this example from the overview.

Repayable grants

- The Report has asserted that a greater reliance on repayment and benefit-sharing mechanisms (such as that used in the Pre-Seed Fund program) would provide more effective incentives in commercialisation programs.
- Repayable grant (loan) schemes pose a number of commercial and administrative problems, such as high administrative costs and incentives for strategic behaviour by firms.
- The repayable grant issue would be better considered in a whole-of-government context, as the Productivity Commission did in its 2001 Inquiry into Cost Recovery by Government Agencies. (PC 2001)

Collaboration

- If the rules of the current CRC program were changed to focus it more on public good, DITR would support the establishment of a complementary program for business; this program would assist collaboration goals through support for smaller, shorter and more flexible arrangements between groups of firms either independently or in conjunction with universities and public research agencies.

Evaluation

- The five categories of Key Performance Indicators (KPIs) — knowledge creation, human resources, finance, collaboration and market outcomes — will provide some consistency across programs and Australian Government departments in the collection of key output data.
- DITR's evaluation of programs is undertaken every 3 years. A substantial upgrade of Departmental program data management systems for monitoring and evaluation purposes of the R&D Tax Concession program will begin in 2007 and allow the Department to measure accurately the performance of the program.
- DITR supports the use of longitudinal studies to help identify the extent, nature and duration of program impacts.
- DITR supports the ongoing strengthening of performance evaluation mechanisms to ensure accurate and appropriate targeting of Government support.

PART I – the innovation system in a global context

The Report needs to assess the functioning of innovation system as a whole, and of interactions within it. For example, links between public sector research and firms, particularly SMEs, remain poor, and Australian industry's relatively low presence in global supply chains limits access to the 98% of R&D/innovative practices undertaken outside Australia.

The Research Study's second Term of Reference was to identify impediments to the effective functioning of Australia's innovation system.

The diagram of the innovation system in the Report (Figure 1.3) illustrates the multiple and interrelated factors that comprise the innovation system at the national level. This encompasses the relationship between science and innovation, feedback and collaboration between institutions, amongst firms, and between both groups. It also encompasses framework conditions like taxation, regulation, Intellectual Property (IP) rights and education and, critically, market conditions as the ultimate driver and rewarder of innovation. Figure 1.3 would benefit from inclusion of the international perspective as is contained in the Figure 3.1 (page 51) provided by DITR in its submission to the Commission. (DITR 2006)

The Report has focused mainly on R&D, with some attention to commercialisation programs, but with little emphasis on what other countries see as essential elements of their systems. The Report's discussion of non-R&D innovation and its impact on productivity is limited. The Report justifies this on the basis that the majority of public support for science and innovation is on R&D. This approach limits discussion to what has occurred in the past rather than identifying whether there are impediments to its effective functioning in the future.

It is true that data is more readily available – both input and outcome – for science and research than is available for the other elements of innovation. However, this should not limit discussion of the importance of these other elements to the effectiveness of the Australian innovation system. Other countries, particularly those in the OECD, are placing emphasis on better understanding the non-R&D elements of the innovation system. (OECD 2005a)

The Report should give more attention to identifying interactions between elements of the national innovation system (its dynamism), and identify the business processes that create value from innovation for Australia.

Discussion of the innovation system should include international linkages in the market and industry dimensions. It is estimated that MNEs undertake at least two-thirds of worldwide expenditure on business R&D and much of this expenditure is internationally footloose (i.e. could take place offshore rather than in Australia). Of the top 50 R&D performing firms in Australia (IPRIA 2005), almost all are multinational firms (both Australian and foreign-owned) and are primarily directing their R&D at capturing global markets.

Innovation, science and commercialisation

Definitions are important to ensure clarity in the policy debate. The Report uses the terms 'science', 'innovation' and 'science and innovation' interchangeably whereas these terms have quite different meanings. Importantly, it should be noted that science and commercialisation are sub-sets of innovation.

DITR recommends that the Productivity Commission adopt the definition of commercialisation as proposed by a study on commercialisation for the Prime Minister's Science, Engineering and Innovation Council completed in 2001 (PMSEIC 2001):

"the process of transforming ideas, knowledge and inventions into greater wealth for individuals, businesses and/or society at large".

Much innovation is non-R&D

Addressing the Report's focus on R&D, DITR notes that R&D innovation includes activities that are both innovative and technically risky. Non-R&D innovation includes non-technical innovation and ranges from aspects of commercialising new products through to improved business systems. Examples are the later phases of development for pre-production, production and distribution, development activities with a lesser degree of novelty, support activities such as training and market preparation, and development and implementation activities for innovations such as marketing methods or new organisational methods which are not product or process innovations. Innovation activities also include acquisition of external knowledge or capital goods that is not part of R&D.

While some are these activities are close to the market, clearly some are further away.

The 2005 Innovation Survey of the Australian Bureau of Statistics (ABS 2006) shows that non-R&D innovation is important to firms. For every dollar spent on R&D, Australian businesses spend almost four dollars on non-R&D innovation. (ABS 2006) Such non-R&D innovation activities are critical to turning ideas and research into new commercial products and services.

The ABS 2005 survey, covering 2004 and 2005, shows the dominant form of business innovation as the introduction of new or significantly improved organisational/managerial processes (undertaken by 24.9% of all businesses) followed by new or improved operational processes (21.6%). New or significantly improved goods or services were the least common type of innovation, at 19.4% of all businesses.

The survey also illustrates the broad extent of innovative activity across the Australian economy — while around 6 000 firms currently claim the R&D Tax Concession, over 47 000 firms are reported as innovating, including R&D and non-R&D innovation. (ABS 2006) It is clear that innovation is likely to be especially important to a highly service-intensive economy like Australia's.

The interdependence of R&D and non-R&D innovation activity is illustrated by the recent activities of the Printing Industry Action Agenda. It identified poor business decision-making in the industry in relation to the purchase of new equipment. Research was funded with support from government into the development of business tools for the acquisition of new technology, which the industry considers has made a significant contribution to business-like thinking on technology acquisition.

The business tools contribute to organisational and process innovation. They benefit the Australian industry but without government intervention the individual firms were not able to identify or fund the development because of poor collaboration. Government should support non-R&D innovation only when it creates net economic benefits and when it would not proceed without support**.**

In the global market, countries seek to attract innovation (R&D and non-R&D) activity because the spillovers generated are higher if the activity occurs in country. The Joint Strike Fighter is an example whereby Australia would not have been able to participate in that global project without a Government facilitated consortium with the result that otherwise competitive Australian firms would have been denied access to the business opportunities.

Given that the nature and benefits of non-R&D innovation are not as well understood as R&D, DITR considers that there is a need for better data collection and more policy analysis. The continuation of Business Innovation surveys is an example of good data collection and they should be used for future policy development and testing in future program design. DITR also sees merit in longitudinal company studies to identify the changes that lead to high growth and internationally competitive companies. Such studies will identify and quantify any impediments for firms in relation to non-R&D innovation.

Services

In relation to the services sector, the Commission has assessed that widespread spillovers in the services sector do not provide as strong a case for direct public subsidies for innovation as might initially be thought and that many innovations reflect the routine, incremental experimentation that is merely part of the business of being a successful service supplier.

DITR considers that spillovers from improved technology, process and business practice innovation are likely to be significantly higher than originally thought, particularly the benefits from much service industry innovation which cannot accrue by being implemented by one firm alone. The nature of the innovation requires increased inter-firm collaboration and convergence of systems from several suppliers.

Manufacturing industries are now highly service-intensive such as in their use of information technology, and in their outputs such as consulting outputs in the construction industry. Increased bundling of goods and services by individual

businesses means that the old distinctions between manufacturing and service sector businesses are less meaningful.

A recent conference in Helsinki on Services and Innovation heard from governments and industry about the implications of service sector development for innovation policy. It was argued there that there is a need to strengthen the multidimensional nature of innovation policy and pay increasing attention to services concepts, business models and networks, organisational developments, customer interface and delivery systems. (Confederation of Finnish Industries 2006)

Information failure and lack of skills

The Report dismisses the case for further intervention in overcoming the information deficiencies faced by firms, especially SMEs.

Addressing information failures and lack of skills has several aspects. The first is identifying these gaps, where "you don't know what you don't know". The second is filling these gaps where they would otherwise remain unfilled.

DITR considers that there are information failures which require intervention to improve innovation competitiveness relating to management, technical and investment capabilities.

Best practice

Many Australian enterprises do not operate near best practice:

- gaps in management training have been identified in industry action agendas;
- many businesses do not know how to access knowledge-based business services (OECD 2006a); and
- some businesses do not manage finances effectively (CPA Australia 2006).

There is also evidence that Australian SMEs perform less well than those in peer nations. The Global Entrepreneurship Monitor (GEM 2006) identified a number of areas in which SMEs had a lower propensity to provide new or novel products/services to customers than the average. The Monitor also identified that established businesses exhibiting significantly lower performance in the **incorporation of new technologies**, especially in the number of businesses that are utilising the very latest of technology developed within the last twelve months. On this issue Australia has only about a third as many business owners who claim to incorporate the latest technology when compared to that of the average for the high-income nations.

In the UK a role for Government has also been recognised in the provision of business improvement information – "It is clearly for business to recognise and adopt best practice. But the Government can play an important role in coordinating the flow of information on best practice, working closely with business networks and industry forums. Evidence shows that relatively small investment on these activities yields high returns to individual companies and to the economy as a whole". (UK DTI 2002)

Knowledge acquisition

Global integration is placing new and increasingly complex demands on Australian firms for access to new knowledge and skills. Intensified issues for firms, especially SMEs, include recognising new needs for improved management, technical and investment skills, and addressing these efficiently in terms of time and other costs.

The value of new knowledge may not be known until it is acquired. This means that knowledge useful for business innovation may be under-consumed.

Feedback received through consultation with industry leaders across Australia to inform the current development of the Industry Statement indicated that many managers see their competencies, and that of their firms, of increasing importance as globalisation pressures continue to increase, requiring innovation to remain competitive. However, Industry Statement roundtable participants from many firms indicated significant information failures − many expressed that they did not know where to go to obtain training and other services and resources that would assist in dealing with economic changes impacting on their businesses. Less successful firms further expressed a lack of understanding as to what they might do to mitigate the pressures of globalisation and increasing competition.

Many firms also said that while they recognised the need to upgrade capabilities they were mistrustful of the consultancy industry and were looking for an 'honest broker' approach to assist them.

This outlook is echoed in studies by the Australian Industry Group, which found that over 60% of firms surveyed were either concerned or very concerned about future economic prospects, but one-third had not identified new strategies to meet current challenges. (AiG 2006)

Firms and industry associations consulted in the development of the Industry Statement, and also those who provided submissions, recognised the value of government action in the provision of information to firms. The government is seen as an honest broker which can provide accurate and impartial information. This is seen by firms as reducing search costs and associated risks of choosing the wrong source of information. These risks include training costs and the time spent on training, a critical consideration for time-poor SMEs.

These findings are not new. The Bureau of Industry Economics' 1995 paper *Beyond the Firm* made a similar assessment, and argued that where such a market failure exists there may be a role for government to provide information and demonstrate the benefits of utilising that information. (BIE 1995)

Later work by the Productivity Commission also highlighted misjudgements by entrepreneurs about the benefits of training. (PC 1998) These misjudgements were presented as leading to underestimation of the importance of certain management capabilities and ignorance of training opportunities or overestimation of transactions

costs of deciding which programs would be of assistance. They were argued as being able to persist as training is not a core activity of small business, whose managers are preoccupied with the day-to-day requirements of running their businesses.

Therefore, while innovation may be at the core of an SME's business strategy, as the Report asserts, the means to fully achieve it may be lacking.

Management skills

The Australian Industry Group has proposed a Business Capability Initiative to lift business performance amongst manufacturers. (AiG 2006) The Commission's Report also notes submitters' comments suggesting possible deficiencies in firms' entrepreneurial, management and leadership skills.

Taking a dynamic view, it has been argued that while eventually the sub-optimal firms may be weeded-out through firm failure, this usually only occurs in the long run, and is not costless. (PC 1998) The Productivity Commission's 1998 work on this suggested that, in such circumstances, small businesses could be informed about the value of management skills through such mechanisms as the use of diagnostic tools to assess deficiencies in managers' skills. This could help determine whether further training may be useful.

In its 1998 work, the Commission also recommended that in particular cases where the advice may not be specific enough or credible enough to convince managers of the merits of such training, there may be grounds for subsidising such training, as this would give potential users a demonstration of faith in the training.

Would Australia benefit from a stronger Government role? While the Report of this current Study notes the existence of the Small Business Entrepreneurship Program, this program is of a relatively modest size compared with many others, with a focus on basic business skills. It does not in general address the business transformational needs of established SMEs that would provide a platform for increased innovative behaviour.

DITR considers that the report should make an explicit reference to the impact that education (skilled labour) can have on the capacity and performance of Australia's innovation system and on economic performance. The report should recognise the role of Government in setting these framework conditions.

Role for Government in addressing these failures

In relation to the service sector, the Report asserts that the marginal benefits of subsidies may be small, given low levels of additionality. DITR contends that evidence-based and well-designed programs have in the past created substantial additionality in the valuable innovative activities of firms.

Two case studies for non-R&D innovation from the COMET program illustrate this well:

- *PageUp* has developed new technology that slashes the cost of recruitment helping customers such as the Australian Tax Office and some major banks to perform their own recruitment online. In the last four years, *PageUp* has grown from six employees to 28 and tripled its turnover to $3 million per annum. The company benefited from COMET business advisor and $80,000 funds for market research, developing intellectual property and strategic planning. Current clients include BHP Billiton, Optus, Flight Centre, Fairfax and Bendigo and Macquarie banks.
- Another example is South Australian company Vonmac, a manufacturer of building blocks (Plastipile), made out of recycled plastic. Vonmac received a $37,600 grant under the COMET program, which helped it to develop its production line. Plastipile was recently used in a $22 million upgrade of a sewerage treatment plant for the Byron Shire Council in NSW.

Gaps in the innovation system occur across the business spectrum. DITR considers that, where additionality may be lower, for example where the activity is closer to the market, the costs of achieving additionality may also be lower, with Government support producing net economic benefits.

Even small net benefits per firm, compared to those related to Government support for R&D, may have substantial impacts across an industry, as illustrated by the example from the printing industry.

Global Engagement

Accessing World R&D

Given that 98% of world R&D and technology development occurs outside Australia, businesses will source many of their ideas, technologies and new process approaches internationally. The value creation from R&D is primarily via global markets.

Innovation cannot be separated from global engagement and accessing global supply chains.

Many smaller businesses have a limited and constrained capacity to understand and employ use of knowledge due to a range of factors including quality of education and entrepreneurial skills, competitiveness concerns about collaborating with competitors and lack of access to good systems for acquiring and managing knowledge and consultation, or fear they may feel threatened with loss of control and even exploitation by a larger firm.

SMEs have concerns about the misuse of their intellectual property by MNEs. (OECD 2005b) Australia has suggested to the OECD that this issue be addressed in its Guidelines for Multinational Enterprises.

The Productivity Commission's 1998 study suggested the potential need for SMEs to gain assistance with improving their performance − it was noted that "small businesses typically obtain fewer feedbacks about their performance than large

enterprises…This could adversely constrain enterprise efficiency and opportunities for some firms…this may provide a rationale for a variety of programs aimed at improving enterprise performance, and in diffusing technologies". (PC 1998)

Collaboration

Links between public sector research and firms, particularly SMEs, remain poor, and Australian industry's relatively low presence in global supply chains limits access to the knowledge developed outside Australia.

Extension services have been provided to SMEs in the agriculture sector for decades, but not in other industry sectors. Many Australian SMEs operate in sectors without collaborative infrastructure and networks.

ABS data (ABS 2006) indicates that joint marketing or distribution was the main type of collaboration of small enterprises, in contrast to large businesses for whom the dominant form of collaboration was joint R&D.

Multi-project, multi-partner programs (such as CRCs and ARC Centres of Excellence) require extensive time/resources to broker applications. Much of industry is poorly placed to put together bids for large strategic programs like CRCs. This is particularly the case for emerging industries which may not have the industry mass and networks to coordinate such bids (unlike for instance, the agricultural sector). Consequently there may be a bias built into the system against newer areas of technology and those without some history.

DITR recommends that the Commission examine this collaboration issue further, taking a firm-centred perspective. This would highlight the impact on Australian SMEs − encompassing supply chain operations, energy efficiency, technology transfer, product realisation, applied research, knowledge and skills dissemination, use of industry best practice and Occupational Health and Safety (OH&S) management. **Any further support for collaboration will need to be flexible, given the wide range of needs and situations of Australian SMEs.**

Role of intermediaries

Related to improved knowledge and technology diffusion between research and business and between businesses is the development of intermediary services, providers that can overcome the information and other failures in connecting people with potential collaborators and providers of knowledge necessary to commercialise ideas and R&D.

The Report provides some recognition that the Australian intermediary market is still developing. As well as gaps in services provision, the market may be too highly priced for SMEs. Australia lacks the medium and large enterprises present in larger OECD economies that take on the role of knowledge and technology integrators.

Most SMEs do not have the time or capacity to find relevant innovation/technology, an area where the search costs are high and where there are asymmetries in

information. They have limited access to resources, information and finance, and many are reluctant to undertake the collaboration processes necessary to gain the innovation/technology due to a lack of experience in the process, and concerns about legal and IP secrecy issues (such as signalling future product development intentions through negotiations) in collaboration.

Submissions to this Study have noted both weak linkages between research organisation and SMEs, and the lack of a base of intermediaries that can bring research organisations, firms and others together.

Australian SMEs have a poor record in the take-up of new technologies and knowledge. The DEST *Mapping Australian Science and Innovation*, reports on average only 34% of Australian SMEs take up external technologies compared to over 85% in Europe and the US. (DEST 2003)

Intermediaries play an honest broker role in connecting research, small and large Australian companies with each other and with multinational companies. The Australian intermediaries market is still at the development stage and high entry costs place SMEs at a disadvantage. The intermediaries market exhibits information and market failures.

In recognition of the positive outcome from intermediary pilot projects the Government has provided further funding to support companies accessing intermediary services.

DITR notes the Report's recognition of the role for government support for intermediaries in addressing information failures and building collaboration. Additional support may be required until the intermediary market matures.

Capital market failure

SMEs have difficulty accessing capital to commercialise due to an immature Australian capital market in relation to early stage and higher risk investments. The Report has questioned whether these difficulties reflect imperfections in markets or the real costs that financial intermediaries face when dealing with small risky firms.

DITR considers that the venture capital sector of the venture capital and private equity market in Australia is under-developed. The seed, early stage and expansion stage investment in young business with rapid growth potential is characterised by low investment levels, a lack of capital formation and scale and relatively few investment managers with a proven track record. This is likely to be an impediment to the commercialisation of Australian innovation. In contrast, the later stage private equity sector is mature and receiving significant investor support.

Banks are reluctant to provide finance to small early stage firms, and in some cases decline to do so, because at very early stages there is no turnover to provide the necessary assurances.

Industry feedback is that it is difficult to attract superannuation funds into financing vehicles to provide patient capital support to early stage commercialisation activities. Many of those funds are managed in a way that rewards short term returns and there are disincentives for directors of these funds to adopt other than a conservative investment approach based on advice from investment advisers whose performance is based on often quarterly investment returns.

DITR programs including Innovation Investment Fund, Early Stage Venture Capital Limited Partnership, Pre-Seed Fund and COMET support capital market failure and skills gaps faced by SMEs at early and high risk stages of their development.

- The Innovation Investment Fund (IIF) addresses two major impediments to the efficient operation of the venture capital market: the lack of capital availability in the early stage capital market and the small number of skilled early stage fund managers. As a result of the review of the industry in Australia, the IIF program was expanded in the 2006-07 budget with a further $200 million in capital.

- The Pre-Seed Fund (PSF) aims to assist the commercialisation of R&D activities undertaken by universities and public sector research agencies by providing early stage pre-seed finance as well as managerial and commercialisation advice.

- COMET allows early-stage companies to get expert advice and services to take ideas to the market they otherwise might not obtain. Without COMET many ventures would not be able to progress their commercialisation as quickly or as optimally as they otherwise could. COMET Business Advisers do not crowd out private sector advisers and consultants as they are not usually interested in such early stage companies.

DITR acknowledges the Report's recognition of the need for support for the venture capital sector at this stage of the market's development.

Regulation and innovation

Regulation is an important influence on the extent and nature of innovation. While regulation incorporating technical requirements can be a driver for innovation, regulatory permissions are equally important in allowing scope for industry innovation.

Regulation can impede innovation by direct regulatory requirements that increase the cost and slow the pace of product innovation. It can impede innovation indirectly by taking businesses away from their "strategic roles of driving innovation, securing investments and increasing productivity", as put to the Taskforce on Reducing Regulatory Burdens on Business. (Banks' Taskforce 2006) Several examples of the impact of regulation on product innovation are:

- Biotechnology (Genetically Modified Organisms (GMOs) and stem cells); balance science and community interests to the release of GMOs and determine the nature of research undertaken in Australia;

- Communications; govern the type of the delivery of different types of innovative products and services; and
- Pharmaceuticals and devices; determine the market entry, pricing and community access to new products.

Governments have acted in a number of areas to address the impact of regulation on innovation:

- Industry has identified two areas of food regulation needing special consideration — regulation of high level health claims, and the regulation of novel foods. Amendments are currently being drafted to the *Food Standards Australia New Zealand Act 1991*, including to address industry concerns in these two areas while continuing to protect the interests of consumers.
- Past regulation of private health insurance has limited the development of innovative products that reflect contemporary clinical practice, such as providing benefits for outpatient and out-of-hospital services. This has excluded services such as benefits for chronic care management of conditions such as diabetes and asthma, and disease prevention programs. In December 2006, the Government tabled legislation to amend private health insurance legislation in a number of areas, including product regulation. (Australian Government 2006a)

The Government's response to the Banks' Taskforce includes strengthening the Australian Government's rules for making new regulation, including analysis of the costs and benefits of new regulation such as impacts on innovation. (Australian Government 2006b)

Given the above, DITR considers the Productivity Commission's final report should make an explicit reference to the impact of framework conditions like taxations, skills and regulation on the efficient operation of the innovation system and the role of Government in setting these framework conditions.

Intellectual property

The Report notes that legal uncertainty about the use of patents for research has the potential to impede knowledge dissemination, and notes the recommendations by the Australian Law Reform Commission, and the Advisory Council on Intellectual Property, to introduce an experimental use provision in the Patents Acts. The Australian Government response to these recommendations is currently being developed.

DITR considers that an appropriately framed research exemption can strike the balance between public benefits from the dissemination of knowledge and protecting the rights of patent owners.

Governance arrangements for innovation policy

The governance framework for Australia's innovation system is important to its overall effectiveness. It forms part of this Study's second and third Terms of Reference on impediments to the effective functioning of the system and scope for improvements, and the decision-making principles that influence the effectiveness and efficiency of Australia's innovation system.

The governance of innovation concerns "the roles played by the various actors in the innovation system, how the rules of the game work, how decisions are taken and how changes take place". (OECD 2005c) Key components include:

- The structure of government;
- The identification of actors involved in decision-making;
- The mechanisms used to determine direction and prioritisation as well as coordination;
- The identification of driving forces in terms of changes, strengths and weaknesses; and
- The identification of evaluation practices, learning mechanisms and measures of performance. (OECD 2005c)

The Report focuses primarily on governance arrangements for public sector research activities, and on performance evaluation mechanisms.

DITR considers that the goal of a coherent and effective innovation system with a coordinated and strategic approach to innovation policy is currently well-supported by the *Backing Australia's Ability* framework. This represents a whole-of-government response to innovation issues needing attention across governments, business and the research community, and has resulted in an $8.3 billion investment in innovation by the Government over 10 years.

The Commonwealth State Territory Advisory Committee on Innovation (CSTACI) is a relatively new intergovernmental mechanism for national coherence in innovation policy.

A number of OECD countries now have innovation governance frameworks in place. (OECD 2005c).

Given the considerable attention to innovation governance arrangements in competitor countries, the final report could comment on whether consideration should be given to appropriate innovation governance arrangements for Australia.

PART II – the Report's draft findings and commentary

This section covers the draft findings and discusses the policy of relevance to DITR programs.

R&D Tax Concession (draft finding 9.1)

DITR welcomes the Productivity Commission's support for the R&D Tax Concession.

Registration data on the take up of the two new elements – the R&D Offset and the 175% Premium elements – both introduced in 2001 suggest increased additionality is being achieved. However, only 4 years of data is available so DITR warns against any significant change in arrangements at this time. The first evaluation of the new elements is currently underway.

Comparisons of Australia's business expenditure on R&D (BERD) with the OECD average, as the Report has done, needs to be interpreted with care. Even if adjusted for research intensity, cross country comparisons need to take account of differences in the innovation systems' architecture, infrastructure and capacities to be valid. **An observation that Australia is only marginally below the OECD average is no rationale for arguing that support for BERD is about right and hence that the system does not require change to support increased business R&D.**

Economic returns from the Australian Government's investment in R&D will continue to be sub-optimal if the Australian business sector lacks the capacity to absorb and commercialise the results of this publicly funded basic research as well as research, technologies, new practices and processes from overseas. The R&D Tax Concession assists Australian businesses to undertake research, particularly applied, to adapt and adopt new ideas as identified through market processes. Such activity builds the absorptive capacity of firms which strengthens opportunity for other innovative activity.

Research about to be published on a group of users of the Australian R&D Tax Concession has found induced persistent changes in the majority of firms surveyed[1]. A contributing factor to these longer term benefits from participation in the Tax Concession are that the Tax Concession requires that the R&D activity be planned and part of overall business strategy, and that the research conducted be systematic, investigative and experimental.

Industry looks to an R&D Tax Concession that is simple and predictable so it can be factored into company investment decisions. The volume based 125% scheme is well known by innovating firms and, apart from pleas for the rate to be

[1] Recent OECD research on behavioural additionality has shown that government R&D programs develop the capacity of firms to manage their R&D, integrate it into their business strategy, build collaborative linkages with other firms and public sector researchers and improve commercialisation.

increased, is accepted by industry. As one Tax Concession recipient commented in a recent DITR study:

> "*If the Tax Concession keeps chopping and changing, this will act as disincentive, as long-term stability takes planning and consistency in Government.*" (DITR 2005)

Invest Australia, the Australian Government's inward investment agency within DITR, notes that the R&D Tax Concession is already a complex scheme for multinational enterprises (MNEs). Explaining the scheme to headquarters is challenging, and adding complexity to it could be counter-productive.

125% R&D Tax Concession should stay

The 125% base concession provides an incentive for firms to undertake more research and development by reducing the after tax cost of R&D expenditure to the firm. The CIE (2003) found that the benefits generated by the 125% concession are between $0.70 and $1.98 for each dollar of tax revenue forgone[2]. This estimate does not account for the substantial clawback of government costs through reduced franking credits to investors.

Since the Productivity Commission's Report cites earlier studies showing a much higher inducement rate for small firms under the 125% R&D Tax Concession, it is reasonable to conclude that some of these firms may discontinue R&D expenditure without the 125% R&D Tax Concession.

Taking an international perspective, companies consider the support provided by governments in their decision on whether to, and where to, invest in innovation. Global investment trends demonstrate that R&D investment is increasingly going to other international locations[3]. The R&D Tax Concession helps retain investment in Australia despite a competitive international environment.

DITR has particular concerns about removing the current 125% base rate for small and medium firms. R&D conducted within small and medium firms is a key vehicle for capturing, absorbing, and generating economic wealth from the constant output of international and public sector R&D.

Erratic patterns of R&D expenditure by small Australian firms (see Figure 1) reinforce the difficulty that they would face to qualify for the 175% Premium scheme.

---

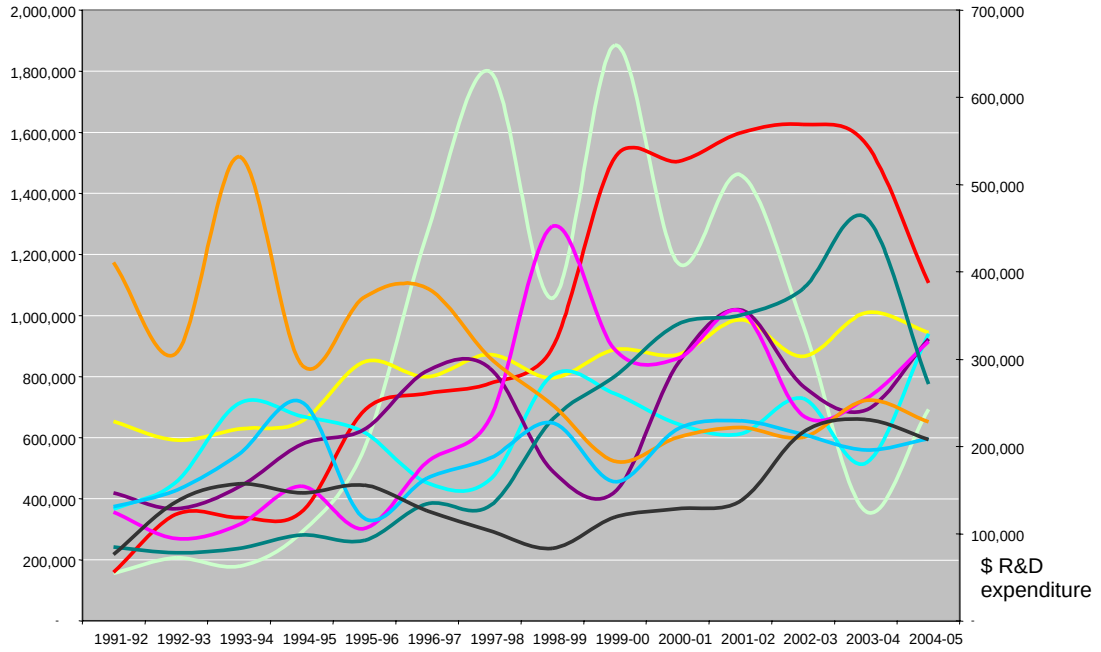
[2] The review of the R&D Tax Concession program by the Centre for International Economics (CIE), 2003

[3] According to LOCOmonitor, Australia's share of recorded R&D FDI projects decreased from 3.9% in 2002, to 2.9% in 2003, to 1.2% in 2004, and 1.1% in 2005

Figure 1

Patterns of R&D expenditure of small firms for a single manufacturing sector

Variability of R&D expenditure of small firms for a single manufacturing sector[ab].



[a] The firm's R&D expenditures showed in the graphic correspond to the top 10 (by R&D expenditure) continuously registering small firms in a selected manufacturing sector.

[b] Small firms are defined as less than 20 employees

Note: The data covers the period 1991-92 to 2003-04

Firms are referenced on the right or left side, depending on their R&D expenditure.

Figure 1 illustrates patterns of R&D expenditure from manufacturing sectors. The data comes from a database of firms that have continuously registered in the R&D Tax concession program from 1991-92 to 2003-04. Sectors are not further identified to protect confidentiality of firms. Assessing variability of large firms is more challenging as the R&D can be performed in different firms within the same group.

Incremental schemes can only be accessed by a small subset of the firms investing in R&D. Only around one in six firms accessing the R&D Concession utilise the incremental element − in the case of small firms (less than 20 employees), only 10% use the 175% Premium scheme while 31% of large firms (more than 100 employees) claiming the Concession use the Premium scheme. (DITR, 2007b)

If Australia only had the 175% Premium incremental regime, the number of companies assisted by the R&D Tax Concession is likely to drop from 6,000 registered for the 2004-05 year to around 1,200 companies. Such an outcome would be contrary to the Government's objective of promoting business R&D expenditure as stated in the *Industry Research and Development Act 1986*.

The US incremental only scheme is only accessed by 15,000 firms (approximately 0.2% of US firms – a similar rate to Australia's Premium) despite an economy much larger than Australia's. France's largely incremental scheme is only accessed by approximately 4,000 firms, again despite its larger economy.

Tax Offset

The R&D Tax Offset was introduced in 2001 to assist fast growing innovative firms, including startups, access cash when they needed it most. Prior to the introduction of the Offset in 2001**,** industry had suggested that the capacity of firms to invest in R&D was largely constrained to available profit as it was difficult for firms not yet in profit to obtain finance based on the future returns of R&D, or future access to the Tax Concession deduction.

The introduction of the Tax Offset has resulted in an extra 1,000 firms accessing the Concession – doubling the number of smaller firms using the concession (Figure 2). The majority use the 125% rate (Figure 3). Elimination of the 125% rate would likely remove 90% of those firms who access the Tax Offset. (i.e. 1,953 out of 2,162).

DITR considers that there is evidence (see Figure 2) to support further examination of the $1 million R&D expenditure threshold for the Tax Offset. There appear to be firms not increasing their R&D beyond the $1 million dollar mark to ensure they retain access to the Offset. Small tax-loss firms spending more than the current cap of $1 million on R&D are subject to the same financial market failures and tax distortions as those spending below the $1 million cap.

Figure 2

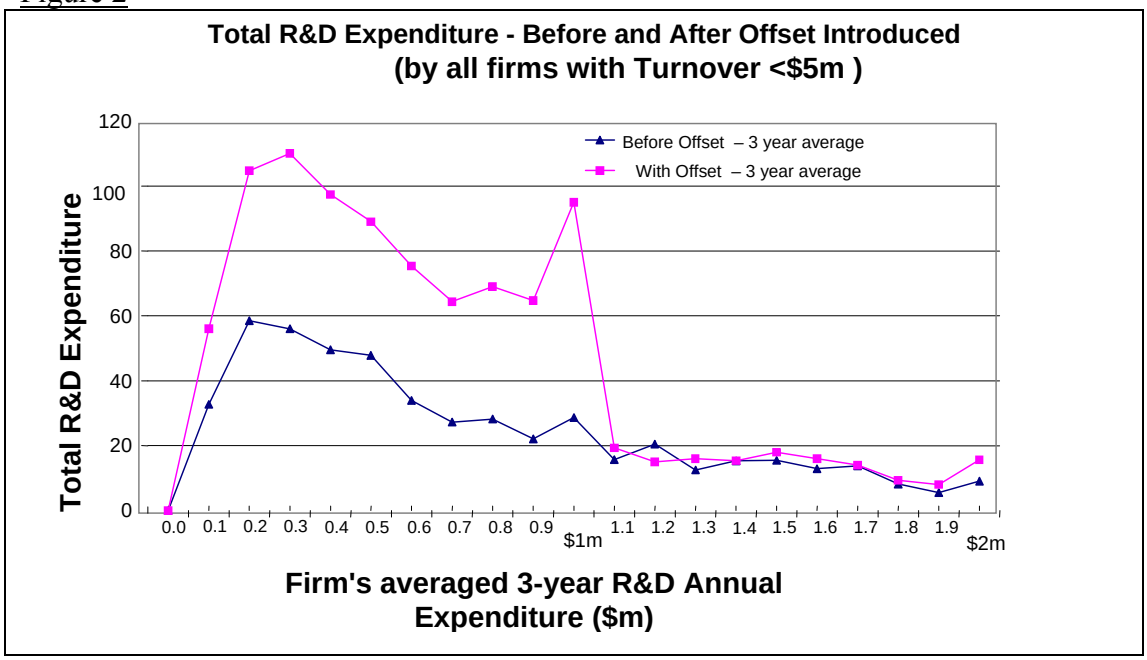
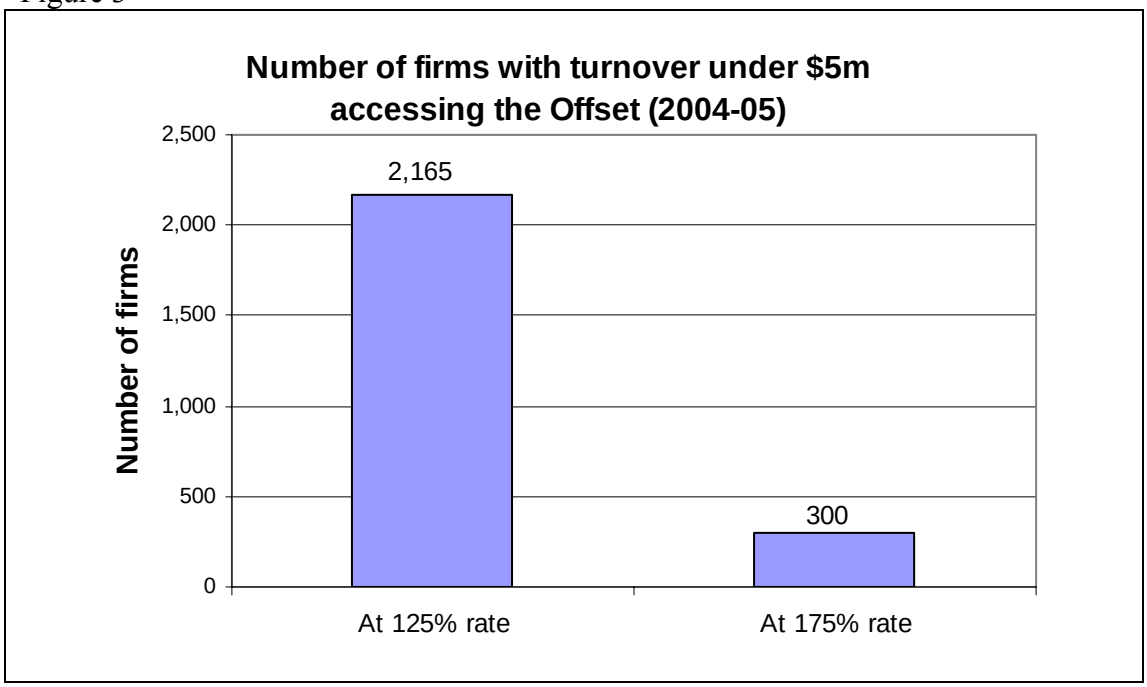


Figure 3



175% Premium should remain

The Report notes that an incremental only R&D Tax Concession will not be accessible to most firms and poses administrative challenges.

In the four years since its introduction, the expenditure on R&D supported under the 175% Premium scheme has risen from $400 million in 2001-02 to over $1 billion of R&D in 2004-05.

To qualify for the higher rate, the scheme only rewards companies with R&D expenditure above a 3-year historical R&D base which is an effective means of driving additional R&D. Around one in six firms currently access the 175% Premium concession. There is no evidence this number would increase if the 125% concession was removed leaving an incremental only scheme

Factors for consideration in an Incremental Only Scheme

Establishing an accurate base level of business R&D

The inherent variability of R&D investments by individual firms makes establishing an accurate 'normal' base level investment problematic, especially for small and medium firms (Figure 1). DITR has investigated the year to year variation of a firm's expenditure on R&D and has found it to be substantial especially for small and medium firms. This is in line with industry advice on the wide range of R&D expenditure and business strategies used by firms.

Some businesses only conduct R&D for a year or two, associated with a new product, and may then cease R&D for 4-8 years until the next product cycle. Some others

initiate R&D largely as and when they strike problems and so can vary greatly from year to year. Experience with many firms using Commercial Ready has been that the timing of R&D expenditure is highly variable because it is contingent on the progress and results of the research, which is inherently uncertain.

The large year-on-year variation in R&D expenditure is the subject of a study by DITR due to be published in early 2007. Figure 1 illustrates the R&D expenditure of small firms each with a different overall level of R&D expenditure. The variability for each is broadly indicative of the type of variability for firms at each level of R&D expenditure/level of turnover.

Predicting additionality

Not all firms are able to predict their access to an incremental program, which limits the number of firms and types of businesses that can be influenced to increase their R&D. **This is an argument for retaining the 125% Tax Concession**.

As well as the inherent unpredictability of the research expenditure timing, some firms fund their R&D through internal purchases of services by other divisions, meaning that the amount of R&D that will be invested in a year is not known or planned in advance.

Protection against artificial structuring requires that incremental entitlements are also limited by the R&D of all firms in a related group. In groups where there is no close coordination of R&D expenditure, it can be difficult for any one firm to predict whether the total group R&D will entitle it to the increment.

Firms most able to benefit from an incremental scheme are those that are able to predict access. These tend to be those that have stable research budgets, are planning very large increases, are single entities, have research with predictable outcomes and have many multiple projects to be able to even out the timing variations.

Maintaining appropriate incentives

The nature of an incremental scheme can lead to artificial structures or timing of R&D investment by firms in order to maximise government subsidies. This structuring, as well as limiting the gains in additionality, can also result in unwanted distortions in company research decisions, encouraging firms to bring forward or hold back research.

The complex protections required to minimise such distortions can add to the administrative burden and prevent widespread company participation. The first four years of R&D Tax Concession data of Australia's **175% Premium suggests that it has stimulated additional R&D expenditure in a select group of firms (especially larger firms) while successfully balancing protection of revenue with administrative burden. This has been possible because of measures including the three-year averaging and company grouping provisions.**

Access by start-up firms

The proposal to give immediate access to start-up firms would create opportunities for firms to artificially structure their R&D to establish a lower base than otherwise. The current use of a three-year history not only establishes a more accurate average of the company's 'normal' R&D expenditure and it limits misuse of the scheme through financial structuring. The 175% Premium element has provision for firms to use R&D Start or Commercial Ready grant histories to qualify, and many of these are start-ups.

International Experience with Incremental Schemes

R&D Tax programs of some other countries include incremental tax credits. Policy discussions with these countries have reaffirmed that incremental programs are not without significant challenges.

Only one country, the US, has chosen to stay with an incremental only tax credit/concession. In 2003 Japan moved away from an incremental scheme to a volume based credit (with a higher rate for those with R&D intensity over 10%). From the beginning of 2006, France has supplemented its incremental scheme with a proportion of volume-based support. Korea and Spain, like Australia, have both volume and incremental elements to their schemes with Ireland also having both, depending on the type of expenditure. Most nations use a volume-only approach including Canada and the UK.

Which R&D tax regime is most efficient and effective in a particular country depends on a number of factors. These include industry concentration, industry structure, and general taxation arrangements applying to companies, the level of global engagement and the like. Simple comparisons of elements of schemes in different countries can be misleading. For example, some countries have both federal and state subsidies.

However, the reason for changes to schemes in other countries can throw light on issues such as high administrative costs for government, high compliance costs for firms, and the risk of creating incentives for strategic behaviour such as company restructuring to maximise entitlements. These issues are relevant to the design of a tax regime that is optimal in terms of maximising R&D outcomes and minimising costs and welfare losses.

An Incremental Scheme based on R&D Intensity

The proposal to base additional R&D on R&D intensity rather than just R&D expenditure history has been considered previously. It was introduced in *Backing Australia's Ability* (2001) but subsequently replaced by a volume based scheme following strong industry representations about its negative impact on growing firms.

Difficulties with an intensity-based scheme include:

- It would reward losers i.e. those whose turnover fell;
- It would offer no reward for spending more on R&D;

- It would penalise firms that are growing;
- It would reduce predictability for firms who are price takers or where sales vary independently to R&D; and
- It would encourage off-shoring, e.g. manufacture in China while keeping R&D in Australia.

The use of research intensity increases the difficulty for firms to plan and predict their entitlement and hence limits the number of firms that can be induced to increase R&D. For example, a research manager who had negotiated a $1 million increase in R&D on the basis that it would attract the 175% Premium might find at the end of the year that due to a surge in the prices or volumes of the company's product (as a consequence of external factors), the turnover had increased. This would mean that there was no increase in R&D intensity, and hence there was no entitlement to the Concession. There may also be unpredictability about R&D costs, adding further to uncertainty for firms.

Intensity measures also have limitations when faced with different stages of a company's lifecycle: during early stages companies would generally be advantaged once they produced sales, and disadvantaged during a mature stage with high sales. An R&D intensive start up company that is not yet producing sales would have difficulty qualifying for a concession.

It is possible that an intensity based measure may be more practical for these large firms which have a more stable R&D and turnover. The draft finding does not recognise however that the R&D for these firms is often funded from overseas headquarters, rather than within Australia.

DITR does not support a single date as the base to calculate additional R&D intensity. The high degree of year to year variation precludes this being a fair or accurate measure, and it would encourage company restructuring of R&D timing to establish an artificially low base.

R&D expenditure is unpredictable and sporadic, and external factors can impact on sales; together these two factors make intensity a weak incentive for additional R&D.

Beneficial ownership of Intellectual Property (IP)

DITR sees merit in the Productivity Commission's recommendation to enable firms that hold their IP offshore to receive support only for incremental R&D. This is a trade-off between stimulating additional R&D expenditure in Australia, possibly lower spillovers where royalty income flows overseas, and the contention that MNEs generally engage in higher quality and more innovative investment than smaller companies.

Basing MNE research projects within Australia provides an added gateway for the Australian researchers and firms to access the bulk of research knowledge and technical skills being develop overseas. They can also provide a gateway for high technology Australian firms to enter the global marketplace. This applies for both the 125% and the 175% Tax Concession.

However, the specific wording of the finding in the Report needs to be more precise as the concept of "beneficial ownership" is the prime mechanism for determining the exact recipient of tax deductions across the whole concession, not just for the issue of foreign owned firms. It also is one of the key compliance protection measures and should not be changed more broadly.

Commercial Ready (draft finding 9.2)

DITR does not agree with the Report that competitive grant programs such as Commercial Ready provide greater scope to target socially valuable R&D projects that would otherwise not proceed. Nor does it agree that this scope is compromised by an undue focus on commercialisation objectives.

Commercial Ready is a competitive grants program which supports the innovation activities of small and medium sized companies (SMEs). The Commercial Ready program was introduced in 2004 and was designed to incorporate the successful elements of the R&D Start Program, the Biotechnology Innovation Fund and the Innovation Access Program. Its establishment reflected concern about the number of programs and that insufficient support was being provided to take the research to commercial reality, for small firms. DITR considers the Report's recommendation is at odds with the program's key objective.

Applications for Commercial Ready are assessed by panels of impartial and independent industry specialists according to the selection criteria:

- management capability;
- the commercial potential of the project;
- the technical strength of the project and the technical capabilities and resources available to the applicant;
- the extent to which the project is likely to provide national benefits; and
- the customer's need for funding.

The Commercial Ready has not increased its focus on commercialisation. The focus of Commercial Ready is to support R&D, proof-of-concept and early stage commercialisation, and support does not extend to later stage commercialisation activities such as sales, marketing or promotion, the benefits of which are more easily appropriated by the firm.

Commercial Ready provides benefits to the economy by supporting projects of Australian SMEs which have the potential to successfully bring their product to the market but which also must demonstrate the need for funding to satisfactorily progress their project. As such it aims to support additional activity.

Commercial Ready assessment screens out projects that would proceed in the absence of public support. It only provides matching grants where this can successfully market products of national benefit. (Attachment A has the National Benefits Policy.)

Post project data which is starting to come in on the predecessor scheme, R&D Start, suggests the competitive grant scheme can generate significant benefit, with 69% successfully commercialised after one year, most companies obtaining smaller grants retaining the majority of staff employed on the project, median value of IP generated from the projects of the order of $6-20 million, and significant numbers of collaborations and subsequent ventures being generated.

Feedback from industry indicates that support for early-stage-commercialisation is needed. Indeed, submissions to the Productivity Commission noted that Commercial Ready is a useful granting program which addresses Australia's current level of private sector R&D and helps to build research capacity, including health and medical research capacity.

The Commercial Ready program will be formally evaluated in 2007-2008 when 3 clear years of data are available. Some program improvements have already been made (turnover thresholds and payment arrangements) as a result of consultation with program clients and other feedback, as noted in the DITR submission to the Study. (DITR 2006).

In the overview, the Report uses the Commercial Ready Program as an example for a focus on later-stage commercialisation. DITR believes this is an inaccurate characterisation and recommends the removal of this example from the overview.

Repayable grants for innovation

The Report has asserted that a greater reliance on repayment and benefit-sharing mechanisms (such as that used in the Pre-Seed Fund program) would provide more effective incentives in commercialisation programs. The Report notes that a number of countries, including Japan, Germany, Israel and Sweden, have introduced innovation grant schemes which require firms to repay at least the value of the grant in the event of commercial success.

DITR has a number of concerns with implementing a repayable loans scheme based on experience with having delivered a loan element in R&D Start. **Repayable grant (loan) schemes pose commercial and administrative problems:**

1. They generally impose **high administrative costs** related to scheme design, compliance monitoring and enforcement over a long period of time. The high administration costs are required as an on-going relationship with the company is necessary to continually assess the commercial success of the project to be able to determine when repayment (if any) should commence. Some projects may take over 10 years before a decision can be reached concerning its commercial success. If repayment is required it may take many subsequent years for payments to be completed.
2. The definition of success is also challenging and would require a set of additional criteria to be developed. Key issues in this regard relate to the subjectively of such criteria – this of courses adds to the complexity of such schemes.
3. Success-based repayable grants create **incentives for strategic behaviour by firms such as technical failure of projects, constraining of profits or**

moving offshore — such behaviour would reduce the returns to the scheme and have efficiency costs

Repayable grant schemes that adequately address these difficulties are not likely to be easy to design and implement.

DITR favours the approach used in its venture capital equity programs. The Innovation Investment Fund operates on the basis of repayment based on commercial success. The Fund is required to repay the amount provided by Government when funds are obtained from successful exits. Note that the IIF is carefully designed so that the actual commercial assessment of the firms and their management capability, along with the processing, and exiting of investments is conducted by qualified private sector experts, with significant investment funds at stake.

The repayable grant issue might be better considered in a whole-of-government context, as the Productivity Commission did in its 2001 Inquiry into Cost Recovery by Government Agencies. (PC 2001)

Automotive competitiveness and investment scheme (ACIS)

The PC Report has questioned the impact of the ACIS program but acknowledges that the support provided by R&D and other incentives need to be weighed against the economic benefits to Australia associated with the transition to a lower automotive tariff regime.

To ensure that the final report is more complete with respect to programs for this sector, the Department provides the following updated information about recently announced changes to the Motor Vehicle Producers (MVP) R&D Scheme to give effect to the Supplier Development Program.

The MVP R&D Scheme was established as part of the extension of ACIS announced in December 2002 and was to provide $150 million to encourage R&D in the automotive industry. The MVP R&D Scheme has held two rounds and grants worth $142.8 million have been allocated to the MVPs. In consultation with the industry, the Minister decided that no more rounds would be held and that the leftover $7.2 million would be used to establish a Supplier Development Program (SDP).

The objectives of the Supplier Development Program are twofold:

1. To enhance the capabilities of Australian automotive component suppliers, through a program of extended support and mentoring, to be delivered by MVPs; and
2. To enable automotive component suppliers to more effectively identify and secure emerging opportunities in international supply chains.

The initial focus of the program will be concentrated on the implementation of enhanced supplier capability development and support arrangements to be initiated by the MVPs. This will involve individual MVPs working with nominated component suppliers to identify priority areas for capability development, which will extend beyond existing development activities.

Collaboration (draft finding 9.5)

The Report finds a case for a complement to the CRC program which assists broader collaboration goals through support for smaller, shorter and more flexible arrangements between groups of firms either independently or in conjunction with universities and public research agencies. DITR notes the importance the BCA places on strengthening collaboration between the many contributors to innovation (BCA 2006), and this is affirmed in the DITR analysis of ABS Business Innovation surveys.

The ABS (ABS 2006) has found that, for innovating businesses, 76% of ideas or information for innovation activity coming from internal sources, 70% from market sources, and only 8% from institutional sources including public sector research agencies. Collaboration between firms is aligned to increased innovation outcomes.

If the rules of the current CRC program were changed to focus it more on public good, DITR would support the establishment of a complementary program for business: this program would assist collaboration goals through support for smaller, shorter and more flexible arrangements between groups of firms either independently or in conjunction with universities and public research agencies.

The Department notes that the R&D Tax Concession and the Commercial Ready program both generate collaborative activity, amongst firms and between firms and research bodies. The programs lead to new collaborations with universities or public laboratories in approximately 50% of firms, and to new collaborations with other companies in approximately 65% of firms. The Pharmaceuticals Partnerships Program (P^3) also provides strong opportunities for on-going collaboration as does the Industry Cooperative Innovation Program (ICIP). DITR has supported intermediaries such as the InnovationXchange and through TechFast (DITR 2006), to assist firms, particularly SMEs, find relevant technology and technology development partners.

Performance evaluation and reporting arrangements (draft finding 7.1)

The Report found that, while performance evaluation and reporting arrangements have developed significantly in recent years, there are examples of major deficiencies.

Measuring program impact is essential for informing whether the policy settings are right and the performance of the initiative/program is satisfactory. DITR supports, in general terms, the Report's proposed criteria for performance evaluation and reporting arrangements.

DITR draws the Commission's attention to the Key Performance Indicators (KPIs) that have been set for each program administered by the Industry Research and Development Board. These KPIs are attached to the Board's submission to the Issues Paper for this Study (IR&D Board 2006). Board programs using these KPIs include the R&D Tax Concession and Commercial Ready. **The five categories of KPIs —**

knowledge creation, human resources, finance, collaboration and market outcomes — will provide some consistency across programs and Australian Government departments in the collection of key output data.

DITR's evaluation of programs is undertaken every 3 years. Evaluation surveys of recipients of the Tax Concession are based on effectiveness, appropriateness and efficiency of the program, including the satisfaction rate of recipients. **A substantial upgrade of Departmental program data management systems for monitoring and evaluation purposes of the R&D Tax Concession program will begin in 2007 and allow the Department to measure accurately the performance of the program.**

DITR notes also that the design for the evaluation of the Low Emission Technology Demonstration Fund will be undertaken in 2007 with an assessment of the economic and environmental benefits of funded projects to be included in that task.

DITR supports the use of longitudinal studies to help identify the extent, nature and duration of program impacts. A current example is the longitudinal study of the COMET program. This involves a series of interviews with firms, starting from the time they receive the grant.

DITR also uses ongoing feedback on program delivery to guide incremental improvements between formal program evaluations. This has occurred for Commercial Ready. A further example is the ongoing analysis of the delivery of the COMET program, which has also resulted in program changes. For example, an issue was raised by stakeholders in relation to eligibility of companies spun out of university and other public sector research organisations (PSRO). The issue related to changes to the organisational structures of certain PSRO commercialisation arms which could make them ineligible for COMET funding. Recognising the Government's policy to encourage and promote commercialisation of public sector research, the COMET Program Guidelines have been amended to ensure that all PSRO-related applicants are eligible to apply for COMET funding.

DITR supports the ongoing strengthening of performance evaluation mechanisms to ensure accurate and appropriate targeting of Government support.

References

Australian Bureau of Statistics (ABS) (2006), *Innovation in Australian Business 2005*, Catalogue 8158.0, December 2006

Australian Government (2006a), *Private Health Insurance Amendment Bill*, Explanatory Memorandum, tabled December 2006, at http://parlinfoweb.aph.gov.au/piweb/view_document.aspx?ID=2539&TABLE=EMS)

Australian Government (2006b), *Report of the Taskforce on Reducing Regulatory Burdens on Business - Final Government Response,* August 2006

Australian Industry Group (AiG) (2006), *Manufacturing Futures − Achieving Global Fitness* http://www.aigroup.asn.au/aigroup/pdf/publications/reports/general_reports/ Manufacturing_futures_full.pdf

Australian Taxation Office (ATO) (2001), *Changes effective from 1 July 2001*, http://www.ato.gov.au/individuals/content.asp?doc=/content/10692.htm&page=35, accessed 15 December 2006

Business Council of Australia (BCA) (2006), *New Pathways to Prosperity: A National Innovation Framework for Australia*, November 2006

Bureau of Industry Economics (BIE) (1995), *Beyond the Firm: As assessment of business linkage and networks in Australia*. Research Report 67. Australian Government Publishing Service. Canberra

Centre for International Economics (CIE) (2003), *The review of the R&D Tax Concession program*

Confederation of Finnish Industries (2006), paper presented to Conference on Services and Innovation, October 2006

CPA Australia (2006), "Understanding Growth Firms - the role of the finance professional in management transition", results of CPA/DITR project, unpublished.

Department of Education, Science and Training (DEST) (2003), *Mapping Australian science and innovation: main report*

Department of Industry, Tourism and Resources (DITR) (2005), *The R&D Tax Concession — Impact on the Firm*, DITR, Canberra, http://www.industry.gov.au/ assets/documents/itrinternet/RandD_Tax_Concession_116_Firm_Study_Report20051 214092802.pdf

DITR (2006), *Submission from the Department of Industry, Tourism and Resources to the Productivity Commission Study into Science and Innovation*, at http:www.pc/gov/au/study/science/subs/sub093.pdf, accessed 30 November 2006

DITR (2007a), *How R&D Assistance Influences Company Behaviour*, due out in January 2007

DITR (2007b), *Expanding business R&D investment: the 175% Tax Premium*

Global Entrepreneurship Monitor (GEM) (2006), *Global Entrepreneurship Monitor 2006 Results*, at http://www.gemconsortium.org/download/1168555248453/Final%20Results%20Report_2006.pdf

Industry Research and Development Board (IR&D Board) (2006*), Submission to the Productivity Commission Research Study on Public Support for Science and Innovation*, August 2006, at http://www.pc.gov.au/study/science/subs/sub077.pdf , accessed 19 December 2006

Intellectual Property Research Institute of Australia (IPRIA) (2005), *R&D and Intellectual Property Scoreboard 2005*

LOCOMonitor: http://www.locomonitor.com

OECD (2005a), *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* (3rd Edition)

OECD (2005b), *Enhancing the Role of SMEs in Global Value Chains: Australian case study on automotive, precision instruments and tourism industries* CFE/SME

OECD (2005c), *Governance of Innovation Systems*

OECD (2006a), *Innovation and Knowledge-Intensive Service Activities*

OECD (2006b), *OECD Reviews of Innovation Policy: Switzerland*

OECD (2006c), *Draft Synthesis Report on Global Value Chains* DSTI/IND/STP/ICCP

Prime Minister's Science, Engineering and Innovation Council (PMSEIC) (2001), *Commercialisation of Public Sector Research*, Seventh Meeting, 28 June 2001

Productivity Commission (PC) (1998), *Design Principles for Small Business Programs and Regulations*, Staff Research Paper, AusInfo, Canberra, August 1998

PC (2001), *Cost Recovery by Government Agencies*, Inquiry Report No.15, 16 August 2001

PC (2006) *Public Support for Science and Innovation,* Draft Research Report, November 2006

Taskforce on Reducing Regulatory Burdens on Business (Banks' Taskforce) (2006), *Rethinking Regulation: Report of the Taskforce on Reducing Regulatory Burdens on Business*, January 2006, available at

http://www.regulationtaskforce.gov.au/finalreport/regulationtaskforce.pdf, accessed 19 December 2006

UK Department of Trade and Industry (UK DTI) (2002), *The Government's Manufacturing Strategy* http://www.dti.gov.uk/files/file25266.pdf , accessed 20 November 2006

ATTACHMENT A

Australian Government
Department of Industry
Tourism and Resources

Industry Research and Development Board

National Benefits Policy

IR&D Board Operating Policy

Policy No. 01: National Benefits

Note: In addition to R&D Start, the principles of this policy apply to some other IR&D Board programs.

When dealing with applications and agreements for projects, the Board is required to have regard to national benefits, 'benefit to Australia', and 'exploitation to the benefit of the Australian economy'.

This policy sets out features to which the Board will give consideration when assessing these benefits under the R&D Start Program Ministerial Directions, including applications to vary commercialisation plans. This policy should be read in conjunction with *Evaluating National Benefit – a guide for R&D Start applicants*, which provides further advice to applicants about developing their case on national benefit.

1. Each case is considered on its merits and the onus is on applicants to substantiate their claims regarding National Benefit. Set out below (in order of relative importance) is a list of the sorts of matters which the Board can have regard to in doing so:

a) National productivity and economic growth

The potential of the project R&D and its commercialisation to:

- contribute to export development and import replacement.
- contribute to the development of strategic industry clusters.
- improve the efficiency, competitiveness and productivity of Australian industry (for example, through the development or adoption of new technologies or processes).
- create or sustain, in a timely fashion, a competitive advantage to Australia that will be hard to replicate elsewhere.
- lead to the establishment of new Australian industries, or generate significant new value adding operations, with associated significant new employment opportunities.

b) Diffusion of knowledge, skills and know-how to other parts of the Australian economy.

The potential of the project R&D and its commercialisation to result in:

- development and release for the use of other firms and research organisations of a platform technology (such as a technology which can be used as the basis for the operation of other applications or technologies)
- development of Australia's skills base in areas of comparative and competitive advantage.
- national and international collaboration with research institutions, customers, suppliers and/or competitors; and strong linkages, including internationally, between those doing the project and others with complementary skills.
- development of a field or area of research not currently well represented in Australia, but which will enhance, through complementarity, Australia's overall indigenous innovation capacity (for example, emerging technologies).

c) Societal, community and ecological benefits

The potential of the project R&D and its commercialisation to:

- address a social, health or environmental issue prevalent in Australia.
- directly enhance national and/or resource security.

d) "Flow on" economic benefits

The potential of the product, process or service resulting from the project to:

- benefit final consumers (for example, produce finished products of higher performance, higher quality and/or lesser expense).
- improve a supply chain by, for example, producing higher performance, higher quality and/or cheaper inputs for industries which constitute a large proportion of the Australian economy.

e) Any other matters which the Board finds relevant

2. Although the Board also has regard to whether or not the commercialisation of the project will take place in Australia, it is conscious of the fact that benefits to Australia can be derived from research and development work which is commercialised overseas. Set out below (in order of relative importance) is a list of the sorts of matters which the Board can have regard to in considering the extent to which Australia would benefit from a project where commercialisation takes place overseas:

a) Benefits of overseas commercialisation of project R&D

As reflected in the project commercialisation plan, overseas commercialisation is reasonable when it will result in:

- the maintenance of Australia as the home base for future R&D, manufacture or product development.
- an increase in the number of the company's Australian-based employees.
- Australian residents receiving commercial compensation through royalties, licence fees, equity, dividends or outright sale.
- ongoing development of the commercial outcomes arising from R&D activities involving domestic and/or international collaboration with other firms and/or research organisations.

b) Benefits of overseas production of products, processes and services resulting from the commercialisation of project R&D

As reflected in the project commercialisation plan, overseas production is reasonable in two circumstances:

(i) <u>in cases where local production is demonstrably uneconomic on grounds of cost, the Board will consider:</u>

- the level of commitment to retaining or enhancing the company's R&D facilities in Australia.
- the degree of globalisation of the relevant industry sector.
- the relative input costs to production as identified by the company.
- the relative transport costs as identified by the company.
- the relative costs of skilled labour as identified by the company.
- legal barriers to entry to foreign markets.
- any other factors it finds relevant.

(ii) in cases where production or commercialisation demonstrably requires close physical interaction with overseas companies, customers, suppliers and competitors, the Board will consider:

- the level of commitment to retaining or enhancing the company's R&D facilities in Australia.
- the mechanisms established to disseminate knowledge and market intelligence from overseas to the company's Australian operations.
- the industry norms in terms of proximity.
- the level of competition in the industry sector and the need to innovate quickly.
- the nature of inputs which require close contact (for example, perishables or knowledge).
- any other factors it finds relevant.

3. Projects are audited and progress against the claims set out in the case for National Benefit will be monitored regularly. The onus is on applicants to substantiate their claims regarding National Benefit, and the extent to which forecast National Benefit has been achieved when variation to an existing agreement to allow overseas commercialisation and/or production of project R&D is sought. If the National Benefit objectives are not achieved, the Board may terminate the project agreement and require the company to repay the grant or loan received.

Last Reviewed: May 2004

EVALUATING NATIONAL BENEFIT

A guide for R&D Start applicants

The R&D Start program aims to stimulate business R&D activity that:

- *without Government support, would not otherwise be undertaken; and*
- *provides benefits to the Australian economy and the broader community that justify the cost of R&D Start support.*

National benefit and your application

In order for your application to be successful, you must submit a business case to the Industry Research and Development Board demonstrating:

- how your proposal is likely to deliver benefits to the Australian economy and broader community; and
- that these benefits justify the cost to the tax payer of the R&D Start grant or loan.

Your business case should also confirm the viability of the project, which may be done, for instance, by either a short description or reference to the project's strategic or business plan.

What constitutes national benefit?

Successful R&D projects can benefit Australia in a variety of ways, including:

- Improved national productivity and economic growth;
- The diffusion of knowledge, skills and know-how to other parts of the Australian economy; and
- The generation of societal and community benefits.

How to establish your case

Your business case should clearly spell out how your project will benefit Australia. For example, are the results of your project likely to create new jobs, make Australian industry more internationally competitive or improve Australia's skill base?

Listed below are some questions and dot points to think about when you are developing your business case:

Will your project improve national productivity or lead to economic growth? Examples of when R&D and its commercialisation are likely to improve national productivity and lead to economic growth include:

- The R&D and its commercialisation are likely to improve the efficiency, productivity or competitiveness of Australian industry;
- The R&D and its commercialisation are likely to lead to the establishment of new Australian industries and/or generate significant new employment opportunities;
- The R&D and its commercialisation are likely to create or sustain in a timely fashion a competitive advantage to Australia that will be hard to replicate elsewhere;

- The R&D and its commercialisation are likely to result in new exports or import replacement;
- The R&D and its commercialisation are likely to contribute to the development of strategic industry clusters (i.e. a concentration of related or complementary businesses with active channels for business transactions, communications and dialogue that share specialised infrastructure, labour markets and services);
- The R&D and its commercialisation are likely to provide a higher quality or cheaper input for industries that constitute a significant proportion of the Australian economy; or
- The R&D and its commercialisation are likely to lead to the introduction of new technologies and value adding operations.

Will your project result in the diffusion of knowledge, skills and know-how? Some common means through which R&D projects result in knowledge diffusion include:

- Contributions to the development of Australia's skill base in areas in which Australia is likely to have a comparative advantage;
- The development and release of a platform technology (i.e. a technology which can be used as the basis for the operation of other applications or technologies);
- The adoption of new technologies and processes, and the knowledge and research underpinning the development and use of those technologies, by other firms;
- National and international collaboration;
- Strong linkages, including internationally, between those doing the project and others with complementary skills;
- Researchers' interpersonal networks (eg. sharing new knowledge as a result of researchers discussing their work with others at conventions, meetings of their professional association, publication of papers); or
- Labour mobility (eg. the movement of staff between organisations as a result of consultancy work or staff turnover).

Will your project result in societal, community or ecological benefits? For instance, through:

- Improved standards of living;
- Positive environmental impacts;
- Improved national and/or resource security; or
- Improved occupational health and safety.

Who, other than your own firm, is your project likely to benefit - and how? For instance:

- Your industry (through, for example, access to new knowledge or technologies);
- Your local community (through, for instance, the generation of new and higher value jobs); or
- Firms lower down the supply chain (through, for example, the development of a cheaper or higher quality input).

Further information

For further information, please contact your Customer Service Manager.

ATTACHMENT B

Errors of fact/Corrections

The Department would like to point out some corrections to material in the draft report.

Intellectual Property

Page 5.1: would be more correct to refer to "experimental use exemption provision" rather than "experimental use provision.

Annex N Intellectual property system

There are a number of minor factual errors in Annex N to the report:

- Table N1, page N2 – an innovation patent does not require a new use of an invention. It requires a substantial contribution to the working of an invention.
- Second last line of page N2 – the 12 month grace period is between disclosure of research and filing of complete patent application.
- Footnote 1, page N2 – while certain rights accrue from the priority date, a patent is only enforceable after grant, but can be enforced back to publication of the patent application.
- Page N3 first line – annual patent fees are generally payable from the fifth anniversary of filing the patent application (regardless of whether the application is accepted).
- Footnote 2, page N7 – plant breeder's rights are administered by IP Australia, not by DAFF.
- Page N8. ACIP and IPRIA are not agencies. The Advisory Council on Intellectual Property (ACIP) is an independent body appointed by the government, and advises the Federal Minister for Industry, Tourism and Resources on intellectual property matters and the strategic administration of IP Australia. The Intellectual Property Research Institute of Australia (IPRIA) is a national centre for multi-disciplinary research on the law, economics and management of intellectual property. It is based at the University of Melbourne, and is run jointly by the Faculty of Law, the Faculty of Economics and Commerce, and the Melbourne Business School.

Fitness-for-purpose of some data that underpins report analysis/findings

While the achievement of Geoscience Australia's outcome (refer to 1b) frequently involves the application of first-class innovative geoscientific research, we draw to the Commission's attention that whole-of-government data collated by DEST/ABS that the Commission uses to underpin its own analysis of direct government support for

innovation and science/R&D) includes this program, which is surprising given Geoscience Australia:

> is neither fully, nor partially, funded through the Australian Government's innovation program, and
>
> is not classified as a PFRA/PFSA; and
>
> neither undertakes research/investigation as a primary objective; nor pursues commercialisation/other initiatives that restrict its ability to ensure the geoscientific data, information and knowledge in its custodianship is widely, readily and freely available to the Australian community(i.e. it is not a R&D program).

The Commission's report would appear more robust if readers were provided an assurance that the Commission had examined the *fitness-for-purpose* of the data that underpins its findings (i.e. an analysis based on stated assumptions/data is easier to defend than the same analysis based on unexamined or erroneous assumptions/data — given the length of the report it is difficult to understand why such details regarding the appropriateness of such data for the purposes used by the Productivity Commission is not provided).

Table 10.1 - Australian Government funding for Public Sector Research Agencies, is an example of questionable data that the Commission uses to underpin its findings. In this case, we draw to the Commission's attention that:

- not all Bureau of Meteorology (BoM) funding is captured in table 10.1, which appears to be correct given:

  > only a small percentage (i.e. less than 10%) of BoM's total funding is captured — funding that is clearly identified as being BoM's Research Centre funding;

- government funding of research-activities undertaken by several agencies/part-programs involved at the interface between science and policy/program delivery (e.g. Bureau of Rural Sciences) are not included in the table

  > if such funding is to be excluded from the table, then so too should Geoscience Australia funding;
  >
  > if the "R&D" funding for such agencies needs to be included in the table, then definitional consistency is also required, otherwise the table's total amount will not be robust.

- all of Geoscience Australia's funding is captured within table 10.1, which appears to be incorrect given:

  > Geoscience Australia is not an R&D program (ref 9c above); and
  >
  > similar to many other agencies (e.g. BoM and BRS) — and even if the differences between R&D and R&/orD are overlooked and/or a much broader definition of research is adopted — not all of the program's funding is used to fund research.

If the Commission decides not to remove the funding data related to the Geoscience Australia program from data it uses to underpin its findings, then funding data relevant to several other government programs/activities should be added to relevant

datasets to ensure a more consistent treatment in the whole-of-government funding data that underpins the Commission's analysis.

While, for reasons given above, Geoscience Australia funding should not be included within the whole-of-government data used to underpin the Commission's analysis of public funding for the Australian Government's innovation program, PFRA/PFSA's or R&D, funding for the Geoscience Australia program is clearly of relevance to the report.

Accordingly, it is suggested that funding for the Geoscience Australia program should be drawn together with funding for other Australian Government programs that have either been erroneously incorporated or omitted from underpinning data used in the draft report, and analysed as whole-of-government funding of other government programs that are also involved in initiatives of direct, or indirect, relevance to the Commission's study.