Background material

Innovation - Unlocking the future

Background material to the Final Report of the
Innovation Summit Implementation Group

August 2000

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Introduction to background material

This background material is provided for those interested in obtaining further information on recommendations put forward by the Innovation Summit Implementation Group in their final report, *Innovation-Unlocking the future.*

The background material should be read in conjunction with *Innovation-Unlocking the future* which is available at www.isr.gov.au/industry/summit/.

National Innovation Summit

More than 500 participants assembled in Melbourne in February 2000 for the National Innovation Summit—a joint business and Government initiative. Participants spent two days brainstorming and exchanging knowledge and experiences. The Summit culminated in a package of 140 recommendations designed to enhance Australia's innovation system.

Innovation Summit Implementation Group

At the conclusion of the Summit, Senator the Hon Nick Minchin, Minister for Industry, Science and Resources, and Mr Campbell Anderson, President, Business Council of Australia, signed a public communiqué identifying the broad settings needed to make Australia 'an international high achiever'. The Innovation Summit Implementation Group was established to take the Summit recommendations forward. The Group was asked to refine, assess and prioritise the Summit recommendations.

Innovation-Unlocking the future

Innovation-Unlocking the future is the final report of the Group. It puts forward 24 recommendations, an estimate of costs for each of these recommendations, and the parties responsible for driving them forward. The recommendations fall into three main themes: culture; generating ideas; acting on ideas. The report presents the recommendations in chapters which reflect these themes.

Background material

Background material: Innovation-Unlocking the future presents information which the Group utilised to refine, assess and prioritise Summit recommendations. The material is set out in the same order in which it appears in the final report.

For ease of reference, the same chapter and section headings have been used in both the final report and in this background material.

Tracking of Summit recommendations

Summit participants and other readers may be interested in reviewing the material provided with a view to tracking the Group's treatment of specific Summit recommendations. In order to assist readers in this regard, two tables have been included with this material.

Table A will assist readers identify the source recommendations of the Group's recommendation. This table contains a list of the Group's recommendations, together with the corresponding Summit recommendations that were refined, assessed and prioritised as part of the underlying analysis conducted by the Group for each of their recommendations.

Table B lists in numerical order, each of the 140 Summit recommendations, cross referencing each back to the recommendations of the Group.

Further information

Further information about the National Innovation Summit, the Innovation Summit Implementation Group and electronic copies of its final report *Innovation - Unlocking the future* can be found at www.isr.gov.au/industry/summit.

Background to 'Creating an ideas culture'

This background material was utilised by the Group in its decision making process and should be read in conjunction with the final report of the Innovation Summit Implementation Group, *Innovation-Unlocking the future.*

Innovation awareness

People's attitudes are critical if we are to create an innovation culture. We must create an environment that fosters new ideas, encourages the development of entrepreneurial talent, rewards initiative and risk-taking, and builds the desire for a shared vision and direction. This recommendation aims to create the necessary environment for an innovative culture to thrive and prosper.

Qualifying the need for action in this area is difficult. Any research into culture and attitudes is necessarily vague, as it is more of a *feeling* or subjective opinion than a recordable or quantifiable fact. Nevertheless, there have been some studies which have attempted to highlight the characteristics of an 'innovative culture'. In these surveys, Australia appears to lag behind many countries around the world.

Droege and Comp [1] conducted a worldwide study on what they considered to be the barriers and success factors of innovation, surveying the managers of companies in 16 countries on whether their company had these factors. Topics included whether managers felt they judged their future development positively and had clear visions, whether they had a clearly defined innovation strategy, and whether they had a clear structure to their cross-border innovation processes. In all these areas, Australian managers scored behind the United States, Europe and Asia.

Another study on international competitiveness concludes that the entrepreneurial expertise of our managers lags behind five countries—including Japan, the United Kingdom and the United States—in areas including entrepreneurial skills, willingness to take advantage of new business, willingness to take financial risks, initiative in making friends with business people from another country, and creativity in generating new business advantages[2].

While these studies do not directly test the culture of innovation in Australia, they suggest that Australian managers may not be prioritising innovation - shown through activities like investment in research and development, seeking to establish relationships with overseas partners, and having a long-term vision of the development of their businesses.

The Group considers that awareness of innovation and its associated benefits is the key to improving our innovation performance. The Group thus recommends creating and implementing a strategy which:

- encourages, promotes and rewards innovation, across all sectors of the Australian community with an emphasis on learning in schools and universities, and attitudes in research organisations and all business; and

[1] *Worldwide Study on Innovation Management—Australian edition*: *Barriers to Success Factors of Innovation*, Droege and Comp. 1999.

[2] Enterprising Nation: Renewing Australia's managers to meet the challenges of the Asia-Pacific century, *Report of the Business Taskforce on Leadership and Management Skills*, April 1995, page 111.

- develops an entrepreneurial culture in Australia which both rewards and supports the innovators.

The major themes for this recommendation include:

- Business - Promote the importance of innovation to their future growth.
- Economy - Increased exports, job creation, creation of manufacturing and knowledge infrastructure and higher standards of living.
- Children - Teach young people that innovation and entrepreneurship will be the key to creating wealth for them in the future.
- Education/skills - Promote innovative teaching in the education system at all levels.
- Research - Promote and adopt a broader definition of innovation.
- Community - Encourage the Australian community to be proud that Australia is an innovative, smart country with entrepreneurial innovators who will be wealth generators.
- Government - Enjoin all Australian Governments to build on the current policy settings to encourage innovation.

In forming the recommendation, the Group considered the following relevant issues:

- A major attitudinal change is required in the Australian community at large. Promotional campaigns aimed at increasing awareness and 'culture change' in the past have taken up to eight years to make a real difference. Examples of these would include anti-smoking campaigns and encouraging Australian drivers to wear seatbelts.
- Significant activities are currently undertaken at both a Commonwealth and State level including government support programs, education/skills training, innovation/entrepreneurial award systems and innovation councils. Current initiatives which support innovation include Commonwealth and State Government programs, State innovation councils, the Cooperative Research Centres Committee, the Industry Research and Development Board, business-based activities and the Prime Minister's Science, Engineering and Innovation Council (PMSEIC).
- This recommendation aims to strategically link the existing initiatives to a national vision with a coordinated set of complementary outcomes.
- The key to the approach will be the creation of a framework which is flexible enough to accommodate existing initiatives of governments and business, but also provide an umbrella for delivering additional activities at a national level.

Recommendation 1

To raise awareness of innovation as a driver of technological and economic competitiveness, business and government lead a National Innovation Awareness Program involving:

- *a national, broad-based public relations campaign involving advertising, documentaries and showcase programs;*
- *leadership (a call-to-action) from the heads of government and business and also the media generally; and*
- *provision of incentives and rewards for innovation champions.*

Cost: $5 million per year over five years.

Responsibility for action: Business, government, education and training institutions and media.

Young Entrepreneurs

A supportive culture is crucial to innovation and it is essential to that we build this culture in the youth of Australia, so that they may bring these ideas and enthusiasm into the future.
We need to recognise the value and worth of Australia's young entrepreneurs and build networks and structures to support our high achievers. This is a joint responsibility of business and Government.

The Group recommends that a program for young entrepreneurs be designed to support the further education and business development potential of young people aged 15-24 with a demonstrated interest in enterprise, design and innovation. It is the intent that business would lead this program. The broad objectives would be to capture young people's interest in and enthusiasm for entrepreneurship; to recognise and reward achievement; to build networks and support structures among high-achieving young entrepreneurs; and to enlist the active support and involvement of industry in fostering young entrepreneurial talent.

This program would draw on initiatives such as the Young Achievement Australia Business Skills Program[3] and the Young Entrepreneurs' Organisation[4], but focus on a broader membership base. The program would have a prime focus on mentoring, facilitation and expert support. At the practical level, activities supported could include innovation displays, exhibitions and competitions; workshop sessions run by specialist business facilitators; and evening and holiday programs offering opportunities for young people with similar talents and interests to share their ideas and learn from each other. Some funding could be provided to underwrite industry participation in such programs, subject to a matching contribution and commitment from industry itself.

Recommendation 2

Drawing on the Young Entrepreneurs' Organisation and other similar programs, business, in conjunction with the Commonwealth Government, develop a program to enhance entrepreneurial skills of young people.

Cost: $5 million per year, over five years from the Commonwealth Government, with business matching this support in kind.

Responsibility for action: Business and Commonwealth Government.

Fostering an entrepreneurial culture through educational institutions

Educators in schools, vocational education and training (VET) institutions and universities play a significant role in developing the skills, creativity and entrepreneurship of their students. Without leadership in this area, Australia will lose ground.

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[3] Young Achievement Australia (YAA) is an independent, non-government, not-for-profit organisation administered by a board of trustees and has been operating since 1977. Run over 16-24 weeks, the YAA Business Skills program brings together 12-25 senior secondary or tertiary students with three to five advisers (mentors) from business and industry. With guidance from program manuals, the students experience all the stages of the business cycle and are responsible for all business processes involved in developing and marketing a product or service.

[4] The Young Entrepreneurs' Organisation (YEO) is a global, non-profit organisation based in the United States. Five Australian cities have YEO chapters. YEO supports its members and their companies through a range of educational and networking opportunities. Membership is by invitation only and limited to those people under 40 years of age who are a founder, co-founder, owner or controlling shareholder of a business with gross annual revenues exceeding US$1million.

Yet, according to the Prime Minister's Science, Engineering and Innovation Council (PMSEIC)[5], many teachers are not well equipped to achieve this goal—many have had little or no recent contact with business or with innovative enterprises. Teachers and educators need opportunities for self-improvement and enhancement of their own skills and knowledge of what innovation and enterprise is all about.

Then they will be better positioned to weave innovation into curricula and teaching practice. A supportive culture is crucial to innovation. A high-quality research system and excellence in applications development are both vitally important in their own right, but will only produce successful innovation if supported by a culture that promotes experimentation and rewards enterprise.

A lack of a strong entrepreneurial culture in Australia has seen some promising opportunities being lost to Australia. Our conservative attitudes to risk have often limited our horizons and closed off avenues for successful commercial development. So too has our lack of recognition and reward for successful enterprise, and our tendency to play down some genuine competitive strengths – such as Australia's excellence in many fields of science and basic research. A more confident and enterprising culture is needed if we are to lift our national performance in innovation.

Our education system has a vital role to play in this regard. Second only to family, it exercises a strong influence on attitudes and culture from the earliest years of a young person's life. Education also has a major role to play in developing effective foundation skills, employment-related competencies and a capacity for ongoing learning; in promoting generic skills such as flexibility, communication and teamwork; in presenting positive role models of successful enterprise and innovation; and in encouraging a constructive rather than defensive attitude to change.

To prepare lifelong, adaptable and flexible learners, schools, vocational education and training (VET) institutions and universities need to be learning, innovative organisations in their own right. Specifically, they need to be open to new methods of teaching and learning; to be willing to take well-based risks; to engage strategically with business and industry and regional communities; and to capitalise on the benefits offered by information and communications technology to the delivery of education and training.

Business and industry also have a key role to play in supporting educational institutions to develop such an entrepreneurial culture. Effective partnerships between education institutions and their local communities will require the active support and engagement of business.

Recent reforms.

At the school level, the *National Goals of Schooling for the 21st Century* adopted by all Education Ministers in April 1999 give specific expression to the importance of enterprise skills, adaptability to change and positive attitudes to lifelong learning. Building on these goals, Ministers have more recently commissioned work to develop a *New Framework for Vocational Education in Schools,* of which Enterprise and Innovation studies will form an integral part. The report on this work is due to be presented to Ministers in August 2000, with a view to implementation of agreed measures in the 2001 school year.

Upper secondary school curriculum has been reformed to cater better for the large numbers of students neither interested in nor suited to a university education. Australia-wide, the number of

[5] Prime Minister's Science, Engineering and Innovation Council '*Ideas for Innovation*' Occasional Paper no 2 (1999)

students participating in “VET in Schools” programs has risen more than five-fold since 1995, from 26,000 in that year to 136,700 in 1999. Increasingly, moreover, the base of these studies is being broadened beyond narrow vocational training of the job-specific kind towards a new emphasis on vocational learning in schools.

The major growth in demand for VET in Schools programs has generated strong impetus for schools and businesses to forge new partnerships at the local level. Commonwealth funding has been important in stimulating these developments, as has the work of the Australian Student Traineeship Foundation and industry organisations such as the Australian Chamber of Commerce and Industry and the National Farmers’ Federation. The scope for further development of such partnerships is currently a focus of examination by the Youth Pathways Action Plan Taskforce, which is expected to report to the Government in August this year.

In the field of enterprise education specifically, there are some outstanding examples of effective strategies and successful practice. The Group noted the achievements recorded under South Australia’s *Building High Performance Enterprising Communities* strategy, which is gaining recognition internationally as a leading example of innovation in school-based enterprise education. Other jurisdictions also are showing an increasing willingness to experiment with creative approaches to enterprise education based on new forms of school organisation, educational delivery and partnerships with industry.

At the post-school level, as in schools, significant advances have been made in building closer relationships between educational institutions and industry and in promoting a more entrepreneurial culture within the institutions themselves. Universities are now far more efficient in their operations, more entrepreneurial in their management practices and more outward-looking in their relationships with the community and business than was the case ten years ago. For example, several universities have recently developed special courses and units in entrepreneurship and entrepreneurial management. In addition, the national training reform agenda of recent years has given industry a much stronger influence over the operations of the vocational education and training system.

Government policies and programs (both State and Commonwealth) have been an important influence in shaping these developments and supporting their implementation. For example, the Commonwealth’s *Enterprise Education in Schools* program and its successor, the *Enterprise Education Programme* fund support for VET in Schools and transition education programs.

Directions for future reforms

Despite this progress, much remains to be done to maintain the momentum behind recent reforms.

Several key constraints limit the capacity of education and training institutions to develop the enterprising skills of their students and to promote constructive changes in social attitudes and cultures.

One key constraint to developing the enterprising skills of students is the datedness of the skills of many teachers, their unfamiliarity with new technology, and their lack of knowledge of modern industrial practice. The speed of changes in technology and industry has left many teachers feeling uncertain and ill-prepared to deal with issues such as enterprise and career education, which presuppose an ability to forge an effective dialogue and working relationship with local business.

Likewise, while there are many notable exceptions, significant numbers of teachers feel ill-equipped to make effective use of information and communications technologies for educational purposes. In both respects, *a major program of teacher professional development* is essential.

Enterprise and Innovation Scholarships

Many teachers have had little or no recent contact with industry generally, let alone with innovative enterprises. Teachers and educators need to be aware of the skills, knowledge and attributes sought by innovative enterprises so that these requirements can be reflected in curricula and teaching practice to produce optimal student learning outcomes. A new program of *Enterprise and Innovation Scholarships* would encourage practising teachers to take up structured workplace learning opportunities with innovative businesses, and provide opportunities and financial support for them to do so.

The Group recommends that the Commonwealth Government establish a program of Enterprise and Innovation Scholarships offering opportunities for practising teachers to gain industry experience with innovative businesses. Funding of $25 million per annum would be made available over four years, beginning in calendar 2002, providing 1,000 scholarships (covering some 4% of Australia's total teaching force) annually of six months' duration each. Scholarships in the field of science and technology should be accorded a high priority. There would need to be a strong commitment of support from industry to provide the necessary work placements for teachers.

Business will play an important role—if business embraces this program and provides opportunities for teachers to gain experience in innovation at work, then Australia as a whole will benefit.

Recommendation 3

To build business and enterprise skills in schools, government and business support a new program of Enterprise and Innovation Scholarships for teachers to take up structured workplace learning opportunities with innovative businesses.

Cost: $25 million per year for four years, shared between the Commonwealth Government, State and Territory Governments with business to provide placements.

Responsibility for action: Commonwealth Government, State and Territory Governments, business and education institutions.

Online learning

Developments in information and communications technology offer huge potential to transform teaching and learning through new forms of curriculum design and delivery. Around the globe, firms and institutions, often working in complex alliances, are investing heavily in the development of online education markets, particularly in relation to adult learners. Studies such as *The Business of Borderless Education* and initiatives such as *Universitas 21* have highlighted the need for Australia to become a strong player in this highly competitive new environment. To be successful, we will need to draw on our competitive advantages in instructional design, underpinning courseware and multimedia and be prepared to collaborate across State and national borders and industry sectors.

ISIG considers it important that Australia capitalise on the educational benefits that recent developments in information and communications technology make possible. Priority attention should be given to online content development in the schools sector, for reasons both of scale and maximum educational impact. At the subject-matter level, both science education and

enterprise education should command a high priority within *a comprehensive program of online content development for Australian schools*.

Online Content Development for Australian Schools

The Commonwealth and State/Territory Governments are collaborating to establish a framework which will support the development of a substantial body of high-quality courseware for Australian schools. The framework will establish policy agreements on matters as diverse as how material would be shared, research about online learning, standards and protocols for interoperability relating to intellectual property and technical standards, the mapping of curriculum concepts and outcomes across jurisdictions, quality assurance criteria, and an assessment of the feasibility of establishing a national portal to host online curriculum developments. A key objective is to stimulate the development of a vigorous and competitive online educational content market in Australia.

The project will build on a pilot being undertaken in Victoria to develop online science curriculum materials as well as content development work in other States and Territories. These activities will provide the basis for the development of quality online curriculum courseware in a range of priority areas such as literacy and numeracy education, science and vocational education in schools, technical literacy and enterprise education. In recognition of the potential for industry development, and with a view to promoting competition and attracting new developers, Education Ministers have agreed that work on the development of online content should be tendered out and be open to both public and private sector interests.

These developments will require a major commitment of resources over a period of several years, but the benefits should amply repay the investment. States and Territories have the prime responsibility for action, but national collaboration and national leadership from the Commonwealth will also be vital. Commonwealth funding in this area should be matched by at least an equivalent contribution from the States and Territories collectively.
The Group considers that funding for this initiative could be utilised for developing suitable online material for schools, the vocational education and training system and for higher education. It is envisaged that funding would be utilised for such items as:

- Developing online curriculum content;
- Establishing technical standards and intellectual property/rights management framework;
- System architecture and interface;
- Market models and pilot projects for stimulating public/private online content market;
- Developing flexible learning resources for special needs group;
- Developing good practice applications for online student services;
- Online access to research publications through national site licenses; and
- Developing online courses in areas where Australia has strong research and teaching capability and reputation in international markets, eg marine science, some fields of medical health and agricultural sciences and metallurgy;
- Developing online content in courses of high demand matched to skill shortages, information technology and bioinformatics; and
- Developing online content for subjects of low enrolment to maximise student choice.

Recommendation 4

To ensure that students have access to innovative learning environments, develop online curriculum materials in the education and training sector. A high priority should be given to the development of innovative online materials to support a number of curriculum areas, especially in science, technology and business education.

Cost: $200 million over four years shared between the Commonwealth Government and State and Territory Governments.

Responsible for action: Commonwealth Government and State and Territory Governments.

The need for high-quality teaching

Teacher education needs to be at the forefront of the cultural change process, preparing teachers who are not only enterprising in themselves but who will be able to inspire a spirit of enterprise and creativity in their students. The Group noted that one constraint relates to the *initial preparation of teachers in our universities.* As part of this process of cultural change, there needs to be a stronger recognition in teacher education courses of the value of vocational learning options relative to traditional, university-oriented studies; a more systematic provision of opportunities for teacher trainees to gain some practical experience in a modern industrial setting; and possibly, also, the introduction of a mentoring program for newly graduated teachers, designed to assist and support them through their early years of teaching.

There is a need to reward excellence in teaching and research through *career structures and remuneration arrangements* which serve to attract and retain high-quality staff. Both in schools and at the tertiary level, current remuneration arrangements and career structures are outmoded, limiting and a deterrent to excellence, promoting uniformity rather than diversity and doing little to reward genuine quality in teaching and research. Relative to other professions, there appears to be little in these current arrangements which would attract a talented young person to a career in teaching. ISIG regards it as an urgent national priority to restore the status and respect which a teaching career once enjoyed in the Australian community.

The state of *science teaching in Australian schools* is another cause for concern. Standards of science teaching are often variable at best; many science teachers have indicated that they would opt for another career if given the choice; and too many students leave school without even a rudimentary understanding of scientific principles or the place of science in society.
A further constraint relates to *the organisation of schools themselves*. In too many cases, under present arrangements, inflexible central regulations and rigid school timetables restrict the ability of schools to provide meaningful learning experiences beyond the ‘traditional’ curriculum.

Related barriers are the restrictive tertiary entrance requirements which apply to school leavers; limitations on the movement of teachers between school, TAFE and industry; and, in some cases, a lack of industry support and understanding of the partnerships which schools are seeking to create. New models of school governance are needed which will allow schools a greater degree of autonomy and flexibility in setting educational priorities according to locally determined needs.

Another important constraint relates to the limited resources made available for enterprise and career education programs in many schools and, in some cases, the marginal or “supplementary” status which is accorded to these activities. Action is needed to strengthen the institutional arrangements, and associated support structures, which underpin a successful program of enterprise education. Too often at present the initiative for such programs relies upon the enthusiasm and commitment of a handful of dedicated teachers, who succeed despite the lack of systemic resources at their disposal. Much could be achieved by a range of relatively simple

measures: for example, by a clearer recognition of the status of enterprise and career education within institutional and educational structures; by the development and maintenance of suitable professional development resources, including quality online curriculum materials; and by a structured program of opportunities for enterprise skills development and contact with industry.

Quality teachers are vital to the educational process and, indirectly, to the performance of Australia's innovation system. It is, therefore, disturbing that significant questions continue to be raised about the quality of teaching in many Australian schools, and about the quality of science teaching in particular.

This is a complex issue to which there is no single or simple answer. Broadly-based strategies are likely to be needed to achieve any significant and lasting improvements. Those strategies would need to involve, for example, the reinstatement of teaching as an attractive and rewarding career option for talented young Australians; improvements in the quality and design of initial teacher education courses; a major commitment to the professional development of the current teaching force; and the development of incentives and career structures which properly reward excellence in teaching.

A wide-ranging review of teaching in Australia would thoroughly examine these and related issues. The focus would be national, but the review would draw upon the findings of current and recent State-level inquiries into teacher education. The review should be conducted and completed within a year, with results widely publicised as a basis for action.

Recommendation 5

Conduct a national review to recommend strategies to re-establish teaching as an attractive and rewarding career option for young Australians, to improve the quality and design of initial teacher education courses, to upgrade professional development for practising teachers, and to promote better incentives and reward structures for excellence in teaching.

Cost: $2 million for one year.

Responsibility for action: Commonwealth Government, State and Territory Governments and education institutions.

Strengthening Australia's skills base

A high-quality skill base is the *sine qua non* of a dynamic, knowledge-based economy. The quality of our skill base, and of the knowledge systems which support it, will largely determine how well as a country we can grasp – and create – new opportunities for technical change and innovation. It will also influence how quickly and effectively our businesses can capitalise on the benefits of new technology and use them to advantage in global markets.

Australia operates increasingly in a globalised economy, and its skills need to be competitive internationally. The quality of our skill base will significantly influence the perceptions of the international community – foreign investors, skilled migrants and currency markets alike – as to Australia's standing as an advanced economy and innovative society.

The quality of a nation's skill base depends crucially on the level and quality of its investment in education and training. For individuals as for societies and economies, a high standard of basic education is not only an invaluable asset but increasingly an economic necessity: those who leave school without effective skills are likely to struggle in the labour market and to face major problems in their future lives. Moreover, the completion of 12 years of formal schooling alone is often not enough: as industry structures change and the skill level of employment rises steadily, a tertiary qualification is increasingly important to entry and success in many occupations.

Governments have a key role to play in these respects: in establishing effective policy frameworks for education and training; in providing student income support and other forms of assistance to those who most need help; in ensuring that students leave school with high-level foundation skills, effective pathways to employment and a capacity for lifelong learning; and in providing access to high-quality professional and vocational education at the tertiary level. 'Skill' is a multi-dimensional concept that is as much about personal attributes as it is about learning, knowledge and qualifications.

Whilst strong technical skills are obviously vital, the so-called 'soft skills' of problem-solving, effective communication, teamwork, self-management and a global mindset are also becoming increasingly important. Individuals with a broadly-based mix of skills – both 'hard' and 'soft' - will best be able to translate innovative ideas into applications and value.

Reflecting significant growth in access and participation at all levels of education and training, Australia's skill base has strengthened markedly over the past 20 years or so. On the latest figures, more than 80 per cent of all 22 year-olds have either completed Year 12 or obtained a post-school qualification; more than half of 25-34 year-olds have achieved some form of post-school qualification; and one in five 25-34 year-olds hold a university degree or equivalent qualification. Over the past five years there has also been a rapid rise in the number of New Apprentices in training, with strong growth in training at higher qualification levels. On all of these measures there have been dramatic improvements since the early 1980s.

Against international benchmarks, Australians now participate in education at rates higher than the OECD average in all age groups; among adults, Australia's participation rates are among the highest in the world[6]. It is reasonable to argue, in these terms, that Australia's skill base is – at least potentially – a source of national strength and comparative advantage.

These quantitative measures tell only part of the story, and important issues have been raised – at the Innovation Summit and elsewhere – about the quality, content and distribution of our education and training efforts. Thus employers have expressed concerns about the adequacy of graduates' skills in creativity, oral business communications and problem solving[7]; there are questions about the balance of priorities between different parts of the school curriculum and different disciplines at the tertiary level; and concerns have been raised about the responsiveness of educational institutions to changes in economic and social needs. There is room also to question whether industry is making the best and most productive use of the knowledge and skills at its disposal.

Skill Shortages

Questions such as these have become more pressing in recent times as concerns have mounted at the emergence of skill shortages in the Australian labour market. Skill shortages and inappropriate skill sets may affect the capacity of industry to carry out research and development and to conduct knowledge-based business in an increasingly competitive global environment. They may thereby represent a significant constraint on investment.

Skill shortages are currently concentrated in a relatively narrow range of professional occupations and in a broader range of trades occupations, notably in the engineering, automotive, electrotechnology, construction and hospitality industries. Probably the most serious shortage, for the threat it could pose to industry growth and investment, is the significant deficit of skilled IT&T professionals – a development by no means confined to Australia.

This shortage has emerged despite major growth – more than a doubling – in the output of IT&T graduates from Australian tertiary institutions over the past 10 years. The primary cause of the shortage lies in the explosion of demand for IT&T-based skills associated with the rapid surge in IT applications across all sectors of the Australian economy; one-off factors such as Y2K and the GST have added to those underlying pressures.

Within the education and training sector itself there is evidence of significant shortages of information technology, mathematics and science teachers, particularly in rural and regional Australia. This is an obvious cause for concern from the viewpoint of our future innovation performance.

Skill shortages are the result of a complex array of labour supply and demand factors, with the recent strong performance of the Australian economy a key contributing factor. Also relevant are changes in demographic structure, wastage both during training and from subsequent employment, cyclical fluctuations in labour demand, emerging demands of new technology, obsolescence of older skills and regional mismatches. Many of these factors are difficult to predict, and do not lend themselves readily to policy intervention.

However, other factors also may be contributing to the current situation, including slow responses by industry and the education and training system to changes in demands for skills; growing pressure on existing infrastructure for education and research; inadequate incentives for teaching staff; and increasing financial pressures on both education institutions and students.

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[6] *Education at a Glance* (OECD, 2000)

[7] Employer Satisfaction with Graduate Skills (DETYA, 2000)

Australia continues to be a net gainer of skills through migration, despite the net outflow of long-term residents in certain occupations, including the sciences. Movement by skilled people reflects the international nature of the labour market for skills. Those skills most in demand in Australia are also keenly sought after by our competitors overseas. In this sense, migration cannot be seen as a quick or easy fix for problems of skill shortages in Australia.

Policy Responses

These various issues and concerns have been recognised by education and training policy-makers over recent years, and measures have been undertaken to address them.
For example, there has been major progress in instituting a comprehensive national approach to the testing and reporting of literacy and numeracy standards in Australian schools; in improving accountability for school performance; and in reforming the upper secondary education curriculum to cater better for the majority of students who have no aspirations to proceed directly to a university education.

In vocational education and training there is an increased number of publicly funded places and new pathways for learners, with closer linkages between schools, VET and industry. In higher education, a wide array of initiatives have been put in place to foster closer linkages between universities and industry, including the Science Lectureships Programme, the Co-operative Research Centres program and the Strategic Partnerships with Industry – Research and Training (SPIRT) scheme. Again, the recent National Skills Initiative and the decision to establish an IT&T Skills Exchange are both direct responses to industry concerns about the growing shortage of skills.

Industry has expressed its strong support for most aspects of existing national policy frameworks for education and training, and is committed to working with governments to consolidate and build upon progress to date.

However, this is not an argument for complacency. While Australia already has in place much of the framework required to enhance innovation through its skill base, a great deal remains to be done to maintain the momentum behind the policy reforms of recent years and to advance and accelerate their implementation. Five particular areas of priority should be noted.

One is the action discussed previously to *develop a more enterpreneurial culture within our education and training institutions*, thereby enhancing their ability to contribute to cultural change more broadly. Action will be needed on a broad front to promote the spread of enterprise education in schools; to update the skills of many existing teachers; to reform initial teacher education; to review school governance arrangements; and to integrate enterprise and career education far better into the mainstream of a school's educational programs. Young people need a better understanding of the post-school opportunities open to them and of the importance of continuous investment in skills and learning.

Second, a concerted effort is needed to *strengthen the quality assurance frameworks at all levels of the education and training system*, and to support those frameworks with effective mechanisms of accountability, monitoring and public reporting. A commitment to quality and high standards of achievement will be fundamental if our education and training system is to contribute fully to enhancing our national performance in innovation. Recent Government decisions are consistent with that objective, but effective implementation will be vital. Quality will also need to be supported by an adequate level of investment in education and training.

Thirdly, existing *partnerships between education, training, industry and the community need to be developed and strengthened*, and new partnerships formed to enhance skills development and

innovation. Much has already been achieved in this respect – especially in the vocational education and training sector – but a more effective dialogue is needed between universities and industry to promote a common understanding of emerging changes in demand for skills and the appropriate educational responses to those changes. The work of bodies such as the Institution of Engineers, Australia and the Minerals Tertiary Education Council provide a useful model in this regard. Important also will be the work of the new IT&T Skills Exchange in the vital area of IT&T skills development.

A fourth area for action relates to our *national policy framework for lifelong learning*. A commitment to continuous learning and skill development will be an essential ingredient for success in a knowledge-based economy and, while Australia rates very well in international comparisons in this area, more needs to be done to promote a national culture of lifelong learning. It is clear, for example, that much of the adult training currently provided by industry is directed to those with high levels of initial education and training. Large numbers of adults currently in the workforce left school early with relatively minimal skills, and receive very limited opportunities for further training within an employment setting.

Participation in training will be boosted where there are clear benefits to employers, in the form of increased productivity, and to trainees, in the form of higher future wages. From this perspective the flat lifetime earnings profiles evident in many skilled occupations, and especially in the skilled manual trades, may represent a deterrent to ongoing skill acquisition. If this is so, it will be important that employers use the greater flexibilities now available to them under the *Workplace Relations Act 1996* to reward individuals for their increased productivity and value in the workplace as a result of their participation in further education and training.

There is also *a strong case to boost direct employer investment in education and training*, particularly by small businesses. There are persistent indications that employer engagement in training is not as strong as it could be, and that many (mainly smaller) employers still regard training principally as a cost rather than as an investment.

Put simply, businesses, especially small businesses, will not participate actively in training if they do not see value in doing so. The challenge for the education and training system is to engage with these small businesses in ways which demonstrate that training can offer practical business solutions.

As part of a comprehensive policy on lifelong learning it is also important to consider the *incentives bearing upon individuals to invest in their own education, training and skills development*. For example, while the overwhelming bulk of undergraduate courses are publicly funded with access to HECS, students undertaking postgraduate degrees by coursework in publicly funded universities or courses at any level in the emerging private higher education sector are typically required to pay up-front, full-cost fees. This may well act as a deterrent to many prospective students.

Last but not least, Australia needs to remain *competitive in the global market for skills and talent*. In order to continue to attract high-quality migrants and retain its own skilled people, or draw them back after a period overseas, Australia needs to remain a desirable place to live and work. This in turn requires globally competitive remuneration structures, research facilities of international repute, and opportunities for challenging work together with promotion of Australian lifestyle benefits.

Migration itself has a small but useful part to play in meeting specific skills shortages. The level of the skilled (permanent) migration programme was boosted to 40,000 in the last federal Budget, with a 5,000 contingency reserve, and there is unlimited scope to recruit specialist skills under long-term temporary entry arrangements. There may be potential for some further fine-

tuning (eg. more flexibility in family reunion provisions) to streamline migration arrangements and increase our attractiveness as a destination for highly skilled migrants.

Responsibilities for action will be shared among a wide range of parties, including governments, both State and Commonwealth; education and training systems and authorities; industry and employers; and individual schools, VET institutions and universities, working with their local communities. As in other areas the Commonwealth will need to play a key role both in national leadership and in the provision of resources for those matters within its own direct sphere of responsibility.

The Group recommends three specific measures to strengthen the national skills base and respond to urgent national skills shortages - firstly to address skills shortages, secondly to enhance the innovation and commercialisation education available to students, and thirdly to make personal investment in self-education more attractive.

Targeted Funding to Address Skill Shortages

There is a strong case for targeted action to increase the supply of high-level skills in key areas of shortage.

In response to industry and student demand, each university has traditionally determined the mix of disciplines it offers and the allocation of students into these areas. However, skills shortages have emerged in several areas, such as mathematics and information technology, which are critical to a knowledge economy. In order to increase the responsiveness of the higher education institutions to changes in demands for skills, universities could be invited to compete for targeted funding for additional places in priority areas of skill shortage. The Commonwealth would meet half the costs of these additional places, with industry contributing the remainder either in cash or in kind.

These additional places would help to reduce the estimated 30,000 jobs in IT and related areas which the industry claims will remain unfilled over the next five years (noting that the main skill shortages relate to the retraining needs of the existing workforce, and that the level of unmet demand for undergraduate IT places is of the order of 1,500 each year). The competitive tendering process, together with the requirement for matched funding from industry, would help to address industry concerns about the current quality and relevance of university level training, especially in the IT and related areas. It would also reward those universities willing to respond to those concerns by developing innovative programs well geared to industry needs.

The costs to the Commonwealth of this proposal are estimated at $5.8 million in 2001-02; $16.1 million in 2002-03; $24.1 million in 2003-04; and $30.4 million in 2004-05. These estimates assume a unit cost per student place of $11,200 (the average cost of IT and related programs under the current relative funding model, including the HECS loans provided to students), with an equal sharing of costs between the Commonwealth and industry (ie, $5,600 each).

Recommendation 6

Provide an additional 2 000 student places per year from 2002 for degree programs in areas of skills shortage, such as in mathematics, information technology and related areas, with the Commonwealth Government to meet half the costs and business to match this contribution. Allocate places by competitive tender, with a strong emphasis on quality and innovation in course content and design.

Costs: $5.8 million in 2001-02, $16.1 million in 2002-03, $24.1 million in 2003-04, $30.4 million in 2004-05 and $30 million per annum thereafter each from business and the Commonwealth Government.

Responsibility for action: Business, education institutions and the Commonwealth Government.

Networking business and S&T students

There is benefit in universities adapting their curricula to reflect more strongly the current demands and realities of the knowledge-based economy by providing access to commercially-oriented material and opportunities.

Too few students have access to concepts of innovation during the training years before embarking on careers. A recent study by AC Nielsen Research indicated that employers perceived the greatest skills deficiencies in new graduates to be creativity and flair, oral business communications, and problem-solving.

In some universities, science and engineering students do not receive education in the commercialisation of technology, and few business students are exposed to the concept that wealth is increasingly driven by innovation. Only a minority of science research students are exposed to industrial and commercial aspects of research, through CRCs and collaborative research, although engineering students do complete substantial periods of work placements. In order to increase exposure to the commercial world, science and engineering students should be able to access formal or informal studies in commercialisation and related business practice.

To maximise the impacts of such courses, the best students should be drawn into such programs on a selective basis with suitable funding. Participation should not be mandatory as part of achieving a science degree.

To broaden the outlook and usefulness of MBA courses, students should have access to campus projects on science and engineering topics. This could be facilitated by the Innovation Centres proposed in recommendation 17.

Linking new graduates with industry is also an important mechanism for technology transfer and skills development. Linkages may be promoted by placing postgraduates in industry as part of their research training and by providing work experience opportunities for undergraduates.

Programs such as the Australian Postgraduate Awards (Industry) component of the SPIRT Scheme (Strategic Partnerships with Industry - Research and Training), R&D Start Graduate and the Co-operative Research Centres (CRCs) go some way towards achieving this. Streamlining and improved resourcing would help to make a bigger impact.

Recommendation 7

Training in innovation and commercialisation to be made available and accessible to all university students, especially for final year and postgraduate students in business, science and engineering.

To link new graduates with business, the Commonwealth Government should undertake a full review of business/industry placement programs. The aim would be to develop a new program more attractive to graduates and business using the United Kingdom's Teaching Company Scheme as a model.

(Cost: $15 million over five years)

Responsibility for action: Commonwealth Government to provide funding, universities and other higher education institutions to develop curriculum and course modules.

Boosting Personal Investment in Education and Skills Development

There is a need to improve incentives, and remove barriers, to personal investment in education, training and skills development. For example, the requirement to pay full-cost, up-front fees for many postgraduate coursework degree courses represent a clear potential barrier for many students.

Such disincentives could be alleviated by an extension of the current HECS scheme to cover these cases, or alternatively by the introduction of a more general scheme of income-contingent loans for tertiary students. There may also be a case to review existing taxation arrangements as they apply to personal investment in skills and learning. Under current taxation law, expenditure on self-education is allowable as a deduction only where it clearly and directly leads to the generation of additional skills or income in a person's current occupation of employment. This could be broadened to facilitate the acquisition of skills for career change.

Recommendation 8

Extend the scope of current income contingent loan arrangements under the Higher Education Contribution Scheme arrangements (for example, to include some post-graduate courses to which the scheme does not currently apply), or introduce a more general scheme of income-contingent student loans, to remove disincentives to personal investment in education and training. At the same time, review current tax deductibility provisions relating to self-education expenses.

Cost: dependent on outcome of review.

Responsibility for action: Commonwealth Government.

Measuring innovation

Australia's competitiveness depends upon its ability to participate in the global transformation that is rapidly restructuring economies and changing the way business and governments operate. The importance of innovation as a driver of growth in this knowledge based economy is well accepted by governments around the world.

Measures of innovation performance are vital to inform public debate on the impact of innovation on growth and to guide governments in the development of policies to encourage innovative activity. Appropriate statistics on Australia's innovation performance are also needed to promote Australia as a new, innovative economy and correct international market perceptions that Australia is an 'old' economy.

Innovation is a much bigger concept than R&D. To assess a country's innovation performance requires the measurement of a broad range of quantitative and qualitative factors, including education, patents, intangible assets and venture capital availability. Innovation measures will

need to be forward looking and dynamic to capture these changing drivers of firm level competitiveness.

The Price Waterhouse Coopers' report on *Growth and Innovation: A Global Perspective* concluded that the focus on innovation is no longer restricted to products. The report found that the prime focus will be on innovation in the management of customer relationships and that innovation in services, the use of IT, internal processes and financial management all rated ahead of product innovation. Other relevant measures could include human resource policies and investment in intangible assets more generally.

There is a need to improve information on innovation in the services sector and to develop indicators that measure the outputs of Australia's innovation efforts. Traditionally, most innovation statistics have focused on the input side. Developing output measures is a difficult task which has taxed the minds of experts internationally. A cost effective approach to the development of statistics in these new areas will require us to draw on international experience, both government and private, on both the data and its means of collection.

Australia has a long history of developing innovation statistics and is expected to continue to help shape international collections. The Innovation Summit reinforced this but raised the need for a more strategic approach to the collection and reporting of innovation statistics.
Public policy development can only be effective if the measures used to assess performance accurately reflect the changing drivers of knowledge based competitiveness. OECD efforts to develop a consistent methodology for the collection of innovation data resulted in the innovation surveys conducted by the ABS in 1993-94 and 1996-97.

At this stage the Australian Bureau of Statistics (ABS) has not committed itself to conducting any further OECD innovation surveys. This raises concerns that trend data will be interrupted and that this will affect Australia's image as an innovative, knowledge-based economy and impede the development of appropriate industry policy. ABS has technical concerns with the OECD methodology and the results.

There is already much relevant data being collected and the expectation is that this will continue. Although the collection of innovation data by the ABS is guided by a user advisory group, this group is small by ABS user group standards and is composed entirely of representatives of the ABS and Department of Industry Science and Resources (ISR). The Group recommends that the user advisory group be upgraded to an Expert Panel, involving other stakeholders such as academics, industry and other Commonwealth and State government bodies. Through our consultation with stakeholders we have received a number of expressions of interests for participation in the Panel.

The primary responsibility of the Expert Panel would be the development of a National Innovation Data Strategy, over a six month period. The strategy would determine a broad definition of innovation appropriate in a knowledge based economy, address the information needs of users, identify gaps in information, examine a range of methods of collection and reporting, including private sector benchmarking services (relevant benchmarking is being undertaken by leading consultancy firms), and surveys of expectations relating to innovative, enterprising activity (eg the Forrester surveys relating to e-commerce). As part of this process, the Panel would also investigate the merits of conducting any further innovation surveys based on the OECD methodology.

Should the Expert Panel recommend the continuation of the OECD innovation survey process, this will also require further funding, as well as ABS commitment to conduct the surveys. Past surveys were jointly funded by the ABS and AusIndustry. Costs have been estimated at $1.3 million over three years.

The Panel would develop an agreed definition of innovation, examine the development of more output measures, assess how to measure innovation in the services sector, explore sectoral approaches to the measurement of innovation, and examine options for benchmarking Australia's performance internationally. Their role will also include addressing emerging measurement needs.

The Panel would assess the possible development of output-based innovation indicators (eg. number of start up companies, revenue from newly released products) to supplement the current input-based measures.

The Panel would examine the costs and benefits of options for collecting quantitative and qualitative indicators. It would also examine alternative approaches to data collection, analysis and reporting.

Indicators would be published in regular analytical reports, including a new biannual report benchmarking Australia's performance internationally as an innovative, knowledge-based economy. Other reports would be produced regularly in accordance with the data strategy. The Expert Panel would review the National Innovation Data Strategy annually to reflect the complex and dynamic nature of economic growth and innovation. After three years, the effectiveness of the Expert Panel and the Data Strategy will be evaluated to ensure that relevant data is being collected, reported, analysed and is being used as an input into government policy development.

Recommendation 9

To enhance our measurement of innovation outcomes, the Australian Bureau of Statistics Advisory Panel be upgraded to an Expert Panel, to provide ongoing strategic guidance on innovation data collection and reporting.

Cost: $300 000 per annum.

The Expert Panel develop a National Innovation Data Strategy to recommend ways forward. Recommendations could include reinstating the innovation survey based on OECD methodology.

Cost: $1.3 million over three years.

Responsibility for action: Commonwealth Government and business.

Intellectual capital and intangibles on balance sheets

The fundamental objective of financial reporting is to provide information for the purpose of efficient and effective decision making. Consequently, any material activity/event that is likely to affect a firm's current financial position or its future performance should be reflected in its financial statements.

In the knowledge economy, there is less emphasis on traditional assets, such as financial capital and physical facilities, and more on an entirely new classes of assets, intangibles such as knowledge and relationships. Conventional accounting practices still largely measure only the value of financial and physical assets. There presently exists no adequate accounting techniques for determining and reporting the value of intangible assets such as human capital, intellectual property, business infrastructure, brand names, databases and relationships with customers and suppliers.

If intangibles are not reflected in the balance sheet, and intangible investments are fully expensed as they are undertaken, both the earnings and book value of equity will be understated by conventional accounting practices. This makes it practically impossible for investors, especially individuals, to:

- accurately assess the rate of return of investment in intangibles, and changes over time in the efficiency of the firm's investment activity;
- evaluate shifts in the characteristics of intangible investments, such as a move out of research; and
- determine the value of a firm's intangible capital, and the expected lives of such assets.

The recommendation aims to improve the reporting of intellectual capital (IC), and associated innovation "intangibles" by including what can be on the balance sheet and by developing a framework to report other intangibles which cannot be included on the balance sheet. Better reporting of intangibles will enable investors and/or shareholders to make more informed investment decisions and allow for a more efficient allocation of resources in the economy. It will also improve the management decisions of Australian companies, as they would have a greater knowledge of what is driving their growth and competitiveness.

If the appropriate measurement of IC indicates that the market rewards those companies which invest in intangible assets (including R&D), then intangible investment will increase. Additionally, if the market rewards those companies which are innovative, this will raise the profile of innovation and make it a more acceptable business outcome. An indication of the benefits of the recommendation may be found in Hall (1998) who examined the relationship between market value and R&D (used here as a proxy for IC). Hall suggests that current investment in intangibles (ie R&D spending in current year) is capitalised into the market value at a rate between 2.5 and 8. A study by Bosworth and Rogers (1998) shows that raising R&D expenditures by $1 million would raise the market value by 0.75%, or if the firm had the median market value, it would raise the market value by $2 million.

The Group was aware that it would not be feasible to mandate reporting of all IC on the balance sheet. A more realistic goal is for better reporting of IC and intangibles, including an accounting framework for disclosure of intangibles. This means including on balance sheets, those intangibles which can be included - whilst developing a framework which will allow consistent reporting of intangibles that cannot be included on the balance sheet. Given the need for a more complete information set for investors, the use of this framework would be mandatory for companies listed on the ASX - for other, private, companies this would be voluntary, based on the information requirements of each company's Board.

The Group, through its consultations, became aware that processes aimed at developing a more consistent framework for reporting intangibles are underway. The Group recommends that these actions be bolstered.

The Group recommends that the Commonwealth Government to formally engage the Australian Accounting Standards Board (AASB), the Australian Stock Exchange and the Urgent Issues Group produce interim guidance on Intangible Assets and in due course an Australian accounting standard for reporting on intangible assets. The Financial Reporting Council (FRC) would be involved in this work.

The Group also recommends that research by the Department of Industry, Science and Resources be sent to both the AASB and FRC when it is completed. This research examines the role that IC plays in driving organisational success in the knowledge economy. This research also examines whether capital markets are appropriately rewarding the external reporting of investments in IC.

The Group anticipates that the AASB will prepare a discussion paper on this recommendation and invite comments from all key stakeholders with a view to issuing an Australian accounting standard on intangible assets approximately 6-12 months later.

The Group also envisages that the UIG would develop a consensus on the appropriate reporting of intangible assets and that the ASX would issue a directive requiring listed companies to include in either the Directors' report, or the financial report, a statement, or other information, on intangibles consistent with the UIG consensus.

Recommendation 10

Enhance recognition of the significance of intellectual capital and other intangible assets. Business and the Commonwealth Government should work with regulatory authorities to develop adequate reporting techniques for intellectual capital.

Responsibility for action: Business and the Commonwealth Government.

Learning for Australia's Future

At the National Innovation Summit, the Institution of Engineers, Australia volunteered to carry forward the ideas and proposals of the Education and Skills Base Working Group. The Institution has prepared a discussion paper on the future development of human capital, lifelong learning, and the implications for Australia's education and training effort.
When considering the 'necessary revolution' in learning, the Institution acknowledges that Australia's future learning systems will be our current efforts re-shaped to respond to societal and economic changes. Some of the key changes we must respond to include the transition from:

- analogue to digital;
- an industrial economy to a knowledge economy;
- 'routine production' to 'symbolic analysis';
- organisational independence to interdependence;
- governments' previous role of 'rowing' to 'steering';
- 'a job for life' to lifelong employability;
- societal stability to rapid change; and
- from learning being an added extra to an inescapable imperative.

To move towards a lifelong learning system, we must update our ideas about what constitutes 'lifelong', 'learning' and 'system', and to implement our ideas quickly. Some specific areas for culture change include:

- adopting the notion that education and training is a life long experience that doesn't stop when a young person leaves school, vocational or tertiary institutions;
- accepting that learning is not something that only formally happens within education and training institutions; and
- re-conceptualising and revising current system architectures (eg the various vocational education and training networks designed essentially for the industrial age) so that they are robust and suitable for the knowledge age.

What are the roles for parties to realise this vision?

All parties will have complex roles and responsibilities, and must network together to achieve agreed outcomes.

- Government's role will be to articulate the national vision, establish and maintain the system architecture in partnership with stakeholders, address resourcing issues and redefine their regulation and enforcement rules in the context of a more open system;
- Individuals will need to embrace and use the learning system and redefine learning as something that can happen anywhere, at any place and at any time;
- Industries will need to ensure that their skills needs drive the system. This will require statements of skills needs that truly reflect the aspirations and understanding of all system stakeholders;
- Enterprises will need deeper and more useful understanding of how economic and social forces are making their work knowledge-based; and what the system offers by way of tools to cost-effectively add value to their efforts to meet the knowledge challenge; and
- Learning institutions will need to examine their ability to compete in a rapidly expanding global human capital development market, worth many trillions of dollars a year. They must analyse their strengths and weaknesses in order to compete against organisations that are more aggressive, profit-oriented, flexible, customer-focused, creatively resourced and entrepreneurial.

Background to ‘Generating ideas’

This material should be read in conjunction with the final report of the Innovation Summit Implementation Group, *Innovation-Unlocking the future.* This material is background information utilised by the Group in its decision making process.

The Research and Development (R&D) Tax Concession

Participants at the National Innovation Summit recommended that the R&D Tax Concession be reviewed. In particular, business participants, both during and after the Summit, raised concerns about the erosion of its value, highlighting its reduction from 150 per cent and its anticipated further depreciation in value with the lowering of corporate tax rates.

Summit participants recommended that the concession be enhanced to stimulate more investment by business in R&D. Greater investment will help drive efficiency in our existing research base, improve conditions for the commercialisation of new processes and product technologies developed by Australian companies, and develop a greater capacity for us to adopt useful foreign technology.

The Group considered a range of options for enhancing the effectiveness of the R&D Tax Concession and examined a number of overseas schemes designed to stimulate business investment in R&D.

United Kingdom

For example, from April 2000, a 150 per cent R&D tax deduction will be introduced in the United Kingdom, with a tax credit available for companies that are in a tax loss position. The UK version of the R&D Tax Concession is available only for small and medium sized companies (SMEs) with an expenditure on R&D over £25,000 (about $65,400) and with a maximum annual turnover of £25 million (about A$64.5 million) whereas Australia provides a 125 per cent R&D Tax Concession for expenditure on R&D over A$20,000, with no maximum annual turnover threshold.

Approximately 4,500 UK SMEs will be eligible to benefit from the estimated £150 million (about A$387 million) per annum concession. Thus, the UK scheme is larger than the Australian Concession (3,256 firms registered in 1997/98) in terms of the total number of firms receiving the concession, but lower in terms of the overall cost to revenue (estimated at A$439 million in 1997/98).

A small UK company facing a corporate tax rate of 20 percent will receive a concession of 10 pence in the pound (or 10 percent of the cost of the R&D) in comparison to the Australian concession of 7.5 cents in the dollar (or 7.5 percent of the cost of the R&D), with a corporate tax rate of 30 percent to be introduced in 2001/02. Some SMEs in the UK may face a corporate tax rate of 30 percent and receive a concession of 15 pence in the pound.

The UK tax credit can provide up-front relief for companies not in profit – surrendering the loss to the Exchequer provides a cash payment of £24 for every £100 spent on qualifying R&D.

Canada

Canada provides tax credits, rather than premium tax deductions, on expenditure for 'scientific research and experimental development' (SR&ED). A 20 percent tax credit is provided for all qualifying expenditures (net of government grants, contract payments and equivalent non-government assistance). An enhanced tax credit of 35 percent is provided for 'Canadian controlled private companies', in respect of the first C$2 million of qualified expenditure per annum, which starts to phase out where the taxable income of a company exceeds C$200,000 until it returns to the standard 20 percent tax credit, where taxable income exceeds C$400,000.

Canadian tax credits are refundable as taxable cash payments to smaller and non-profitable companies. This is a targeted incentive to those companies in a start-up or developing phase. Tax credits are non-refundable for large and profitable companies.

The Canadian taxation system is complex, with both Federal tax rates and Provincial rates applied to corporations. Taking into account an average Provincial tax rate, the Canadian corporate tax rate is about 36-44 per cent (this is lower for SMEs). From 1 January 2000, this will be reduced by 7 per cent over five years for businesses in the highest taxed sectors, and small businesses with taxable annual incomes between C$200,000 and C$300,000.

Assuming a 36-44 per cent corporate tax rate, the 20 per cent tax credit will provide about 7.2-8.8 cents in the dollar (or 7.2-8.8 per cent of the cost of the R&D) and a 35 per cent tax credit will provide about 12.6-15.4 cents in the dollar (or 12.6-15.4 per cent of the cost of the R&D). In comparison, Australia provides a concession for R&D expenditure, of 7.5 cents in the dollar (or 7.5 per cent of the cost of the R&D) with a corporate tax rate of 30 percent.

The Canadian system supports approximately 11,000 applicants per year, which is close to three times the number of registrations for the R&D Tax Concession in Australia (3,256 firms registered in 1997/98).

Canada also has provisions for claiming for expenditure on shared use equipment, which is defined as expenditure on new, depreciable property (which does not qualify as SR&ED expenditure) that is used more than 50% but lower than 90% of its operating time for the conduct of SR&ED. Eligible expenditures earn a partial tax credit over time — one half of the partial credit (half of 50% of the tax credit) at the end of the first 12-month period after the acquisition of the equipment and the other half of the credit (as above) at the end of the first 24-month period after acquiring the equipment.

The United States

The United States research and experimentation (R&D) tax credit scheme is an incremental scheme that provides a tax credit of 20 per cent to *additional* R&D expenditure greater than a pre-determined base level against a 35 per cent federal company tax rate. US tax credits are non-refundable.

The base level is determined by using an average ratio of R&D expenditure to sales over the specified fixed four-year base period 1984 to 1988. For start-up firms, the fixed base percentage is 3% for the first five tax years for which they have qualifying research expenditure.

The US tax credit provides a concession of about 7 cents in the dollar (or 7 percent of the cost of the *additional* R&D) which is slightly lower than the 7.5 cents in the dollar (7.5 percent of the

cost of any eligible R&D) provided by the Australian 125 percent R&D Tax Concession, with a corporate tax rate of 30 percent.

The US tax credit scheme is generally seen as being of more benefit to larger companies (companies with assets greater than $US250 million constitute 70% of tax credit users). The US tax credit scheme costs approximately US$2 billion per annum (about A$3.45 billion). While this is approximately eight times the annual cost of the Australian R&D Tax Concession (estimated at A$439m in 1997/98) program, it is proportionately smaller given the relative size of the two economies (using 1995 constant prices, GDP in the US [US$8637.2b] was about 19.5 times the size of Australia's GDP [US$444.7b] for 1999).

The Group also reviewed material which, although now somewhat dated, highlighted a number of advantages and disadvantages of the R&D Tax Concession. The following summarises evaluations of the R&D Tax Concession undertaken by the Bureau of Industry Economics and the Industry Commission in 1993.

Advantages included:

- Certainty for companies conducting R&D - The long-term nature of R&D investment means that companies require a degree of certainty in the R&D support environment.
- Entitlement based nature of the program - The R&D Tax Concession is an entitlement for eligible companies and activities. This means that companies can factor the cost reductions provided by the R&D Tax Concession into investment decisions.
- Market driven allocation of funding - The R&D activities are selected by industry, which are best placed to understand the market and their technology requirements.
- Lower compliance and administration costs than discretionary programs - The R&D Tax Concession requires less administrative assessment and has reasonably well defined eligibility requirements. As a result, compliance and administration costs are relatively low compared to discretionary programs such as competitive grants programs.
- Administration arrangements are already in place - Because the R&D Tax Concession has been in operation since 1985, the administration arrangements for the scheme are well established.

Disadvantages included:

- Low inducement rate (Additionality) - A "transfer of benefit" occurs when the 125% R&D Tax Concession is claimed on R&D that would have occurred in the absence of the concession. Transfer of benefits represents a cost to the social benefit of the scheme and therefore reduces the efficiency of the program. The social benefits are increased when a project that was economically marginal becomes economically viable because of the R&D Tax Concession.
- Does not provide immediate benefit to tax-loss companies - Tax-loss companies do not receive the subsidy provided by the 125% Tax Concession until they derive taxable income.
- The level of subsidy is susceptible to changes in the corporate tax rate - The level of subsidy is a function of the corporate tax rate at the time. Since 1985, the level of subsidy has changed 5 times (both increased and decreased) as a result of changes in the corporate tax rate. It should be noted that compliance costs remain relatively static regardless of the corporate tax rate.

The Group concluded that the R&D Tax Concession remains the central element of innovation policy in Australia, supporting around $4.5 billion of business expenditure on R&D.

An inability of firms to fully capture all of the returns to their R&D investments is a disincentive to undertake R&D activities, providing the overall rationale for the provision of government support for industry R&D.

The Group believes that a significant increase in the amount business invests in R&D will be achieved by rewarding those who undertake additional R&D through an improved concession.

In the recommendations it is putting forward, the 'base' rate for the R&D Tax Concession would remain, albeit at a higher base level, but there would be a second, higher (premium) rate available to companies who undertake 'additional' R&D. This model would actively support those firms who are growing rapidly, whether small or large, and thereby provide a stimulus to business investment in R&D.

The model for giving effect to an incremental system could involve, for example, companies undertaking in advance and in writing, to increase the level of their R&D expenditure for three years over a specified base established from their claim history. The premium rate would only be paid on the increased research being claimed under the R&D Tax Concession.

The commitment given by the company, in order to qualify for the premium, could be that its claims over the subsequent three years will average 10% (for example) more than the established base level of claim.

The Group recognises that an incremental option provides larger financial incentives. As such, the legislative and administrative structures for the implementation of this option will need to be robust, to prevent abuse of the system.

Nevertheless, under this approach, firms would be encouraged to continually improve their level of R&D expenditure. As the new base for each three-year contract period is established at the highest level of R&D spend achieved during the preceding three years, firms will need to continually increase their R&D expenditure above the rising base levels to obtain the premium rate.

The Group recommends that:

- the base rate for the concession be increased to 130 per cent. A 130 per cent concession at a corporate tax rate of 30 per cent in 2001-02 would cost an estimated $100 million per annum and would maintain the level of support previously available through the concession at the 36 per cent company tax rate;

- a higher premium rate (between 170 per cent and 200 per cent) be provided to companies who raise their amount of R&D investment above a base level. To apply for the higher rate, businesses would have to increase their level of R&D investment by an average of 10 per cent (for example) over a base established from their claim history;

- a cash-out option to provide smaller businesses with access to cash flow, which can be used to accelerate growth and increase the amount spent on R&D be introduced[8]. For every dollar invested in R&D, companies would receive a 39 cent payment. This option would be

[8] Companies that do not pay tax are not able to benefit immediately under the current R&D Tax Concession.

available to companies with a turnover of less than $1 million, and an investment in R&D of less than $1 million. This cash payment is equivalent in value to the 130 per cent concession at a corporate tax rate of 30 per cent. The Group believes this initiative will benefit between 600 and 700 Australian firms.[9]

Recommendation 11

To stimulate innovation through increased business investment in research and development, the Commonwealth Government should:

- *increase the base rate of the R&D Tax Concession to 130 per cent;*

  Cost: estimated at $100 million per annum.

- *raise the rate of the R&D Tax Concession to between 170 per cent and 200 per cent for the increment of research and development, which is over and above a threshold base. To qualify, companies would need to increase their level of research and development by an average of 10 per cent over the identified base rate determined by, for example, their previous claim history; and*

- *introduce a cash-out option for small to medium sized enterprises with a turnover of less than $1 million and an investment in research and development of less than $1 million, based on the 130 per cent rate.*

Responsibility for action: Commonwealth Government to provide incentives and business to invest in R&D.

Support for high-quality basic research

High quality research is essential for the generation of new ideas, products and processes. Publicly funded research has a key role in this area. High-quality basic research and knowledge creation is a global business, and Australia needs to continue to be competitive internationally in the quality of its research efforts.

Competitive research grants

The Australian Research Council (ARC) provides support for high-quality research, principally in the higher education sector. The ARC supports research in all fields except clinical medicine and dentistry, which is the responsibility of the National Health and Medical Research Council (NHMRC). Following the recent Wills Review of Health and Medical Research, the Government announced that it would double funding for the NHMRC by 2004, based on the quality of Australia's research performance in this field and on the economic and social benefits to be gained.

However, there is similar potential across a broader spectrum of research. Particularly important are those research activities spanning traditional discipline boundaries, which have strong potential to yield new processes for generating knowledge and applying it to good effect in modern industrial settings.

Within the context of a broad framework of reform for university research and research training, the Government has recently put in place new arrangements for the ARC to award competitive grants to university researchers to undertake world-class research. The grants to support

[9] Based on past claims history through the R&D Tax Concession.

discovery (basic) research and linkage (applied) research contribute towards the costs of research centres, fellowships, consumables, equipment and research assistance.

As shown in the following table, Commonwealth funding for such programs has stabilised in recent years following an earlier period of growth (all outlays are expressed in constant terms, in 2000 cost levels).

1996	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
$199.6m	$216.5m	$238.5m	$231.1m	$240.7m	$239.2m	$238.7m

By international standards, support provided by the ARC for competitive research grants is low. The ARC supports around 20 per cent of applications under its flagship scheme for basic research. By comparison, the National Science Foundation in the United States funds 31 per cent of grants and in the United Kingdom, between 20 per cent and 41 per cent of applications are funded.

Furthermore, the average size of ARC grants for basic research is A$55 000 and grants do not normally cover the full direct costs of a research project. In the United States, the average size of successful grants is equivalent to A$169 000, while in the United Kingdom grants range between A$180 000 and A$453 000.

The Group believes there is a strong case to increase funding for ARC competitive grants to ensure that Australia's investment in research is maintained at internationally competitive levels across a broad range of disciplines.

Beyond the commitments already made in areas such as biotechnology, environmental sustainability and health and medical research, we must nurture our research capabilities in the 'enabling' sciences of physics, chemistry and mathematics, and also in the humanities and social sciences. Research in the humanities and social sciences, for example, can enhance the organisational, management, legal and marketing knowledge that is critical to successful innovation.

Recommendation 12

To build Australian research capability, Commonwealth Government funding for the competitive research grants schemes administered by the Australian Research Council be doubled over a five-year period

Cost: would rise from some $50 million in the first year to $240 million by the fifth year.

Responsibility for action: Commonwealth Government to provide outlay, research institutions and their researchers to undertake world-class R&D

Research infrastructure

University and public research infrastructure can be divided into three broad categories:

- *'project-specific' research infrastructure* - those items of equipment, facilities and services which support particular research projects, such as those supported by grants administered by the ARC, the NHMRC and externally contracted research;

- *'major research facilities'* - costly and highly visible items of research infrastructure which are commonly beyond the reach of individual research teams, or even individual institutions or nations (see discussion above);

- *'deep' or 'systemic' infrastructure* - encompasses the general assets, facilities and services which support the research and teaching functions of universities and public research institutions, including equipment, facilities, laboratories, libraries, computing capabilities and technical and administrative assistance. Support for deep infrastructure for research is provided through the "Research Quantum" of higher education operating grants, while support for teaching and research infrastructure more broadly is supported through operating grants as a whole.

In Australia, the level of funding for 'deep' research infrastructure is recognised as a serious problem.

The deteriorating position of Australia's deep infrastructure in universities is illustrated by the following observations:

- Targeted university research funding (excluding project-specific research infrastructure) increased by 96 per cent over the period 1990-1999 in constant dollar terms. Project-specific infrastructure funding increased by 244% over the same period; however, funding for operating grants (including the Research Quantum), which supports deep infrastructure and general university teaching and research functions, increased by only 30%. Clearly, funding for research has been outstripping support for deep infrastructure over a long period. Any further increases in the size and number of competitive research grants at marginal cost without a commensurate increase in deep infrastructure funding will exacerbate this problem.
- Australian universities and public research organisations are spending a smaller share of their funds on new capital items than in the past. In 1990-1991[10], our universities expended 16.4% of their R&D expenditure on fixed assets, such as land, buildings and other capital items. By 1998, this proportion had declined to 6.8%[11]. Our universities and public research organisations typically spend only 5% of their total budgets on new capital items, which is barely sufficient to cover the rate of depreciation. By contrast, our international competitors typically invest 20%-25% on capital items.

  There is evidence to suggest that cost increases for equipment are causing Australian researchers to pull away from areas of research in which they were previously internationally competitive[12].

- Australian university libraries are reducing the number of publications to which they subscribe in order to contain costs. The number of journals purchased by Australia's university libraries declined by almost half in the five years to 1998, from over 200,666 titles to 112,974. Over the same period, the average cost per title increased from $287 to $485.[13]

A substantial injection of funds for infrastructure is needed in order to maximise the contribution of universities and public research institutions to the broader innovation system. This should enable our institutions to support their total portfolio of research and teaching with world-class

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[10] ABS, 1993, *1990-91 Research and Experimental Development All Sector Summary Australia*, page 3

[11] ABS, 2000, *Research and Experimental Development Higher Education Organisations 1998*, page 7

[12] BHERT, 1999, *The Case for Additional Investment in Basic Research in Australia* Position paper number 3, page 4

[13] Steele, C, 2000, Waiting for an 'education budget' *Campus Review*, 21-27 June 2000

facilities, research and teaching staff, underpinned by organisational structures which can respond flexibly to opportunities and demands.

The Group considered alternative scenarios for determining the amount that should be spent in this area. The current spending base of $230 million per annum[14] could be increased by 50 per cent (adding $115 million per annum), or by two thirds (adding $150 million per annum). The Group concluded that a significant injection of some $500 million over 5 years to support research infrastructure is warranted, and that decisions on its allocation per year be determined by Government and the research institutions themselves.

Recommendation 13

Australia's research capability be strengthened through an injection of Commonwealth Government funding totalling $500 million over 5 years for infrastructure.

Cost: $500 million over 5 years.

Responsibility for action: Commonwealth Government to provide outlay and education and research institutions to invest in world-class research infrastructure.

Improving access to government programs

Participants at the National Innovation Summit put forward recommendations concerning streamlining access to and better coordination of government innovation support programs.

One of the concerns of participants was that, with the number of government innovation support programs available at both State and Commonwealth levels, it is difficult to identify programs that are relevant to businesses. By having a single point of contact with information about government programs available and their applicability, access to programs relevant to a particular business could be improved.

The Group considers that improved access to government innovation support programs could be achieved by providing an information source and business advisory service. Such a service could be made available to business both through service providers and through an Internet-based, self diagnostic facility. Its target would be small businesses that lack the information or confidence to effectively access innovation programs.

A key aspect of the service would be its capacity to relate the stage of the innovation cycle that the business is at with the range of innovation programs available.

This approach would add value by not only helping a business identify what assistance is available to them, but also by providing advice on the programs most appropriate for their circumstances and guidance on where to go to apply.

The Group envisages, as part of the implementation of the service, that agreement would be reached on common company information requirements for programs. Once the system is in place, the information collected by the adviser/service would flow through to program deliverers, thereby reducing duplication of effort for business and streamlining delivery.

To address the issue of gaps and overlaps that may be reducing the effectiveness of government support for innovation, the Group proposes that those responsible for developing the Internet based diagnostic will also be tasked with assessing and reporting on the gaps in business needs that they identify in developing the diagnostic. Their report should be addressed to both

[14] Provided through research quantum of university operating grants.

Commonwealth and State Government. The Commonwealth, State and Territory Advisory Council on Innovation (CSTACI), for example, could be tasked with reviewing such reports and recommending to government, gaps that warrant policy attention.

The developer of the diagnostic tool could also be charged with identifying and reporting on roadblocks and barriers to accessing programs, particularly for SMEs, as viewed from a business perspective. The development of the diagnostic tool will need to incorporate a detailed understanding of the process by which businesses become aware of relevant programs, how they contact the program deliverer and the requirements to access the program. Information provided should be helpful in identifying the roadblocks and barriers that businesses encounter. Advice should be provided to relevant program owners on improving program access for SMEs. This information could be disseminated to the CSTACI which could have a role in overseeing how program owners address access issues.

Mechanisms for feedback from advisers to policy makers on gaps (and overlaps) in the range of assistance will need to be established. Such feedback should be developed as a clear function (and opportunity) of being an adviser. Networking, conference or reference groups are options for facilitating the feedback loop. Again the CSACI could play a useful role in ensuring this feedback mechanism is established and in coordinating Commonwealth and State policy and program responses to the identified gaps and overlaps.

The Group considers that implementation issues that need to be considered include:

- Acceptance of approach and agreement reached on responsibility for delivery;
- Determination of the scope of programs to be included;
- Identification of the currently available programs that fit within the scope;
- Summation of these programs against an appropriate model, ie a ‘business life cycle’ model;
- Liaison with program deliverers;
- Building infrastructure including IT systems, diagnostic tools, internet infrastructure, service/program linkages, training and listing of advisers (there is no intent to accredit advisers as it could establish a restricted market in providing the service); and
- Achieving and maintaining the critical mass needed to enable the service to meet a broad cross section of business needs.

The attached flowchart illustrates the Group’s proposed model.

Recommendation 14

To provide Australian business with timely access to innovation support programs:

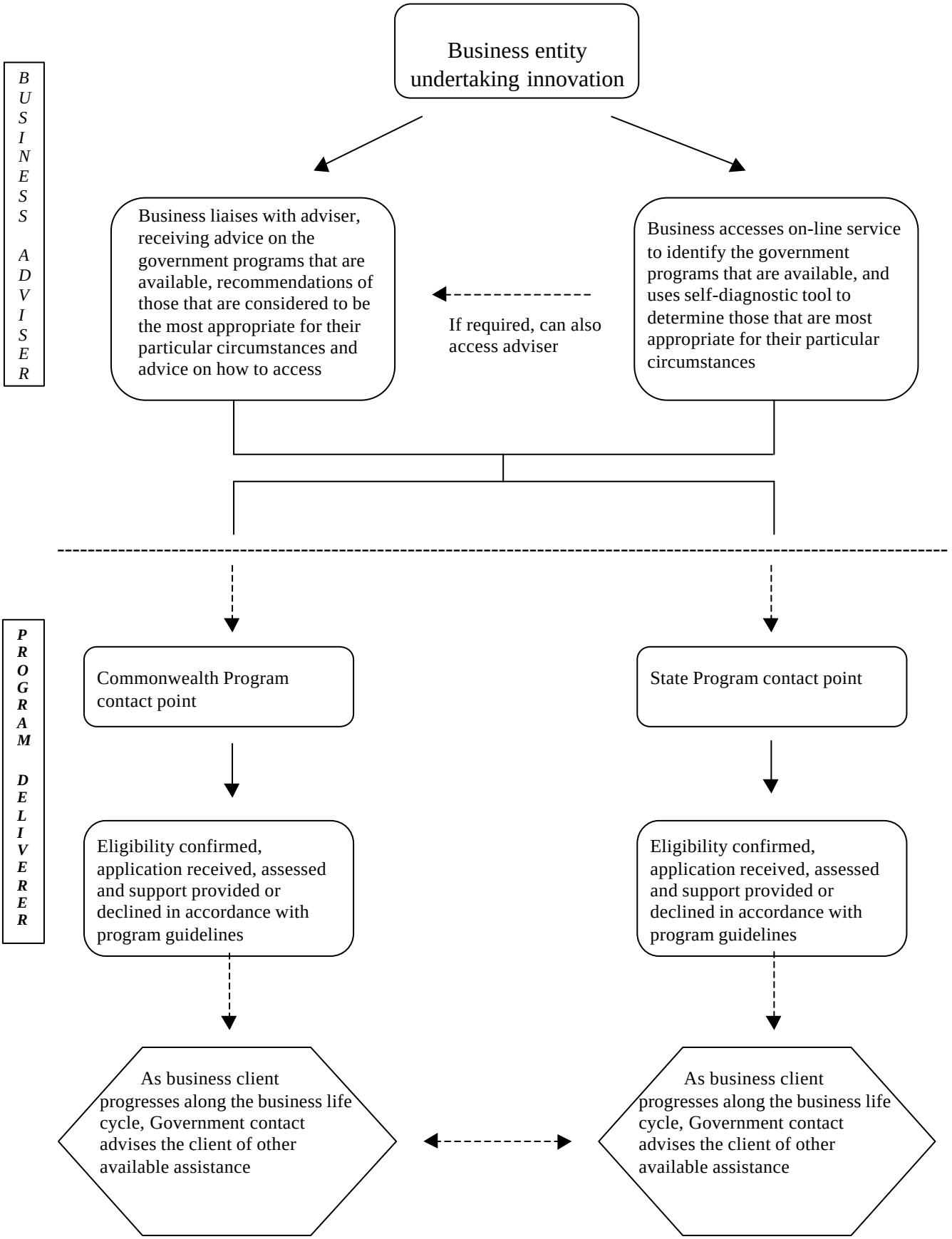
- *establish an access point and advisory service (both an Internet-based self-diagnostic tool and a customised service) to advise on the appropriateness and availability of innovation programs for companies’ specific purposes*

  Cost: $2 million to $3 million to establish and $1 million per year thereafter; and

- *use the diagnostic tool to identify gaps, overlaps and access barriers in existing programs, and report findings to a coordination body such as the Commonwealth, State and Territory Advisory Council on Innovation for follow-up action.*

Responsibility for action: Commonwealth Government and State and Territory Governments to provide funding and to establish the best mechanism in conjunction with industry associations.

FLOW CHART OF PROPOSED MODEL TO IMPROVE INDUSTRY ACCESS TO GOVERNMENT INNOVATION SUPPORT PROGRAMS



Encourage philanthropic investment

While only approximate comparisons can be made between philanthropy in Australia and other countries, there are indicators suggesting that philanthropic donations as a percentage of GDP are higher in the United States than they are in Australia. For example, US business contributions to research spending in the private non-profit sector is double that of Australian business. This is often attributed to more generous tax incentives in the US but it would seem to be related to a wider range of incentives available for the philanthropist.

Corporations are increasingly aligning their philanthropic activities with their brand characteristics and corporate values. They expect their philanthropic activities to provide them with a positive corporate image, enable them to be identified as the employer of choice, and enable their existing employees to feel good about their employer and thus improve retention rates. This new culture of corporate philanthropy needs to be recognised in formulating an incentive regime.

On 26 March 1999, the Prime Minister announced a $51 million package of taxation measures to encourage greater corporate and personal philanthropy in Australia. This initial annual revenue cost will rise over time as these measures encourage the further growth of philanthropy. The new arrangements took effect from 1 July 1999. The income tax law was amended to provide:

- an income tax deduction for non-testamentary donations of property with a market value of more than $5,000, regardless of when property was purchased or acquired by the donor.
- a capital gains tax exemption for testamentary gifts of property donated to organisations, bodies or funds eligible to receive tax deductible donations.
- a new category of ‘private funds’ to be included in the gift provisions. These new funds will not be required to seek donations from the public at large but will still be required to meet all of the other ‘public fund’ conditions to be approved.
- greater incentives for donations of property made under the Cultural Gifts Program administered by the Department of Communications, Information Technology and the Arts, involving: a capital gains tax exemption for all gifts accepted by the Program; and allowing deductions for all gifts accepted by the Program to be apportioned over a period of up to five years.

The purpose of the amendments as a whole is to encourage greater corporate and personal philanthropy in Australia by providing tax incentives for donors, but the CGT exemption and apportionment over five years only apply to donations made under the Cultural Gifts Program. The incentive system for philanthropy has a bias toward cultural gifts.

For example, if an individual donates a painting to the National Gallery under the Cultural Gifts Program they may spread the deduction over 5 income years. However, if the same asset is donated to a medical research institute the donor would only be able to claim a deduction in the year in which the donation is made. Depending on the donor’s taxable income and the value of the asset, the incentive for donation would be reduced without the capacity to spread the deduction over more than one year.

In terms of facilitating philanthropic investment in R&D, there are various organisations in Australia that provide information about and promote philanthropy, including Philanthropy Australia and Givewell. However, the Group considers that opportunities exist for other philanthropist-recipient matching services, particularly in science and research.

The Group considers that a range of actions could be undertaken, in partnership with the Prime Minister's Community Business Partnership to enhance philanthropic investment in R&D. These actions could include:

- Building positive attitudes toward philanthropy within Government through such measures as high-level statements of policy (such as those made by the Prime Minister in relation to Community and Business Partnerships);
- Encouraging development of a broader private infrastructure for promotion of philanthropy (such as the Ian Clunies Ross Memorial Foundation or Research Australia), matching of philanthropists with recipients (similar to the Institute for the Promotion of Science in the US), and philanthropy managed funds (similar to Fidelity Investments Charitable Gift Fund). This may be achieved by supporting feasibility studies and identifying private sector champions for these initiatives;
- Providing equitable treatment for philanthropic investment in R&D by ensuring that the incentives that apply under the Cultural Gifts Program apply across all fields of philanthropy;
- Increasing the variety of incentives for philanthropy by allowing tax deduction for donations of personal property, real estate, intellectual property, and life insurance, and by encouraging the use of salary sacrifice and payroll deduction with immediate tax benefit.

Irrespective of whether philanthropic investment is for the arts or R&D, the Group considers that the incentive system for philanthropy could be extended to include the following:

- Tax deductions for gifts of property worth more than $5000;
- Capital Gains Tax exemption for gifts of property (including real estate and shares);
- Apportionment of deductions over a maximum of five income years;
- Tax deduction for gifts of cash, life insurance, and securities; and
- Salary sacrifice and/or payroll deduction for philanthropic purposes.

Recommendation 15

To increase philanthropic support for Australian innovation:

- *extend the Prime Minister's Community Business Partnership's brief to include the development of appropriate incentives to actively promote science and research philanthropy;*

- *promote philanthropy for science and research, recognise significant donations to science and research, and promote awareness about availability of incentives;*

  Cost: $0.5 million per year for three to five years

- *introduce tax deductions and exemptions for R&D donations/contributions to match those available for the arts. Include carry forward provisions for tax deductions and Capital Gains Tax exemptions.*

  Cost: to be determined by Government; and

- *conduct a feasibility study for a service to match philanthropists with researchers, universities and research agencies.*

  Cost: $200 000.

Responsibility for action: Business and Commonwealth Government.

Performance-based research funding and setting priorities

In December 1999 the Government released *Knowledge and Innovation: A policy statement on research and research training*, announcing a new policy and funding framework for higher education research and research training. The new framework aims to improve the quality of research and research training in the higher education sector, concentrate research activity in those areas where institutions have particular strengths, and encourage stronger linkages with industry.

As part of the new framework, two new performance-based funding schemes for research and research training in universities will be introduced: a Research Training Scheme and an Institutional Grants Scheme. The incentive structures supporting these schemes have been designed to promote changes in institutional behaviour consistent with the broader objectives just mentioned.

The *Research Training Scheme* will fund research training places in institutions according to a formula comprising three elements: the number of research students completing their degrees (50%), the institution's research income (40%) and publications output (10%).

The *Institutional Grants Scheme* will provide institutions with block grants which give them the flexibility and autonomy to manage their own research activities and set their own priorities. Funds will be allocated according to a formula which recognises institutions' success in attracting research income (60%), attracting research students (30%), and publications output (10%).

These two schemes will be fully implemented from calendar year 2002.

In terms of setting research priorities, submissions to the Chief Scientist's Capability Review on this issue reportedly give little support for priority setting mechanisms. While the issue of setting priorities for areas of research in Australia was raised at the Summit, the Group believes that the market is the main and most effective mechanism.

Various funding bodies administer a variety of priority setting mechanisms. For example, the CSIRO has in place its own priority setting mechanism. The Australian Research Council awards research funding competitively, based on excellence. Research grants awarded by Cooperative Research Centres are based on the best business case. From time to time, government establishes high priority research areas. In response to the Wills Report[15], the Commonwealth Government made health and medical research such a priority.

The Group considers that we have in place appropriate priority setting mechanisms, and supports ongoing monitoring of performance in this area.

Other background information to 'Generating ideas'

The Group canvassed a range of issues during its deliberations, some of which did not directly result in the formulation of a recommendation. What follows is a summary of some of those issues. While they did not lead to recommendations, the Group nevertheless considered that they may be of interest to observers of the Group's work. They are therefore presented in the interest of keeping all parties informed.

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[15] Entitled *The Virtuous Cycle: Working Together for Health and Medical Research December 1998*.

Research Finder

Research Finder is a recently established internet search tool which enables access to Australia's researchers, research capability and emerging technologies. An initiative of the Department of Industry, Science and Resources, *Research Finder* is available at http://panoptic.act.cmis.csiro.au/research-finder.

Stage 1 provides a high quality keyword search capability of more than two million documents on the web sites of Australia's research organisations. It allows targeted searching by Research Organisation and provides substantially enhanced capability to discover Australian research content over that currently available.

Stage 2 of *Research Finder* will use intelligent software to classify the content of all these web documents so that users can target their searches to specific Industry Sectors and/or Research Fields. This capability will add great value to the content of all the web sites and will promote better web site data management practices by Research Organisations.

Research Finder will enable business and investors, both in Australia and overseas, to learn about what is happening in Australia's universities and other research organisations. They will be able to identify leading edge research and emerging technologies, resulting in new linkages and investment.

The Group considers that *Research Finder* will serve to enhance awareness of Australian R&D and to facilitate technology diffusion. The improved discovery available through *Research Finder* will encourage researchers to improve the quality and timeliness of information they place on their website.

Competitive neutrality

Participants at the National Innovation Summit recommended that research agencies be encouraged to adhere to the principles of competitive neutrality. The Group’s view is that the market competitiveness of an enterprise should not be enhanced or impaired by virtue of its ownership arrangements. Competitive neutrality policy measures deal with market distortions to achieve a situation where government or private ownership is neutral in its effect on competition.

The Group has been advised that the efficiency ground for the competitive neutrality policy is primarily that the existence of a net competitive advantage for a government business may enable it to price below more efficient or equally efficient (private sector) competitors. If a less efficient government business takes business from a more efficient firm because of such advantages, or the advantages hinder the entry of new competitors into a market, resources in the economy are not being used in their most efficient use. This distortion of resource allocation reduces the overall economic welfare of the community.

The Group considers that the Competitive Neutrality regime provides a framework for addressing this issue. This regime requires public research bodies to price their research at full cost. A complaints mechanism provides for those who believe that the competitive neutrality principles have been breached. Investigation showed that there had been few complaints and no complaints upheld.

Private sector research capacity

While competitive neutrality regimes appear to increase the ability of private sector research agencies to compete on an equal footing with public sector researchers, the Group asked itself a number of related questions during the course of its deliberations.

1. How do the major companies make decisions about the level of R&D expenditure and how/where it will be carried out?

2. Is there a differential productivity rate for public and private research bodies and how does Australia compare?

3. Is the balance of public and private research capacity different in Australia than it is in other OECD countries?

The following information was collected in response to these questions.

R&D location decisions

In some international circles, there are questions about the attractiveness of Australia as an investment location, including as a location for R&D investment. Some offshore opinion leaders and decision makers appear to believe that Australia is not well positioned to participate in the increasingly global nature of the information/knowledge based economy.

Invest Australia is addressing this issue in collaboration with other stakeholders. It is currently developing a strategy to enhance Australia's profile and reputation as an international R&D investment location. Further information on *Invest Australia* initiatives can be found at www.isr.gov.au/invest/index/.

Productivity in private and public research agencies

Private sector R&D activity is often perceived as having a higher productivity rate than public sector R&D activity. Available information found no readily comparable productivity data to substantiate the claims of differential productivity between public and private research organisations.

Of interest, however, is that studies of CSIRO and Australian university outputs against the American Association of University Technology Managers (AUTM) showed that Australian public research bodies were as productive as their US and Canadian counterparts. Thorburn (1999) showed that when CSIRO's performance was compared against the AUTM survey figures[16], it had out-performed that benchmark in all but spin-off company creation. Over the 10 year period this benchmark had been met and had fallen over latter years.

Balance between private and public research

OECD data shows that in 1996 Australia's private sector R&D expenditure falls below OECD averages.

[16] The AUTM survey 1997 indicates that in US universities, for each 1,000 researchers employed in 'faculties', there were 37 disclosures, 9 patent applications, 11 licence agreements and US$320,000 in royalties. Using the AUTM standard, the CSIRO should have applied for 45 patents (actual number was 52), received US$1.6 million in royalties (actual was US$4 million) and produced 7 spin offs (actual was 2.5).

Expenditure on R&D performed within sector, funded from all sources (% of GDP)

	Sector of performance	
	Govt. & universities	***Business***
Australia (1996)	***0.85***	***0.79***
Canada (1998)	***0.56***	***1.03***
France (1998)	***0.81***	***1.37***
Germany (1998)	***0.75***	***1.57***
Japan (1997)	***0.65***	***2.10***
UK (1997)	***0.63***	***1.22***
USA (1998)	***0.61***	***2.08***

Source: Science and Technology Budget Statement 2000-01, Tables 9 and 10

However, the business R&D expenditure figure shown in the table above captures only that R&D activity performed in-house. It does not include activity out-sourced to domestic non-business sectors, or overseas. Yet interviews reveal that out-sourcing of R&D activity has been a significant trend in the past few years.

The table following shows (using a sample of OECD countries) R&D outsourced by business to other sectors as a percentage of total business expenditure on R&D. It suggests that Australian business had a high level of outsourced R&D in 1996 which, taken with evidence from interviews of further outsourcing in more recent years, may point to a diminished ability of business to build up its own capabilities in-house.

	R&D financed by business, outsourced to other sectors, as % BERD		
	1996	1997	1998
Australia	6.4%		
Canada	5.2%	5.3%	5.1%
France	3.3%	3.7%	
Germany	3.0%	3.0%	3.3%
Japan	4.7%	4.5%	
United Kingdom	4.1%	5.0%	
United States	1.8%	1.7%	1.7%

Source: ISR S&T Analysis Section

Private sector interview data showed that while in normal circumstances R&D expenditure levels were set by reference to percentage of sales revenues, benchmarked against key competitors, there had been a global trend to ensure that returns from R&D expenditures were maximised and costs reduced. This has meant, for example, in the mining industry that individual companies have reduced their expenditure on that R&D where its benefits cannot be fully appropriated by that company, undertaking industry-wide beneficial research collaboratively. Cost reduction programs have often also led to pressure to out-source discretionary expenditures.

Projects that formed part of discretionary or collaborative budgets were out-sourced (80%). Estimates of the amount out-sourced within Australia averaged 50% of new expenditure. The quality of the expertise and access to that expertise were the two relevant factors in deciding to whom to out-source.

One of the reasons given for the increase in out-sourced R&D was the significant differential in costs between in-house R&D and public research institutions. One company estimated that difference to be $250,000 per graduate for in-house and one-third of that for university-based R&D and slightly higher for CSIRO. The reason for the difference was attributed to the cost of overhead capital and infrastructure. Other companies suggested that the differential was significantly less, reflecting differences in the extent or sophistication of capital required and variable utilisation patterns.

Purchasers of the R&D, often as separately accountable business units, are motivated by a desire to contain costs. They also seek to negotiate directly with the experts they have identified. In turn, researchers are motivated to win research business. They often believe that pricing regimes that include overhead recovery rates are inappropriate and make them uncompetitive.

If this is correct, it would suggest that despite the existence of the Competitive Neutrality regime and the lack of complaints, marginally costed research may be available from public research institutions. If this is so, then it appears that there may well be disinvestment in R&D infrastructure by both public and private sectors. The private sector is maintaining or even contracting its research capability as it moves to out-sourced R&D and public sector pricing practices may not allow fully for replacement of infrastructure.

While the Group has not formulated specific recommendations on these issues, the Group considers that the following could be further assessed. Is there merit in encouraging public research bodies to adopt tighter project management processes? Could public sector research bodies be encouraged to implement annual audits of pricing of contract research? Could government and business establish a mechanism to agree on how national R&D infrastructure ought to be funded by phase of research? Could public research granting bodies be encouraged to award grants at full cost? These, and many other issues, may well benefit from further investigation by interested parties.

Background to 'Acting on ideas'

This background material was utilised by the Group in its decision making process and should be read in conjunction with the final report of the Innovation Summit Implementation Group, *Innovation-Unlocking the Future.*

Supporting new, innovative firms

At the Summit, a strong call was made to strengthen the development of new firms through enhanced investment of seed capital in new innovative ideas.

The success of small innovative companies depends on access to appropriate forms of finance and suitably skilled managers. Seed funding is fundamental to the survival of new innovative businesses. Both Commonwealth and State Governments have programs designed to stimulate the availability of seed capital and to remove impediments to the commercialisation of innovative ideas. For example, the Commercialising Emerging Technologies (COMET) program was launched by the Federal Government in November 1999 to provide support for the key steps in the innovation and commercialisation process in order to assist the target groups to bring their product to market.

Of all the stages in the innovation process it is the transition from research and development through incubation and commercialisation that creates the most difficulty for new firms. Many firms fail at this stage because they cannot obtain funding, appropriate management skills or access to advice to grow their innovative ideas.

A recent study[17] revealed that venture capitalists would like to see more entrepreneurs and managers in Australia with the skills to develop and take forward business proposals. This suggests that as business skills increase in this area so to will the willingness of venture capitalists to invest. The COMET program was introduced in late 1999 to address this issue.

The COMET program has been well received by innovative firms around Australia. Though the program has only been operational for six months, if current demand continues then the funding allocated to the program will be insufficient to support the number of high quality applicants. The strength of demand for the program suggests there is a strong need in the Australian business community for this kind of assistance.

The COMET program provides support to enable individuals, early growth firms and spin-off companies to maximise their potential for innovation and the commercialisation of innovative products, services and processes by supporting the key steps in the innovation process. In the case of spin-off companies they must demonstrate that they operate as a separate entity and have either (i) a written agreement; (ii) a licensing arrangement; or (iii) an arrangement to exploit technology developed prior to the spin-off.

Two forms of assistance are offered to clients of the program: individually tailored assistance developed to meet a client's specific needs with regard to commercialisation; and/or, financial

[17] PricewaterhouseCoopers for the Department of Industry, Science and Resources, entitled *Benchmarking Australian Institutional Investment in Domestic Venture Capital 2000*.

assistance to undertake an existing program of management development which will enable them to increase their capacity for innovation and commercialisation.

The first form of assistance is particularly valuable to spin-off companies. Successful applicants work with a private sector business adviser to develop a tailored plan of assistance, including strategies to attract and manage capital through equity or debt funding. The majority of strategies are designed to enable clients to develop the sound management skills, a skilled team, comprehensive business plans, and market research required to successfully compete for equity funding, particularly from venture capital fund managers and business angels. Clients implement the strategies with the assistance of individual consultants, and under the guidance of the business adviser.

Institutional investment in high risk start-up companies

A related issue is how to encourage institutional investment in high risk start-up companies. Two existing programs address this issue. The Innovation Investment Fund (IIF) Program was announced by the Prime Minister in the Small Business Statement in March 1997. The Fund aims to provide access to equity capital (venture capital) to encourage small, new-technology companies to improve the commercialisation outcomes of Australia's strong research and development capabilities.

The Commonwealth is providing $221 million under the IIF program to establish 8-9 venture capital funds in two stages. The first round of the IIF has provided $130 million in Commonwealth funding which was matched on a minimum 2:1 basis with private capital. This was established five funds of around $40 million each. The government has announced second round funding of approximately $91 million. Round Two licensees are expected to be announced in late 2000. In the second round, applicants were asked to make competitive bids on the capital ratio - between 1:1 and 2:1.

Distribution of returns heavily favours the private investor, an incentive to encourage investment in early stage ventures. Following the repayment of capital and interest on a pro-rata basis, only 10% of profit is distributed to Government with 90% going to the private sector.

On 15 March 2000, Senator the Hon Nick Minchin announced the establishment of a revolving fund for the Innovation Investment Fund (IIF) program that will make more venture capital available for small, innovative Australian businesses. The Minister acknowledged the revolving fund as an important part of the Government's strategy to respond to the message arising from the Summit that: access by Australian firms to start-up capital is crucial for securing Australia's economic prosperity and delivering jobs and opportunities for all Australians. The revolving fund means that the returns of Commonwealth capital and interest from successful investments in Round One and Two of the IIF will be reinvested in the innovation system.

The *Venture Awareness* program which became operational in February 2000 aims to facilitate the growth of Australian firms, including early stage, technology based firms, by improving their access to venture capital. This is to be achieved by establishing a set of investment benchmarks for Australian venture capital and helping to improve evaluation of venture capital investments. Funding of $1 million a year over three years has been allocated to this initiative from existing portfolio funding.

A consultancy for the benchmarking component was completed in June 2000. It found that approximately 56 per cent of all venture capital in Australia is obtained from institutional investors with 90.6 per cent of this provided by superannuation funds. This equates to 50.7 per cent of all venture capital raised in Australia being provided by superannuation funds. This later figure is notably higher than the Australian Venture Capital Association Limited (AVCAL)

reported figure of 38 per cent. PWC believe the difference in findings is likely to be due to the relatively small sample size in both surveys.

The results of the consultancy will be used to design a range of activities to improve evaluation of venture capital investments by investors, including institutional investors, and to stimulate the level of investment in Australian ventures.

Additionally, the changes to the Business Tax regime, including exemption of capital gains to the Pooled Development Funds and overseas pension funds, are likely to increase the general pool of venture capital available in Australia from both local and overseas institutional investors.

The Warren Centre, through its Enterprise Innovation 2000 initiative, is preparing to establish a 'Mentoring Start-Ups' program to promote innovation, encourage start-ups and provide services to help establish and grow start-ups via a networked service delivery model.

Another example of support for small innovative firms is the Australian Business Angels. This is a specialist equity matching service to introduce well managed investment ready companies to investors who are willing to provide capital. Investors also introduce business contacts and provide advice, such as business and strategic planning.

Expansion of COMET

The Commercialising Emerging Technologies Program was announced on 17 November 1999. Although COMET is relatively new, it has experienced a higher than expected take-up rate. Announced as a $30 million, three year initiative, if the present rate of applications continues demand is expected to result in a commitment of all these resources in a much shorter timeframe.

Expanding the COMET program will substantially increase support for the commercialisation of Australian research. It will facilitate the development of spin-off firms and other sustainable high growth, high technology firms which will have flow on benefits for employment. Additionally it will create a more educated and networked group of early stage technology managers. Developing such a group of skilled individuals will assist the growth of innovative companies into the future. The action will also encourage private sector investment in this stage of the venture capital market.

Increasing funding to COMET to double the current allocation of $30 million over three years. This would assist approximately 500 businesses.

The Group suggests that AusIndustry should investigate the role that banks and regional business advisers could play in disseminating information on the COMET program to potential applicants.

Expansion of the COMET program would ensure that COMET services are available to a larger number of start-ups including the firms resident in, and that emerge from, technology incubators. Additionally it would address the increasing demand for the program from early stage technology businesses.

Recommendation 16

To increase the growth and competitiveness of new technology firms, double funding for the Commercialising Emerging Technologies (COMET) Program to supply business expertise and improved management of the commercialisation of emerging technologies.

Cost: $30 million over three years

Responsibility for action: Business and Commonwealth Government.

Commercialising public sector research

At the National Innovation Summit, participants noted that our performance in achieving commercial outcomes from public sector research is far from best practice. In particular, we generate very few spin-offs.

Australia makes a substantial investment in public sector research (estimated $3.326 billion in 1999-00 in cash terms). The investment should contribute to a strong knowledge base, to innovation and national competitiveness, to high quality graduates and optimal commercial outcomes.

A June 2000 study by Narin for the Australian Research Council (ARC) and CSIRO, *Inventing our Future*, showed that 'there is a critical link between innovation, as expressed in the development of patented technology, and scientific research across a range of disciplines, authored at publicly-funded institutions.'

Data gathered by the US Association of University Technology Managers show that in FY1998, licensing of discoveries to industry had generated US$33 billion of economic activity and supported 280,000 jobs. At least 364 new companies based on an academic discovery were formed in FY1998, and a total of 2,578 such companies since 1980.

Recent data gathered by the Australasian Tertiary Institutions Consulting Companies Association (ATICCA) Incorporated indicate similar levels of activity, when data from both countries is measured per (local) $100 billion research income. However, if performance is compared on the basis of per capita or on GDP, it shows Australia is well behind other major players.

While it is understood that much university research will not lead directly to commercial outcomes, at least not in the short term, every effort should be made to increase both the collaborative research carried out by universities with industry and to encourage and facilitate the commercialisation of relevant university research.

Barriers to commercialisation in public sector institutions include a lack of expertise in valuing and managing intellectual property, in business planning and management and a general lack of finance for the early stages of research commercialisation. These are highlighted in an ARC report released in early August 2000, *Research in the National Interest: Commercialising University Research in Australia*. The cost of commercialisation is a significant barrier with an estimated cost put at one hundred times that of the actual research. These identified barriers need to be rectified to increase the relatively low research commercialisation rate in Australian universities.

Incentives to commercialisation

Most universities operate within very strict corporate governance regulations, set out in State legislation, some of which engenders risk averse commercialisation decisions. Thus, State legislation can be inhibiting to commercialisation decisions.

Also, it is important to strike an appropriate balance between the need to commercialise public sector research with the strong need for independent inquiry, dissemination of knowledge, technology transfer and maintenance of a system with a strong problem-solving capacity and a generator of 'public good' outcomes.

The very diverse nature of Australia's universities should not be a barrier to each institution putting in place, not only effective IP management processes, but also effective incentives for researchers to commercialise their results. These processes should address the holding of equity in spin-off companies as well as the currently preferred technology licensing route. Examples of best commercialisation practice could usefully be disseminated to other universities and public sector research agencies.

Commercialisation through licensing or spin-off company

Licensing IP to an existing firm appears to be the easiest proposition for the technology transfer arms of most Australian public sector institutions. Although not necessarily the best, this pathway may be a consequence of universities' stringent budget constraints which lead to a focus on generating revenue in the short term - financial resources are lacking to establish and fund start-up companies, including management salaries, legal, business and patent costs. Licensing involves rather less effort and depth of expertise than the creation and nurturing of a spin-off company.

Equity in a university-owned spin-off company gives academic researchers a very direct financial stake in the commercialisation of their work. This option can give the researcher a continuing sense of ownership, and may also directly involve them in the operations of the firm in a way that maximises technology transfer. Researchers may be able to be directly involved in the firm, such as through equity and directorships. Developing spin-off companies may give the greatest flexibility in developing reward systems. Also, starting a new company and taking equity is the only option if the product cannot attract interest from an existing company.

CSIRO does not allow staff to take out equity in spin-off companies. The CSIRO Board considers it could impact on public good research because of conflict of interest, and sees difficulty in equitably rewarding entire teams who may be involved in developing a product. CSIRO takes all the equity itself and staff cannot participate in any sort of share scheme with an outside agency that is working with CSIRO.

While all pathways to commercialisation should be considered, the generation of spin-offs should be encouraged in recognition of the far greater potential outcomes. Apart from greater commercial return, spin-offs can foster networks of science-based firms in a locality and facilitate future linkages, including staff transfers and graduate employment.

Intellectual Property management in universities

A recent ARC survey (November 1999) of commercialisation practices and staff incentives in selected Australian universities found that most claim all of the IP, and then apply a formula for sharing revenues between the inventor, the Faculty and the university's commercial arm. Often the commercial arms deduct 'overheads' up-front before the remaining revenue is distributed.

The NHMRC has recently issued, for comment, draft guidelines on management and commercialisation of IP. While indicating that the NHMRC is not interested in direct ownership of IP nor benefiting directly from commercial outcomes of research that it has funded, the document aims to ensure that NHMRC researchers have access to good practices for the identification, protection and management of IP and that this will, as a result, maximise the benefits and returns of public investment in health and medical research. Institutions (rather than individual researchers) will be required to declare their adherence to the guidelines.

One of the proposals in the draft guidelines should prove most effective in raising commercial awareness if it was to be extended across the institution to include **all** researchers:

> "…all material arising from NHMRC-supported research is reviewed for IP content prior to its release into the public domain."

The ARC's recent report *Research in the National Interest: Commercialising University Research in Australia,* gives consideration to changing the current ARC policy of non-intervention in IP issues arising from any of its funded research. One model it raises as a condition of award of an ARC grant, that the researcher holding the licence is to exploit any IP.

This is the model instituted early this year by the University of Melbourne to stimulate researchers to commercialise research. The University had followed the example of the University of Toronto and the Cambridge model of IP management and vested 100% of IP rights with the IP creator rather than with the institution. Along with the researcher's freedom to pursue an appropriate path to commercialisation or not is the university's freedom from financial responsibility. This lies with the researcher. The practicality may well be that most researchers (as happens in Toronto) will use the services of the university's commercialisation arm for this purpose.

Improved focus of innovation activity in universities

While acknowledging that a number of universities and public research agencies already have cooperative and productive commercialisation policies, a survey carried out for the Wills implementation committee recognised an impediment to commercialisation resulting from low levels of business skills and advice available to universities.

A pilot scheme of Innovation Centres is recommended to facilitate more effective access by all university researchers to optimal expertise, focussing on IP management, entrepreneurship and commercialisation.

The Innovation Centres could build upon existing university commercialisation arms and:

- be the first point for university researchers wishing to take their research further down the commercialisation track,
- (provide advice and assistance on Intellectual Property issues, on optimal commercialisation options, on business plans, mentoring etc;
- facilitate access to venture capital and to pre-seed venture capital;
- coordinate actions in the Research Development Fund recommended below; and,
- assist universities to improve their skills in identifying invention markets.

It is envisaged that the Innovation Centres would be established for five years and reviewed during this period to provide a basis for deciding on the future of the pilot scheme. Current university commercialisation arms might well originate proposals, either singly or in collaboration with others, combining regional strengths or complementary activities. Partners might be found in, or the proposals originate from, the public sector science agencies, university Research Offices or draw on expertise from CRCs or other university departments.

The Centres should aim to be world class establishments, fostering the commercialisation of research and new ideas and encouraging graduates to expand their horizons towards industry.

Competitive pre-seed fund

There is currently a gap in funding available to universities and to public sector research agencies to help them carry out "proof of concept" work to test and evaluate a concept to better define its potential.

The ARC identified this gap in universities in its recent Strategic Plan as the '*innovation progression gap'* and, in its recent report *Research in the National Interest*, proposed a figure of $500,000 on what could be required as seed funding for a project. Similarly, a survey by the Wills implementation committee found that the major impediments to commercialisation is the level of funding for proof-of-principle. Pre-seed funding could be provided through extension of existing competitive collaborative research grants with matching private funds (perhaps from philanthropic sources). Universities would be expected to raise at least 25 percent of the total requested from their own resources including business, their alumni and venture capital funds.

The scheme would be similar to one established in 1998 by the UK government - the *University Challenge Fund* (http://www.dti.gov.uk/ost/ostbusiness/uni.htm) - to address the provision of finance to bring university research discoveries to a point where their commercial usefulness could be demonstrated and first steps taken towards commercialisation.

Recommendation 17

To increase the commercialisation of research undertaken in universities and other public research institutions:

- *encourage the full range of options to commercialise research, noting the long-term benefits which will often accrue from the creation of spin-off firms rather than relying on licensing arrangements;*
- *encourage a review of the remuneration arrangements and incentives structures governing the research activities of staff, to maximise incentives for effective commercialisation;*
- *all universities to implement effective intellectual property management plans and consider the proposal made in the National Health and Medical Research Council's draft IP Guidelines that all material generated through university-based research be reviewed for IP content prior to its release into the public domain;*
- *establish five world class Innovation Centres as a pilot to provide commercialisation advice including on IP and financial management (Cost: $40 million); and*
- *establish a competitive pre-seed fund for universities and other research organisations. The fund would be based on the IIF model, managed by a business partner who provides a share of capital determined through a competitive tender process (Cost: $20 million from the Commonwealth Government, supplemented by business partner contributions).*

Responsibility for action: Commonwealth Government, business, universities and public research institutions to collaborate on implementation.

Clustering resources

A recurring theme at the National Innovation Summit was that collaborative activities, such as clusters, networks and incubators are an effective means of achieving increased innovation. A range of innovation benefits emanate from such forms of collaboration, including technology diffusion, knowledge leverage and exchange between firms and research institutions, strategic advice, peer mentoring, unlocking expertise within companies and organisations, and the development of the critical mass necessary to bring new ideas to market.

The benefits of encouraging connectivity have already been demonstrated through the CRC program. Continued support for the program is therefore recommended as is the need to establish connections between the incubators, CRCs and other elements of the national innovation system.

The Prime Minister's Science, Engineering and Innovation Council Nexus Working Group, in June 1999, observed that innovators who have developed a product to the 'proof of concept' stage face difficulties in moving on to the commercialisation and business development of this innovation. They noted that technology incubators have been introduced around the world as a mechanism for helping start-up firms through this difficult stage and have proven to be an

effective way of increasing the number of companies that succeed and grow, and for a relatively modest investment.

The transition from research and development through incubation and commercialisation creates many difficulties for new firms. Many firms fail at this stage because they cannot obtain funding or appropriate advice to grow their innovative ideas.

The introduction of a national incubator program will substantially increase support for the commercialisation of Australian research. This will ensure that new firms are supported through the difficult incubation phase, improving the chances of new firm survival. It will facilitate the development of spin-off firms and other sustainable high growth, high technology firms which will have flow on benefits for employment. Such a program may also generate additional collaboration and increase the availability of seed capital. Additionally it will create a more educated and networked group of early stage technology managers. Developing such a group of skilled individuals will assist the growth of innovative companies into the future.

Experience in other countries demonstrates that technology incubators are an effective way of increasing the number of companies that succeed and grow, and for a relatively modest investment. Scandinavia, Israel and the United States operate highly successful incubators with a strong technical focus. A 1996 survey of US technology incubator managers reported that 90 percent of their graduate companies were still in business.

While Australia has many business incubators, less than ten of these are specifically focused on developing young technology-based companies. Those that do exist have proved highly successful in encouraging linkages between research organisations and industry. For example, the Australian Technology Park has successfully graduated twelve companies from its incubation program with a total estimated value at the time of graduation of $5.5 million.

The new Building on Information Technology Strengths (BITS) Incubator centres provide support and information for new and growing firms, providing financial support, business skills development, marketing and sales advice, and act as mentors for new businesses.

A national coordinated Technology Incubator Program would be designed using BITS and best practice from other economies as models. Its development would require an analysis of existing infrastructure and identification of gaps and it would need to build on the resources and initiatives already in place to support new business development. The program would be fully integrated with existing business support programs and incubators would be required to have strategies for networking with elements of the science and innovation base including CRCs, technology parks, finance providers and business.

A technology incubator program of this type could be implemented at a cost in the order of $100 million over 6 years. This could provide up to 9 technology incubators (this assumes that incubators in high-technology fields other than IT&T are more expensive because of the need for other research and business facilities in addition to information infrastructure - the average funding would be $2 million per annum per technology incubator compared with $1.5 million pa per BITS incubator).

Each technology incubator could have a particular sectoral focus, encouraging connectivity between emerging firms in each sector. The program would provide closely managed environments where entrepreneurial companies can develop essential management, marketing, IT, technological and human resource management skills.

Recommendation 18

To grow new high technology firms and strengthen linkages between research organisations and business, establish a national technology incubator program based on the BITS Program and international best practice models.

Cost: $100 million over six years.

Responsibility for action: Commonwealth Government, State and Territory Governemnts, business and research institutions.

Diffusion of leading-edge technologies

Technology diffusion is a vital link in the innovation process. It is critical to improving the global competitiveness of Australian firms as it facilitates access to and the take-up of both hard and soft technologies, including process technologies, new and advanced materials, design and engineering technologies /techniques, modern management and best practice techniques and reorganisation of work flows.

Strengthening the role of technology diffusion and international linkages provides greater access for more Australian firms in both mature and new industries to new and leading edge technologies and global best practice. The take up and adaptation of the 98 per cent of new technologies developed overseas will improve industry competitiveness.

Technology diffusion allows firms, particularly SMEs without the capacity to undertake R&D, to gain access to new technologies at significantly reduced cost and risk. It builds firms' skills and confidence, improving the ability to identify, acquire and apply technologies and thereby become innovative businesses. Increased receptivity of firms is a critical factor in the ability to benefit from globally produced knowledge.

The OECD has noted that technological alliances between firms, and particularly between firms of different countries enable each partner to extend its knowledge sources, reduce research costs, extend its range of products and access new markets. Those firms engaging in international collaboration are also able to bench-mark themselves against their competitors and absorb emerging business practices.

To attract and develop international alliances it is important that Australia is seen by other countries as having the skills and technological expertise necessary to be an effective collaborator.

There are a number of issues relevant to the diffusion of leading edge technologies in Australia:

- There is a lack of information and knowledge, particularly among SMEs, about new technologies and global best practices, and their benefits for business in both new and mature sectors.
- Many SMEs, on their own, do not have access to the information or the skills to take up and adapt the new and leading edge technologies and practices required to build competitiveness in the global market place.
- Industry organisations can play a major role in technology diffusion as they frequently have the know how to attract and engage with their industry members and shape diffusion activities to effect the greatest take-up.
- Improvements in competitiveness in the longer term will outweigh the costs in accessing technology in the immediate period.

There are a number of areas where action could be taken to improve the diffusion of leading edge technologies to Australian businesses and researchers.

Increase support for international industrial R&D collaboration

Government support for international collaboration includes the Technology Diffusion Program (TDP) and the International Researcher Exchange Program (IREX). However, the TDP does not provide support for R&D costs, while IREX is focussed on promoting university research rather than industrial collaboration. There is no Government R&D support specifically targeted at encouraging international R&D collaboration by industry which is often cited as a constraint by business (particularly by SMEs).

Opportunities have recently emerged for collaborative R&D agreements with other countries. Pilot programs have been negotiated with Korea and China and discussions are being pursued with Israel. However, the pilot programs have not been taken to the next stage of full-scale collaboration.

Similar opportunities for collaborative work are provided by Australia's recently expanded S&T agreement with the EU. Whilst some support is available for travel and other expenses associated with international research collaborations, the Group believes that there is inadequate support for the research itself.

Providing $25 million a year would support international research collaborations. The minimum amount needed to support a viable program with any one country is $3-5 million a year. Matched by the same amount from the other country and with the whole amount matched by the industrial partners, a viable total of $12-20 million is then available for each country. The Group envisages $20 million would be used in this way, with the balance used to increase international research conducted through selected CRCs.

Showcasing Australian innovation

Support for showcasing through an industry-led international showcasing initiative would significantly increase international awareness of Australia's S&T capabilities. International showcasing (eg the aXcess Australia concept car) has also been demonstrated to yield considerable commercial benefits for the private sector.

In recent years Australia has targeted agreements with those countries which offer the greatest potential benefits to our companies. Showcasing technological capabilities has led to immediate business opportunities and to research collaborations that link Australian companies and their technology to partners overseas. Activities of this type in Germany, Finland and the US have brought substantial benefits and the promise of productive long-term relationships. Some $7 million is required to expand this work and take advantage of emerging opportunities. This would allow Australian participation in up to fifteen overseas events.

Technology accessibility

The Group notes that industry and researcher access and adoption of new and leading edge technologies and practices is critical for the global competitiveness of Australian firms, regardless of where developed. Networks provide access to new and best practice technology by SMEs, which generally do not have the capacity to undertake R&D and are, by themselves, finding it increasingly difficult to compete in the emerging global manufacturing environment. This is characterised by an integrated systems approach to manufacturing, in which major companies use supplier networks rather than individual component suppliers.

Network feasibility studies have identified a number of promising opportunities in areas including welding, materials technology and microelectronics. Full scale programs in these areas typically cost $3-5 million each. A new program is proposed, with funding of $30 million per annum, to allow access to emerging opportunities, such as in nanotechnology and micro-engineering.

This amount would allow up to five networks to be supported, with matching contributions from industry partners. It would include a mobility and exchange component, to bring in global specialists to assist with the transfer of technology from overseas.

Recommendation 19

To build competitiveness of Australian business through knowledge of and access to overseas science and technologies:

- *increase support for international business R&D collaboration, including through Cooperative Research Centres (Cost: $25 million per annum);*
- *increase and focus showcasing of Australian innovation capability, to build awareness of Australia as a high technology receptor (Cost: $7 million per annum for four years); and*
- *ensure that technology developed in Australia and overseas is accessible to those who need it, including researcher and business mobility and exchanges, and science and technology agreements with other nations (a range of activities will have a total cost of around $30 million per annum for four years).*

Responsible for action: Commonwealth Government, research institutions and business.

Best Practice

SMEs engaging in a high level of innovation and research and development (R&D) require access to 'best practice' information to enhance their competitiveness and to operate at the cutting edge of their industry.

Business competitiveness and profitability can be increased by facilitating the uptake of creative and entrepreneurial practices. Emphasis is on adopting an entrepreneurial culture within the business, creating the ability to generate and capture knowledge, and being innovative in areas that establish and sustain long-term competitive advantage. 'Best practice' in innovative businesses is therefore a broad concept that encompasses the delivery of goods and services, the application of imaginative management skills, and the adoption of new technology.

The National Innovation Summit identified the need to address three issues in relation to the forms of 'best practice' that are relevant to innovation. These were:

- the adequacy of existing information sources relating to innovation in industry;
- the evidence of any significant gaps in this information; and
- access to this information, particularly by small to medium-size enterprises.

There is a lack of information in the marketplace about 'best practice' and the changes that this can bring to business operations. Furthermore, we have virtually no information on which best practice approaches are of greatest benefit to firms operating in the innovation and R&D markets. The market failure in best practice information increases the smaller the size of the firm.

SMEs are often unaware of the latest information and management tools which would assist them to improve their performance. By providing the tools to access ‘best practice’ information and services, government and industry organisations can assist businesses to benchmark processes against international ‘best practice’ models. By doing so, entrepreneurial managers will be better placed to improve existing functions thereby enhancing the profitability and growth of their businesses.

A two-stage initiative is recommended. The first phase, a stocktake of ‘best practice’ programs and services, will be undertaken and the results used to identify and address gaps in current ‘best practice’ information and service provision. The aim is to collect all relevant information into one reliable, useful source. In particular, the stocktake will identify and address any ‘best practice’ models that are highly relevant to enhancing the competitiveness of businesses engaging in significant levels of innovation and R&D. The information can then be used as a basis for further initiatives to close the gaps.

Government, working collegiately with industry bodies, will develop the parameters of the stocktake. This project will be undertaken by an appropriate body in conjunction with relevant industry representatives to ensure the needs of identified sectors are adequately addressed.

The second phase, a demonstration program involving gap filling, case studies, an awareness raising database and promotional activities, would be delivered by industry associations.

Phase two of the proposal is premised on the findings of phase one. These findings may include a significant under utilisation of best practice models by industry, a lack of awareness and significant gaps in the current suite of available tools. The second phase encompasses the use of this information in conjunction with detailed case studies to demonstrate the benefits to business that have implemented best practice. The second phase also includes developing a mechanism for information distribution.

The ‘gap filling’ and measurement components of the demonstration program could involve a role for academic institutions, industry associations and agencies such as the CSIRO through review of existing training programs and measurement of results. A series of tasks including awareness raising, various information seminars and demonstration case studies will be undertaken to promote the initiative and activities and engage Australian industry. The awareness seminars will continue over a number of years to reinforce the message and reach new businesses.

Outcomes for the government in the implementation of this recommendation are an enhanced industry policy focus and greater government program effectiveness. The basis of the response to the recommendation should ultimately be industry driven, its purpose being to facilitate the first step in guiding businesses towards increased innovation and a high level of industry competitiveness. Government and industry working collegiately to increase overall economic competitiveness and long-term sustainable development is a medium to long-term outcome. Outcomes of this recommendation will aid in fostering a strengthened relationship between industry and the Government.

Workplan

The target group falls into the SME range, especially those established businesses that have a solid market base and the capacity to grow and develop. These businesses will generally require assistance to access ‘best practice’ information, and will require guidance in the area of benchmarking ‘best practice’.

The recommendation involves engaging a consultant to undertake market research and a stocktake of existing programs that encourage the uptake of 'best practice' – keeping in mind that 'best practice' is constantly evolving. There is an emphasis on not duplicating existing programs and services. Collating existing information to assess where resources should be focused is important for the program.

The recommendation would include liaison with industry representatives to address pertinent issues, such as:

- identification of industry specific areas of concern;
- development of a template for evaluating these areas of concern and identifying gaps; and
- identification of potential industry leaders in order to develop 'best practice' benchmarking case studies.

Vision, implementation, measurement and evaluation should be considered as the initial workplan is being developed.

Recommendation 20

To assist Australian small business to adopt innovation and innovation management by:

- *conducting a stocktake of innovation best practice—record results, address gaps and determine what steps the Commonwealth Government should take (Cost: $1 million over one year); and*
- *running a demonstration program through industry associations. This program would include case studies, the development of an awareness-raising database, promotional activities and a mechanism to identify gaps in innovation programs (Cost: $3.5 million over two years, or less depending on the level of industry association involvement).*

Responsible for action: Commonwealth Government and State and Territory Governments and business.

Intellectual property (IP)

IP is a fundamental component of applying and commercialising ideas. At the National Innovation Summit, a number of critical issues were noted for optimal operation of the Australian IP system, and our use of IP as a tool to maximise commercial outcomes.

A strong competitive IP system is necessary if Australian firms are to capture the benefits of their intellectual property to ensure that Australia is a competitive location for investment and technology transfer and that Australian consumers have access to the latest products. In this way it underpins the other initiatives from the Summit to encourage innovation.

Knowledge is becoming the key driver to economic and social development. Consequently, it is increasingly important that Australian firms and research institutions understand how to protect and capture the benefits of their innovations. Anecdotal evidence suggests that Australians have a poor track record of capturing the benefits from their leading edge innovations. Furthermore it is important that all Australians understand how the IP protection systems support the economic and social development of the country.

The need to improve the awareness of intellectual property management within various groups in the Australian community (eg. business, particularly small business, researchers, educational institutions) has been identified by, for example,

- a range of fora and reviews including the Summit and The Advisory Council on Industrial Property (ACIP) report on the enforcement of patents.
- formal market research which IP Australia has conducted and anecdotal feedback it has received in dealing with various stakeholder groups; and

- in the development of the government's biotechnology strategy.

Also, more firms are becoming aware of the value of their intellectual assets. PricewaterhouseCoopers LLP recently conducted an intellectual asset management trends analysis. It reported a rapid increase in the value of intellectual assets over the past decade and in 1998, they accounted for more than 78 percent of the total value of the S&P 500. As a result, companies with large portfolios of intellectual assets are re-assessing their management practices to focus on what is now becoming the main source of value in the new economy.

The intellectual property protection system is not well understood in government circles, and there is a poor understanding of the interrelationship between IP law and economic outcomes. Unfortunately there is limited research being conducted in this field and so governments do not have a good base on which to develop high quality policy. A multidisiplinary research centre which brought together economic, commercial, legal and technical aspects could provide research and collate data to underpin high quality policy development related to the IP system. Such a centre could also be used to identify best practice to support awareness activities.

IP Australia has been running an IP awareness campaign as part of its marketing strategy, through such activities as regional seminars, presentations, attendance at shows and exhibitions and the development of information material on CD, internet and other media.

The administration and policy development of the various elements of the IP protection system is shared between five Federal Government departments. This can be confusing to businesses and innovators seeking information on IP protection and the system. Creation of a single entry web point facility should assist in providing speedy and relevant information.

The Melbourne Institute of Applied Economic and Social Research's 1998 paper on *The Use of Intellectual Property by Large Australian Enterprises* indicates there is a strong correlation between intellectual property protection and company profitability.

Over recent years there have been a number of reviews aimed at improving the Australian IP system:

- The review by the Australian Law Reform Commission on the industrial design system recommended the introduction of a more effective and streamlined system for protecting industrial designs. The Government announced on 16 February 1999 that it would introduce this new system;
- ACIP conducted a review of the petty patent system and recommended replacing it with a new system called the innovation patent. This proposed system would provide quick, inexpensive protection for minor inventions that cannot be protected under the existing patent system. Overseas experience suggests that such systems are of particular importance to SMEs. The Government announced on 20 February 1997 that it would introduce this new system.

Interest groups have strongly supported the early implementation of both these new protection systems, but legislation is yet to be enacted.

ACIP, in its report on the *Review of Enforcement of Industrial Property Rights*, proposed a number of measures to improve the certainty of patent rights and to make it cheaper and easier to enforce rights. The Intellectual Property and Competition Review (IPCR), which is currently underway, is a major review of the impact of the intellectual property protection system on competition and is due to report in September 2000. In its interim report, the IPCR endorsed the ACIP recommendations and made a number of other recommendations to improve the operation

of the IP protection system. The recommendations made by these reviews have picked up key concerns by major industry and professional groups.

Australia is currently considering accession to the Madrid Protocol which will make it easier for Australian firms to register their trade marks in major markets worldwide. Our major trading partners have joined, or are in the process of joining, this protocol (the United States is well advanced in its steps to join), so it is important Australia accede to ensure that our firms are not disadvantaged in marketing their products.

The Patent Law Treaty which was recently concluded will simplify administrative processes associated with the obtaining and maintaining of patent rights, reducing costs and complexity for users of the patent system world-wide.

IP Australia, the Department of Foreign Affairs and Trade, Attorney Generals Department, the Department of Communication, Information Technology and the Arts and Agriculture, Fisheries and Forestry - Australia are pursuing a range of activities through the forums of the World Intellectual Property Organisation (WIPO), the World Trade Organisation (WTO) and the Asia-Pacific Economic Community (APEC) to make sure the harmonisation and integration of the international IP protection systems meet the needs of Australia.

The Copyright Amendment (Digital Agenda) Bill and Copyright Amendment (Moral Rights) Bill have been introduced to increase the harmonisation and integration of our law with international treaties on copyright and related rights.

There are a number of recommended initiatives to address these issues. All of the actions listed below can be funded from within IP Australia's existing resources.

Recommendation 21

To strengthen Intellectual Property (IP) protection of Australian research in the global economy:

- *bolster IP Australia's intellectual property awareness campaign to include regional seminars, presentations, attendance at shows and exhibitions and the development of information material on CD, the Internet and through other media;*
- *develop a single-entry point web facility providing Australian businesses and innovators with easy access to information relating to the national and international IP system;*
- *establish a multi-disciplinary research centre to conduct research that will underpin high-quality policy development related to the IP system. The centre could also identify best practice in support of awareness activities;*
- *Government urgently respond to recent reports concerning the intellectual property system and implement subsequent actions;*
- *legislation be expeditiously enacted to progress the proposed industrial designs and innovation patent systems; and*
- *Government should agree to join the Madrid Protocol, and implement this decision quickly.*

Cost: within IP Australia's existing resources.

Responsible for action: Business, Commonwealth Government and research institutions.

Identify and remove regulatory impediments to entrepreneurship

The regulatory burden is often cited as an impediment to innovation - that is, the requirements and cost of Government '*red tape*' constrain innovative activities. While, considerable effort has been expended by governments, both Federal and State, to address this issue, there has not been a consideration of the unique needs of start-up innovative companies. Addressing the needs of

such companies, and better targeting regulatory and education initiatives to meet their needs, will improve the climate for innovative firms while providing for more cost effective Government regulation and / or assistance.

At the Summit, participants noted that identifying and removing regulatory constraints to entrepreneurship and innovation would stimulate new firm growth. Particular concerns were risk and reward structures, and ensuring that businesses have access to timely and cost effective advice concerning relevant regulations.

Business innovation will increase when there is clear understanding of the regulatory process / regulatory burden, greater involvement in the targeting of regulation reform initiatives and where any inappropriate barriers to commercialisation of research are removed.

Government needs to recognise the impact on innovation in the regulation making process and should ensure accountability and transparency of new regulations to allow better targeted regulation reform and education initiatives and improved targeting of Government business advice and assistance.

A two stage process is suggested to remove regulatory impediments to entrepreneurship. Firstly to identify regulatory burdens and secondly, to act on these findings.

Identifying regulatory burden

A number of activities could identify where regulation retards innovative behaviour.

Firstly, a consultancy could be commissioned to map the costs and information requirements of start up companies at each stage of their development from concept stage.

Based on the findings of the consultancy, an integrated suite of business advice tools, education options and materials could be developed to assist new start-up companies choose the most appropriate corporate structure at each stage of their development.

Secondly, a stock-take of regulatory reform initiatives undertaken by the Howard Government could be undertaken to gauge their effectiveness and opportunities for further reform. In the stock-take, consideration should be given to the impact on innovation and the needs of start-up companies. (it may be possible to piggy-back on other Office of Regulation Review (ORR) reporting requirements).

Thirdly, it is important to ensure that new regulations do not create new impediments to innovation in business. The impact on innovation could be explicitly considered in the preparation of Regulation Impact Statements (RIS). RISs should be subject, where practicable, to consultation and comment prior to new regulations being made, and require a public comment on their acceptability by the ORR prior to consideration of the regulation by Parliament. Amendment to the RIS guidelines would require Cabinet, and possibly CoAG, endorsement.

New regulations should provide, where possible, a technologically neutral approach. New regulations, and supporting explanatory material (including the RIS), should be made available electronically by all regulators as soon as possible and, where possible, should be made available electronically for comment prior to enactment.

Acting on the findings

Upon completion of identifying the regulatory burdens, the Group proposes developing (either internally or through consultancy) new business advice and education tools on issues such as choosing the best corporate structure.

Primary carriage of the program would be by the Federal Government and would require the active involvement of a range of regulatory agencies and the Office of Regulation Review.

Estimated costs to conduct the recommended activities are:

- consultancy to map the costs and information needs of start up companies (Cost: approximately $400,000);
- stock take of regulatory reform initiatives already undertaken (Cost: $100,000);
- amending regulation impact statement (RIS) guidelines to explicitly recognise the impact on innovation (Cost: negligible);
- public accountability of the acceptability, or otherwise, of RISs (Cost: negligible);
- regulations to adopt, where possible, a technologically neutral approach (Cost: negligible);
- electronic accessibility of new regulation and explanatory material (Cost: negligible); and
- development of an integrated suite of business advice tools and education options to assist innovative companies (Cost: $400,000 - $1.2 million).

Much of the information already exists, albeit available in a piece-meal manner. An initial task for implementation would be to consolidate this information and then utilise external consultants to 'fill the gaps'. Potential sources of information include:

- program evaluations (particularly AusIndustry customer feedback data);
- professional organisations (Institute of Accountants, etc);
- Office of Regulation Review; and
- previous Productivity Commission reports.

The main constraint is likely to be potential competing regulation reform priorities (ie. other initiatives targeting other groups such as small business, regional Australia or the environment). Other constraints include potential defensive positions taken by some regulators / business assistance providers and, while noting that the financial outlays are relatively small, a lack of seed funding

The recommendation could be implemented in approximately 2 years.

Recommendation 22

To minimise the regulatory burden for innovative start-up firms:

- *establish a consultancy to map the costs and information needs of start-up firms (Cost: $400 000); and*
- *develop an integrated suite of business advice tools and education options to assist innovative firms (Cost: $400 000 to $1.2 million).*

Responsible for action: Business and Commonwealth Government.

Entity taxation

At the Summit, participants noted that the creation of a simple tax flow-through investment vehicle would stimulate investment in innovation by individuals and institutions.

Venture capital entities (including the Innovation Investment Funds) are typically structured as trusts and sometimes as partnerships. Currently partnerships (without limited liability) and trusts

(with limited liability) are tax flow-through vehicles — that is, income and capital gains are taxed in the hands of the investors rather than in the entity.

Flow-through taxation is important to preserve the 50 per cent CGT discount for individual investors, the concessional treatment for domestic superannuation funds and the CGT exemption for overseas pension funds. Without a tax flow-through vehicle, gains from investments would be taxed at 30 per cent within the entity rather than at half the marginal tax rate of the individual investor if they invested directly.

Without a tax flow-through entity in Australia, overseas investors will want to invest directly from overseas rather than through an Australian-based venture capital entity. If foreign investors invest directly, it may reduce the potential spillover effects of the presence of experienced foreign investors enhancing the capacity of local investors to assess and undertake high-risk investments.

- From 1 July 2001, trusts will be taxed as companies (on assets acquired after 23 December 1999) unless the trust is eligible to be taxed as a Collective Investment Vehicle (CIV, see below), which provides for flow-through taxation. Many, if not most, venture capital trusts would not be eligible for CIV treatment and none of the IIFs would be eligible.

- It is possible that partnerships will become more attractive as a vehicle for venture capital investors because partnerships are a tax flow-through entity. However, partnerships do not provide limited liability. The lack of limited liability may not be a problem for an investment vehicle if it is appropriately structured and the activities of the vehicle are restricted to investment.

The extent to which the introduction of the entities taxation arrangements (taxing trusts as companies unless they are CIV compliant) will impede investment in innovation is not yet known. There is some anecdotal evidence that funds managers are already adapting to the new environment. In addition, recent reports have suggested that investment in the venture capital sector is increasing.

Recent changes to taxation arrangements that will promote investment in innovation

The Government has recently made a number of major changes to the taxation system that will have the effect of stimulating investment in innovation by individuals as well as institutions. These changes, such as the halving of CGT for individuals and the provision of CGT roll-over relief, have long been objectives of the innovation community. Measures have also been introduced to promote investment in venture capital by institutions through the targeted CGT measures for superannuation funds investing through the Pooled Development Funds (PDF) program and the overseas venture capital tax concession. In additional, many of the other measures introduced as part of the Government’s business tax reforms will have a positive impact on investment including in the venture capital sector.

It would be appropriate to judge the effectiveness of these major reforms to the taxation system, in particular the changes to the CGT, before additional major changes to the tax system are considered.

If the new CGT regime attracts sufficient numbers of investors to venture capital then venture capital funds in the future may well be able to meet the widely-held criterion (300 investors) for CIV compliance. Alternatively, venture capital funds can be structured as partnerships and there is already evidence that this is happening.

The United States situation

In the US, Limited Partnerships (and Limited Liability Companies) are tax flow-through vehicles and are used as the vehicle of preference for venture capital investors. Unlike Australia, the US has a classical tax system and not an imputation tax system. The use of tax flow-through vehicles is particularly important in a classical tax system because it prevents the double taxation of income. In Australia, the imputation system prevents the double taxation of income by providing franking credits for any company tax paid. Under an imputation system, the company tax system is a withholding tax and not a final tax.

Establish a sliding scale capital gains tax regime for investments in innovation based companies

The concept of variable capital gains tax (CGT) rates was raised at the Summit and considered by the Review of Business Taxation. In its response to the Review, released on 21 September 1999, the Government announced a series of actions to reform Australia's business tax system. These included:

- for individuals, only 50 per cent of capital gains being taxed, with the result that the highest rate of tax for individuals will effectively be 24.25 per cent;
- for superannuation funds, only two thirds of capital gains being taxed, effectively meaning a concessional tax rate of 10 per cent;
- promoting venture capital investments in Australia by exempting capital gains earned through Pooled Development Funds by Australian superannuation funds; and
- exempting from capital gains tax, investments in venture capital projects in Australia by non-resident tax exempt pension funds, such as US and UK pension funds.

The decision to introduce a two-step CGT rate was taken in recognition of the problems inherent to a sliding scale CGT rate, that is, it can:

- lead to a lock-in effect where marginally profitable investments are held longer to increase tax advantages;
- be complex and costly to administer;
- involve high compliance costs; and
- have a large impact on revenue

Collective Investment Vehicles

The Group proposes five actions to develop an entity taxation regime that is most suited to innovative behaviour.

Firstly, *seek amendment to CIV legislation* to improve ability of venture capital funds to achieve CIV status and attract a mix of different investors including individuals, pooled investment entities such as superannuation funds, and overseas entities such as overseas pension funds.

The draft CIV legislation could be modified to improve the ability of different investors, all of whom could invest through a CIV individually, to invest through a CIV together. This would be a relatively minor amendment to the current draft provisions. It would also enable domestic investors to benefit from the presence of experienced foreign investors. This may enhance the capacity of domestic investors to assess and undertake high risk investments and thereby promote greater depth in the market for innovation investment. The cost to revenue of a well targeted change to the CIV legislation to allow entities that are proposed to be allowed to separately invest in CIVs to be able to jointly invest in CIVs would be relatively small.

Secondly, *seek transitional CGT roll-over provisions for trusts converting to partnerships* so that venture capital trusts that wish to roll-over into a partnership structure can do so without triggering CGT. This issue was considered and rejected by the Review of Business Taxation (RBT).

Thirdly, *monitor venture capital fund use of available tax flow-through vehicles*: collective investment vehicles (CIVs) and partnerships.

Along with the introduction of the unified entities taxation regime and the CIV provisions, the Government has introduced a range of other tax reforms that have the potential to impact on innovation investment by both individuals and institutional investors. The extent to which total tax reform will impact on innovation investment will not be known until these changes have been fully implemented and operational for some time. As such it is appropriate to monitor investment in innovation broadly and the use by venture capital funds of the available tax flow-through vehicles. This will provide the basis for evaluating of the impact of these changes on innovation investment.

Fourthly, if monitoring of venture capital fund use of available tax flow-through vehicles indicates vehicles are not appropriate, *seek creation of a tax flow-through vehicle restricted to investing in innovative businesses*. Innovation Investment Vehicles (with CIV status) could be approved by the IR&D Board and be subject to similar conditions as IIFs in regard to allowable investments.

If, once sufficient information has become available on the use of the available tax flow-through vehicles, it becomes apparent that the CIVs and partnerships are not appropriate vehicles for venture capital investment, further amendments could be sought to provide a vehicle that is better suited to venture capital investment.

Fifthly, *seek amendment to Pooled Development Funds (PDF) legislation to allow CIVs to wholly own a PDF* in the same way as deposit taking institutions (banks), life companies and superannuation funds are currently allowed to own PDFs.

The CIV is the Government's proposed approved structure for collective investments. The Government may wish to encourage such vehicles to make investments in the venture capital sector. This could be achieved by allowing CIVs to own PDFs so that they can gain the concessional tax treatment provided to PDFs for their eligible investments. The CIV structure would allow the tax-free nature of PDF dividends to flow-through to investors.

Recommendation 23

Ensure that venture capital and start-up firms are not constrained by entity taxation in Australia - a detailed explanation of measures is provided at www.isr.gov.au/industry/summit

Cost to revenue to be determined.

Responsible for action: Commonwealth Government in consultation with business and research institutions.

Government purchasing

It may be possible to enhance innovation through Government purchasing by establishing a culture in Commonwealth, State and Territory Government agencies which recognises the benefits of buying from innovative Australian enterprises.

The benefits of supporting innovation through government purchasing can be significant for both government and industry. For government, there is potential for better value for money outcomes in purchasing and the opportunity for improved policy coordination and delivery. For industry, the existence in government of more positive and receptive attitudes towards the products of

innovative Australian small-medium enterprises (SMEs) can result in valuable and timely contracts which enhance the long-term survival and growth prospects of these companies.

Increasing the attractiveness of innovative Australian products in the government market place requires initiatives designed to raise awareness, knowledge and skills in government and industry alike..

Although purchasing policies at the Commonwealth and State/Territory levels recognise the contribution that purchasing makes to industry development, more can be done through government purchasing to improve the environment for innovation in Australia, and to emphasise that support for innovation through purchasing is compatible with the principles of value for money, responsible risk management and agency accountability.

A more supportive purchasing environment for launching innovative goods and services would provide firms, particularly innovative small to medium enterprises, with greater certainty of cash-flow and the opportunity to demonstrate their products to prospective buyers, thereby enhancing their prospects for longer-term growth. More broadly, modification of existing arrangements would improve the culture of Australia's existing innovation system.

For government, establishing stronger links between purchasing arrangements and support for innovation could lead to better value for money outcomes from the purchasing process. Such links would also improve the cost effectiveness of the Government's R&D, technology commercialisation, education and training, and research programs by enhancing the market prospects for goods and services developed with government assistance. However, any modifications to existing government procurement arrangements to increase support for innovative firms require careful design to ensure consistency with Australia's international trade obligations.

A significant impediment to using purchasing to provide better market support for innovative goods and services and entrepreneurial companies is the culture of risk aversion that exists within many government agencies. This culture favours well-known or established products that offer agencies proven solutions and an assurance of guaranteed whole-of-life support. By comparison, goods and services of innovative small or medium-size Australian companies, which may provide agencies with technically superior or more economical solutions, are often less well regarded because of a poor appreciation of the capabilities of these firms and their products among potential government and large private sector buyers.

Development of more positive and receptive attitudes towards the products of innovative Australian SMEs among government agencies requires a sustained effort towards the objective of facilitating full and fair participation by innovative firms in the government market place.

A new program is recommended to overcome the problems that innovative SMEs can experience in gaining access to the government market place. Estimated cost of the program is $10 million over three years. Resources for the program would include the following elements:

Self-help technical resources would be developed to:

- provide SMEs with information that will de-mystify government purchasing policy and processes;
- describe and explain the steps involved in tendering for government contracts;
- describe tenderers' responsibilities;
- indicate the expectations of government agencies when evaluating tenders; and

- enable government agencies to better assess and manage any risks associated with buying products from innovative SMEs.

A network of up to 20 facilitators would operate nationally to:

- provide practical advice and guidance to SMEs on the use of the resources described above;
- work with innovative SMEs to develop and implement business strategies that would enable them to increase their probability of winning government contracts;
- provide broker services on commercial terms to SMEs in relation to post-tender contract negotiations;
- work with government organisations to identify projects (or elements of projects) within government agencies that could represent potentially valuable tendering opportunities for innovative SMEs; and
- assist Government to market the program.

The facilitators would be selected through a competitive process in which formal applications would be sought for the positions. The program would co-fund on a dollar for dollar basis certain eligible costs incurred by an SME or government agency in engaging a facilitator. Apart from assisting SMEs to win specific government contracts, an important role for each facilitator would be to transfer knowledge, information and skills to SMEs to improve their longer term performance in the government market place.

Facilitators would be given professional development on an annual basis by the Department of Industry, Science and Resources to ensure they remained familiar with developments occurring in purchasing and other relevant policy and program fields. These occasions would also enable facilitators to raise issues relating to the administration of the program and the quality and relevance of its resource materials.

The facilitator network may be built on the existing Industrial Supplies Office (ISO) Network. The ISO is a network of organisations throughout Australia and New Zealand, funded by Commonwealth, State and Territory governments and managed by industry, with the objective of maximising market opportunities for local manufacturing and value-adding companies. Significant beneficiaries of ISO's work are smaller companies without the resources to undertake marketing campaigns that compete with those of large multinational corporations.

A Marketing Strategy would be developed to:

- raise awareness within agencies of the link between procurement and innovation as a policy objective of the Government; and
- publicise and promote the program particularly government agencies and SMEs.

The Marketing Strategy would include Success Stories in the form of case studies that would be developed and disseminated to demonstrate how innovative goods and services can assist the attainment of agency purchasing objectives. The case studies would be based on SMEs and larger companies that have been successful in using sales to public sector organisations as a basis for other sales, particularly in export markets. The aim would be to steadily increase the number and range of the case studies to demonstrate their relevance to government agencies and other buyers.

The policy rationale for the program and its supporting resources, case studies and information providing news and updates to stakeholders, would be placed on a website that would be linked to those of all government agencies. Contact information for staff administering the program would also be provided on the website.

The Government would develop and administer the program, and monitor progress towards its objective of fostering innovation through a more supportive government purchasing environment. In this respect, some indicators for measuring the success of the program would be:

- rising demand for services provided through the program's facilitator network, and the sustained growth of similar private sector services to facilitate SME access to public and private sector markets for innovative goods and services;
- an increasing proportion of government contracts being won by SMEs that have supplied innovative, cost-effective solutions to the requirements contained in tender specifications; and
- increasing evidence that governments in Australia are becoming more informed buyers of goods and services produced by innovative SMEs.

The estimated cost of the program is $10 million over three years.

The program infrastructure would be transferred to the private sector for maintenance and development at the end of three years. The question of whether further Commonwealth financial support should be provided after this time would be considered as part of the evaluation to be undertaken during the third year of the program.

Recommendation 24

Establish a new Commonwealth Government and State Government Purchasing Program including:

- *self-help technical resources to analyse and assess risk;*
- *a facilitator network to assist innovative small to medium enterprises to implement strategies aimed at winning more government contracts (builds on the existing Industrial Supplies Office Network);*
- *marketing strategies to raise awareness within agencies of the link between procurement and innovation; and*
- *a website which will contain policy rationale, supporting resources, case studies and information providing news and updates to stakeholders about the program.*

Cost: $10 million over three years.

Responsible for action: Commonwealth Government and State and Territory Government and business.

TABLE A

INNOVATION SUMMIT IMPLEMENTATION GROUP RECOMMENDATIONS*

Rec #	Description	National Innovation Summit Source Recommendations
Culture 1	Raising awareness of innovation	Recs # 1,3,7,8,9,11,12,13,15,20, 28,31,39,40,115
Culture 2	Young Entrepreneurs Program	Recs # 10,14,12,22,28,33,84
Culture 3	Enterprise and Innovation Scholarships	Recs # 14,15,18, 21,23,24,25,33,72
Culture 4	Online Curriculum Materials	Recs # 15,18,21
Culture 5	National Review of Teaching	Recs # 18,34,114
Culture 6	2000 degree places in Maths, IT etc	Recs # 32
Culture 7	Cross disciplinary study units and industry placements	Recs # 14,16,17,21,23,32,71,74,75,76, 104,105
Culture 8	HECS extension and self education in centres	Recs # 16,18,19,32
Culture 9	Innovation measurement strategy	Recs # 6,41
Culture 10	Reporting intellectual capital and intangibles	Recs # 41,45,52,53,54,55,56,57
Generating Ideas 11	Enhance R&D Tax Concession	Recs # 110,111
Generating Ideas 12	Increase Australian Research Council funding	Recs # 113,114,115,117
Generating Ideas 13	Increase research infrastructure funding	Recs # 32,113,114,115,117,119
Generating Ideas 14	Internet access point and diagnostic for innovation programs	Recs # 29,95,97,98,99,100,101,108,124,127,139
Generating Ideas 15	Promotions of research philanthropy	Recs # 89
Acting on Ideas 16	Extend Commercialisation Emerging Technologies program	Recs # 40,83,85,86,92,93,125,126
Acting on Ideas 17	Commercialising public sector research	Recs # 40,70,71,72,74, 75,76,82,83,84,85,87,88,126,129
Acting on Ideas 18	National Technology Incubator program	Recs # 74, 75,77,78,79,80,81,82,83,93,102,116,126,137,138,139,140
Acting on Ideas 19	Accessing international science and technology	Recs # 73,75,79,80,91,96,102,109,130,131,132,133,134,135,136,137
Acting on Ideas 20	Best practice in innovation Stockdale/demonstration	Recs # 7,37,38,82,101,125
Acting on Ideas 21	Intellectual property legislation/awareness	Recs # 20,46,47,58,59,60,61,62,63,64,65,66,67,68,128,129
Acting on Ideas 22	Minimise regulatory burden	Recs # 42,43,44,45,50,69
Acting on Ideas 23	Entity taxation / collective investment vehicles	Recs # 44,48,49,51,92,94
Acting on Ideas 24	Enhancing innovation through Government purchasing	Recs # 112

*** This list of recommendations was sourced from the Innovation Summit Implementation Group.**
The accompanying table - Table B contains a description of each of the National Innovation Summit recommendations.

TABLE B

NATIONAL INNOVATION SUMMIT RECOMMENDATIONS*

Rec #	NIS Rec	ISIG Rec
1.	Develop a broad innovation culture in the community.	**1**
2.	Create a shared vision through an action framework, including a plan for resource allocation	**Addressed through all recommendations**
3.	Strong political leadership to champion the creation of an environment that supports and sustains innovation.	**1**
4.	Signal priority of innovation by enhancing the Chief Scientist's role.	**Addressed by the Chief Scientist Capability Review**
5.	The Chief Scientist to conduct a substantive whole-of-government strategic review of innovation-related activities and skills.	**Addressed by the Chief Scientist Capability Review**
6.	Develop Innovation Indices to monitor and provide feedback on the progress to becoming an innovation-driven economy.	**9**
7.	A national advertising campaign promoting and celebrating entrepreneurship and innovation to: • reduce the stigma of failure • Engender community support • Publicise innovation, not just R&D	**1**
8.	Facilitate the transition to a can-do society. • Encourage an entrepreneurial culture through a business driven change management program - showcase success stories, staff exchanges and graduate placements in firms. Demonstrate innovation successes to industry widely	**1**
9.	Initiate national innovation and entrepreneurial awards	**1**
10.	Development of a program akin to the US Business Plan Olympiads.	**2**
11.	ISR negotiate the inclusion of awards for the human dimensions of innovation within existing and relevant award programs	**1**
12.	Greater focus on improving the return from the public investment in science and technology through the provision of support for entrepreneurship	**1& 2**
13.	Develop an interactive web site containing "good news stories" and the Working Group's case studies, to assist in enterprise learning.	**1**
14.	Establish partnerships between business, government and academia which develop the needed educational programs on innovation and entrepreneurial skills	**3,2& 7**
15.	Establish a curricula which balances knowledge content, innovation, entrepreneurship and creativity in the whole education system.	**1,3 & 4**
16.	Provide postgraduate grants, incentives to firms for staff entrepreneurial training, talent identification program	**7 & 8**
17.	Higher Education and industry to be more pro-active in developing skills in technology and intellectual property management. Include IP in higher education curriculum	**7**

Rec #	NIS Rec	ISIG Rec
18.	Reform and resource the education system to promote life long learning, develop creativity, entrepreneurship and innovation. Identify and disseminate examples of lifelong learning and support public champions promoting it. .	**3,4,5 & 8**
19.	Reduce the cost of lifelong learning through mechanisms such as tax incentives	**8**
20.	Continue to develop public awareness of the importance of IP and innovation (through government providing appropriate incentives and support) including: • add IP content to science and technology programs for secondary school students • run training for researchers and technology managers in public research institutions and managers of SMEs in the strategic use of IP advisers in commercial negotiations and for risk management purposes – drawing on international expertise to ensure we achieve world best practice • run courses/information sessions for researchers and technology managers in public research institutions and managers of SMEs that focus on the specifics of IP regimes in our major trading partners • develop a public awareness campaign through providing public recognition for successful Australian innovations.	**1,7 & 21**
21.	Business Council of Australia and the Department of Employment, Training and Youth Affairs (DETYA): • support the reforms under way to broaden the range of choices available in schools for vocational learning, including structured workplace learning and the attainment of vocational qualifications in school • support enterprise education and the development of entrepreneurial attributes as essential components of curriculum in order to enable young people to: – experience real-life situations, learn to take risks, identify opportunities to improve products, processes and services relevant to meeting client needs, deal with failure and understand their own strengths and weaknesses, and – develop an understanding of business, including the importance of combining subject matter expertise with a broad range of skills needed to communicate effectively with clients, identify client needs and develop creative solutions drawing on a range of disciplines.	**3,4 & 7**

Rec #	NIS Rec	ISIG Rec
22.	Expansion of leadership development programs aimed at community leadership, such as the Williamson Community Program, tertiary education leadership programs, as well as supporting youth development activities aimed at developing leadership skills in young people.	**2**
23.	• Target marketing under the auspices of the Australian National Training Authority (ANTA) and similar bodies to promote the value of industry involvement in education and the importance of school–industry linkages • support by businesses through greater work placement opportunities and active liaison with local schools about job opportunities, students' career options and the needs of business • the expansion of business practice firms, and • improved integration by governments of school–industry programs with other programs, services and activities to maximise their effectiveness. DETYA to develop a Workshop Series designed for educators and leaders in industry to create a new curriculum that would engage young people in a creative way in joint learning programs.	**3 & 7**
24.	Encourage a two way flow between teachers and industry	**3**
25.	Increase support for cooperative industry-education programs	**3**
26.	A National Innovation Strategy with specific innovation targets over one, five and ten years to "turn Australia round"	**Addressed through all recommendations**
27.	Establish an independent National Commission on Innovation Assessment. • Develop a National Mission statement (strategy) on innovation and establish an inclusive taskforce to move a national campaign forward. • Vest carriage of the national innovation agenda in some form of industry-led Council • A key issue is coordination of elements of the innovation system	**Addressed through all recommendations**
28.	Create a non-government national foundation to foster entrepreneurship. Improve the understanding of all elements of the national innovation system. Evaluate the establishment of "Innovate Australia" as a business proposition.	**1 & 2**

Rec #	NIS Rec	ISIG Rec
29.	Develop and migrate towards an "ideal coordination model".	**14**
30.	Develop an effective framework through which Australia's emerging strengths can be identified and set priorities for further development of innovative industries, and to better coordinate government support programs. This will require a coordinated effort involving Federal and State governments, as well as industry and research leaders. The framework should also be used to provide a rational approach to maintaining and building the science and technology infrastructure base in Australia.	**Addressed through all recommendations**
31.	Industry to encourage growth through innovation	**1**
32.	Double the current expenditure on education as a proportion of GDP over a 10 year period	**6,8 & 13**
33.	Support innovation and entrepreneurship training to close key skill gaps (such as marketing and funding) and to determine technology needs. Specific programs would need to be geared for most companies of less than 500 people.	**2,3 & 7**
34.	Undertake an analysis of education and innovation linkages to understand the long-term demographics and biases driving the system.	**5**
35.	Foster foresighting as a mechanism to identify emerging innovation skills gaps	**Addressed through Sectoral based Action Agendas**
36.	Attract highly skilled migrants and former Australian residents to expand the technological capability	**Addressed through Business Migration Program (DIMA)**
37.	Companies explore the options for developing incentives and rewards for employees in order to build enterprise alignment.	**20**
38.	ISR to fund a research study, to be undertaken by industry associations, working cooperatively, to monitor and regularly report on trends in organisational alignments in business.	**20**
39.	Incorporate good case studies into a National Clearing House on Enterprise Learning	**1**

Rec #	NIS Rec	ISIG Rec
40.	Encourage a more innovative management culture: • Top-level chief executive officers of innovative companies to discuss their strategies to encourage innovation. • Provide subsidies to enable SMEs to train their staff in innovation and entrepreneurship.	**1,16 & 17**
41.	Establish an independent National Commission on Innovation Assessment as a tripartite body involving governments, industry and the research community • to develop a shared national understanding as a guide to future actions and the recommendation of national innovation targets, through the preparation of definitive statements on our innovative status across a range of metrics • to assess national and international progress in developing innovation metrics and advise on the preferred activities of the Australian Bureau of Statistics in this area to promote firms' awareness of the value of benchmarking their own innovation performance and encourage provision of expert advice to build these capabilities within firms	**9 & 10**
42.	Review regulations to remove impediments to innovation. Eliminate duplications and inconsistencies in regulation and legislation through COAG, Ministerial Council or similar, with industry input	**22**
43.	Include innovation in regulatory impact statements and a statement of intent	**22**
44.	Implement changes to the tax system to minimise compliance costs and impediments to innovation and entrepreneurial behaviour. Review tax laws to ensure they do not act as a disincentive to IP protection. A team of professionals, academics, investors and business people to develop draft guidelines for amendment to the tax system	**22 & 23**

Rec #	NIS Rec	ISIG Rec
45.	Review amendments to the tax laws along the lines recently proposed in the United Kingdom (on a revenue-neutral basis) concerning deductions for R & D expenses and writing off capital costs to ensure neutral treatment across different kinds of IP rights and for tax-loss companies and public research institutions to facilitate unlocking their IP.	**11 & 22**
46.	Support amending the *Trade Practices Act 1974* in accordance with recent recommendations of the National Competition Council (NCC) to extend the current IP exemption to all relevant kinds of IP to provide certainty for owners and licensees wishing to invest in innovation and exploit exclusive rights attaching to IP, and consider: • reviewing the ACCC/NCC interpretation of the IP exemption to determine whether, having regard to the likelihood of it being upheld by a court, legislative amendment is desirable to provide certainty for enterprises wishing to invest in innovation as owners and licensees of IP.	**21**
47.	IP legislation - clarify ownership and valuation, and improve defensibility. IP legislation should take account of major markets, where not conflicting with the national interest	**21**
48.	Create a simple tax flow through investment vehicle for innovative companies	**23**
49.	Establish a sliding scale capital gains tax regime for investments in innovation based companies	**23**
50.	Review and reform regulatory requirements for fund raising documents	**22**
51.	Allow easier establishment of PDFs by consortiums and business angels. Expand and promote IIF and PDF amongst institutional and individual investors.	**23**
52.	Address the issue of intangibles on balance sheets. Establish a Working Group to review the external reporting framework of intangible assets and recommend ways of improvement. Develop accounting standards for better disclosure of intangible assets	**10**
53.	The Australian Accounting Standards Board, the accounting profession and business develop new reporting framework of intangible assets and recommend ways of improvement. Develop accounting standards for better disclosure of intellectual capital and innovation in the process of value creation in business.	**10**
54.	At the OECD, lead the acceptance and adoption of global guidelines for valuing and reporting intellectual capital	**10**
55.	Lead in the development of global guidelines for valuing and reporting IP	**10**

Rec #	NIS Rec	ISIG Rec
56.	Mandate regular reporting on innovation management (IP)	**10**
57.	Enhance the awareness of the benefits of measuring innovation performance. • Provide expert advice to help firms build up their capabilities in measuring innovation performance. • Provide information and guidelines for the development of better benchmarking tools. • ISR, in conjunction with the BCA, Ai Group and ACCI develop an approach to enable firms to self-evaluate their measurement and reporting of intellectual capital. The approach should be piloted over a six-month period.	**10**
58.	Make information on Australia's IP system widely available. Single entry web information point for all aspects of IP	**21**

Rec #	NIS Rec	ISIG Rec
59.	Streamline the process of drafting IP legislation to implement law reforms that will keep Australian IP laws competitive with leading trading nations. We must reduce the lead time for effecting change in IP legislation. In particular, there are a number of developments that require legislative implementation: • follow through with replacing the petty patent system with the 'innovation patent', involving a lower threshold of inventiveness • follow through with announced plans to update the *Designs Act 1906* to provide clearer definitions, stricter eligibility and infringement tests, a more streamlined registration system, and better enforcement and dispute resolution procedures • progress the *Copyright Amendment (Digital Agenda) Bill 1999* through industry consultation to address the challenges for copyright protection posed by new communication technologies, particularly the Internet • consider amending the *Patents Act 1990* to provide a 'grace period' as in the United States to the effect that early publication is not fatal to patentability provided the application is lodged within a specified period (which would require multilateral implementation) • consider amending the *Patents Act 1990* to provide for extension of patent terms based on justification on evidence of regulatory processes reducing effective patent life (which requires careful balancing of competing interests) • consider strengthening Australian regulatory legislation if necessary to protect commercial-in-confidence information submitted by enterprises to government authorities when registering products in Australia • implement the recommendations in the Advisory Council on Industrial Property (ACIP) report *Review of Enforcement of Industrial Property Rights*, including: – amend the *Patents Act 1990* to follow the United Kingdom legislation which permits a wider ambit of claims being supported by and gaining priority from the provisional specification – confer jurisdiction in patent matters in the Federal Court and/or Federal magistracy – promote further specialisation of judges in IP matters – the benefit of the doubt in substantive examination by IP Australia ought to be removed, and the presumption of validity heightened, to ensure that validity will in most cases be tested at the time of grant.	**21**
60.	Amend designs law and allow innovation patent	**21**
61.	Government to action ACIP recommendations regarding the enforcement of IP rights	**21**

Rec #	NIS Rec	ISIG Rec
62.	Establish IP policy research Centre.	**21**
63.	Establish an IP research centre, funded by government and/or industry, possibly through the auspices of IP Australia, to provide independent multidisciplinary input into IP policy formulation; such a body could: – examine industry sectors with low R & D intensity, particularly those with export potential, to see where measures to increase R & D intensity and more effectively manage IP would best be targeted – develop a prioritised list of currently pending reform issues, such as enforcement processes and costs of enforcement, coverage of emerging technologies by existing IP rights – conduct a study of the decision record of the Australian courts which would involve an investigation of the outcome of every reported decision in which the validity or the infringement of a patent was at issue – conduct a study of IP protection and service provider costs and the effectiveness of government programs to cover any perceived funding gap. • ensure effective input from users of the IP system • establish a coordinating body or mechanism to liaise between government departments with responsibility for different areas of IP and ensure that IP policy is coordinated and given higher priority • establish a 'single entry point' website to coordinate enquiries concerning IP falling under different portfolio responsibilities • reduce the lead time for effecting change in the IP system, for example by giving higher priority to IP legislation.	**21**
64.	Coordinate IP policy across Government departments	**21**
65.	Encourage all trading partners to implement the minimum requirements of the World Trade Organisation TRIPS Agreement and support countries in Australia's region to develop their IP systems.	**21**
66.	Give high priority to international negotiations on IP harmonisation	**21**
67.	Encourage TRIPS implementation in the region	**21**
68.	Government to take account of pre-competitive aspects of IP when responding to the NCC review of the Trade Practices Act	**21**
69.	Include an innovation impact assessment requirement on all NPPs	**22**

Rec #	NIS Rec	ISIG Rec
70.	Encourage research institutes to increase researcher incentives to undertake commercially relevant research	**17**
71.	Introduce mechanisms to breakdown the cultural barriers between industry and the higher education sector, including: • employment arrangements that facilitate and reward links between industry and research organisations, and promote mobility of staff between the two sectors, and • education programs that better target the needs of industry for graduate skills.	**7 & 17**
72.	Restructure incentive and risk reward systems to motivate, promote mobility and encourage integration of knowledge areas. • Create incentives promoting cross-sectoral staff mobility and linkages for professional staff in the research community, industry and government. • Encourage research organisations and firms to stimulate innovation through staff equity participation and other benefits.	**3 & 17**
73.	Forge global scientific and industry networks (with funding). Give research students access to industry and international networks	**19**
74.	Foster linkage to public research organisations and widen business participation. Support more collaborative, strategic projects	**7,17 & 18**
75.	The range of funding mechanisms to support innovation in the public sector research and technology should be reviewed to identify ways to better promote the links between companies and research institutions.	**7,17,18 & 19**
76.	Include university business schools in networks with science and technology students	**7 & 17**
77.	Establish a national technology incubator program as a joint initiative of the private sector, State and Federal governments. Their primary focus should be the provision of expertise in developing, managing and licensing IP, setting up new companies, business management and attracting venture capital, rather than 'bricks and mortar'. At least some should be sector-specific (for example, to biotechnology) in recognition of the different routes and skills required for commercialisation of technologies in different sectors. It is preferable that the incubators draw on more than one higher education institution to ensure a depth of commercialisation opportunities and to maximise access to skilled commercialisation managers.	**18**

Rec #	NIS Rec	ISIG Rec
78.	Develop world best practice incubator program. Industry and its associations to promote, nurture and mentor new business. Create a program funding proof of concept from $50,000 to $500,000.	**18**
79.	Leverage and refocus existing programs toward early stage business formation eg CRCs could participate in incubation, extend BITS to other sectors or redirect Start funds to an incubator. Increase the CRCs, strengthen the linkage concept and reduce their regulation	**18 & 19**
80.	Review options for supporting early stage of innovation process. Leverage and refocus existing programs toward early stage business formation eg CRCs could participate in incubation, extend BITS to other sectors or redirect Start funds to an incubator.	**18 & 19**
81.	Provide low-cost access to full-service incubator skills.	**18**
82.	Encourage links between research sector, government and business through a business angels network. Universities and commercialisation companies to raise seed capital for supporting university spin-offs. Business associations to player a strong role in the development of expert technology tools and mentoring programs.	**17,18 & 20**
83.	Augment university resources to ensure ideas become commercialisable deal flow. Provide seed-funding and training to promote the establishment of spin-off companies. Encourage large institutional investors to allocate a small percentage of their funds to support pre-seed venture capital. Create an awareness program for investors and mentors. Provide business service support - training packages, training sessions, information brokers	**16,17 & 18**
84.	Provide competitive access to a combined package of business skills training and seed capital for public sector researchers and students – a possible mechanism is a business plan competition that links technologists and MBA students and is judged by Industry (eg the MIT Scheme).	**2 & 17**
85.	Enhance public funding of R&D to provide encouragement and funding for: • the provision of affordable skilled services of valuers, patent attorneys and lawyers for public research institutions and SMEs in protecting and commercialising IP, on a success or deferred fee basis early-stage IP protection costs.	**16,17 & 18**
86.	Expand and publicise COMET and similar programs	**16**
87.	Investigate the options for reducing the risk for staff at research institutions to found their own businesses.	**17**
88.	Increase the public sector's capacity for market analysis	**17**
89.	Remove red tape for endowments focussed on commercialising innovation	**15**
90.	Assess whether national or regional support is better	**Addressed through individual program design/objectives**

Rec #	NIS Rec	ISIG Rec
91.	Industry associations to take a pivotal role in international promotion of Australia's technology capabilities.	**19**
92.	Provide incentives for Australian subsidiaries to take up Australian innovations to create start-ups	**16 & 23**
93.	Establish an innovation trust for pre-seed investment and early-stage opportunity characterisation	**16,17 &18**
94.	Promote private sector initiatives to raise pre-seed, seed and start-up capital. Remove all legal impediments to investment by super funds and overseas institutions	**23**
95.	Continue simplification of Governmental delivery mechanisms	**14**
96.	Government programs facilitating technology transfer and diffusion to accommodate mature businesses as well as high technology business	**19**
97.	Co-ordinate innovation support across government	**14**
98.	Integrate programs supporting R&D and innovation	**14**
99.	Align funding mechanisms to maximise innovation outcomes	**14**
100.	Make existing concessional funding programs available to innovative projects in new business areas of existing firms.	**14**
101.	Innovation programs to be realigned to encourage technology receptivity	**14 & 20**
102.	Introduce additional funding programs to support research networks that promote cooperation and networking within and between organisations, including international links. They should complement, not duplicate existing programs such as CRCs and retain plurality of funding mechanisms. Funding should involve commitments from the private sector as well as government.	**18 & 19**
103.	Retain the Core START element: 1. Introduce an optional arrangement for START Grants to be paid in the form of a voucher, redeemable at publicly-funded research institutions. 2. Part of START Grants be delivered as “in-kind” services for innovators, potentially through the Australian Innovation Partnership. 3. START Grant recipients be eligible for “technical performance insurance” to enhance the attractiveness of new Australian technology to potential purchasers.	**Addressed through R&D Start Review**

Rec #	NIS Rec	ISIG Rec
104.	Amend START Graduate program to more closely match the UK Teaching Company Scheme.	**7**
105.	*Expand graduate and postgraduate placements:* Initiatives aimed at improving the skill base in industry to be streamlined, promoted widely and funded to meet expanded demand. Specifically, Australian Postgraduate Awards and R & D Start Graduate should be rationalised to ease application, lower direct costs to SMEs and improve timeliness. Public submissions also suggested: – exposing postgraduate students to the 'factory floor' to gain a better appreciation of industry needs from research (for example, the Science and Technology Awareness Program), and – allowing experienced industry employees to carry out industrially relevant research and submit for a doctorate (for example, Deakin University's Doctor of Technology)	**7**
106.	Retain payments to the IIF Program to finance new funds, thereby ensuring that the scheme becomes self-funding.	**Revolving IIF Announced in March 2000**
107.	*Expand collaborative research grants* More funds to be provided to meet the unsatisfied demand and encourage SMEs to participate on an individual or group basis. SMEs would be required to provide a minimum of 10 per cent of direct funds and be entitled to a significant proportion (50 per cent?) of the project IP rights. Additional incentives could be provided to SMEs which currently do no R & D to collaborate with public sector research groups as a first step towards building their innovative capacity.	**7**
108.	The Federal Government to establish an Innovation Access Program for SMEs to be delivered by industry associations.	**14**
109.	Publicise the TDP more widely. Reshape the program to engender a more industry-led approach to dissemination	**19**
110.	1. Alter the R&D Tax Concession to a Tax Credit Scheme to broaden its applicability to firms not currently paying tax. 2. Amend the level of the financial benefit of the Scheme to 200% labour costs and overheads, and 100% for other eligible expenditure. 3. Introduce a limited term (up to five years) "kick-start" incentive that rewards firms undertaking incremental R&D. 4. Insulate the tax credit from changes in the company tax rate by expressing it in terms of cents per dollar of R&D expenditure. 5. Remove concessional components of the tax credit from the calculation of franking credits available. 6. Make R&D tax credits transferable to shareholders, customers and suppliers. 7. State Governments should investigate options for payroll tax relief on R&D personnel.	**11**

Rec #	NIS Rec	ISIG Rec
111.	Broad evaluation of the tax concession, including: • options for tax concession, incentives, such as tax credits, and consistency requirements • cost benefit analysis	**11**
112.	Broaden the focus of innovation in the drivers eg Government as a leading edge customer	**24**
113.	Facilitate cross sectoral meetings to identify infrastructure gaps	**12 & 13**
114.	Reverse the decline in S&T infrastructure to retain and attract world-class researchers and teachers.	**5,12 & 13**
115.	Maintain and strengthen the research base. Identify broad priority areas. Create a passion for world class scientific outcomes by emulating the sports model	**Addressed by the Chief Scientist Capability Review**
116.	Concentrate research: • within disciplines through performance-based funding allocation • co-location of major facilities • virtual networks	**18**
117.	Develop an effective framework through which Australia's emerging strengths can be identified to provide a rational approach to maintaining and building the science and technology infrastructure base in Australia.	**12 & 13**
118.	Re-balance R&D disciplines in the public sector system.	**Addressed by the Chief Scientist Capability Review**
119.	Encourage private sector R & D capacity: Suitable mechanisms, such as appeals, should be put in place to encourage the public sector to charge full-cost rates, withdraw or fully transfer that capability to the private sector.	**13**
120.	Policies for the establishment of major national facilities should be reviewed and clear guidelines should be developed for their support, based on: • their need as a national facility being clearly justified • their utility to industry being identified and promoted, including industry access to the associated research and training activities • there being feasible strategies in place to support their ongoing operation and capital costs, and • consideration being given to the location of these facilities to encourage linkages with clusters and technology parks. Consideration should also be given to extending the concept to major industry initiatives, beyond research *per se.*	**Addressed by the Chief Scientist Capability Review**
121.	Create a permanent budget item for MNRFs and include incentives for industry	**Addressed by the Chief Scientist Capability Review**
122.	Invest Australia to target multinational companies to expand or locate new facilities in Australia and revamp the existing R&D attraction program to fully promote the uniqueness of Australia's research and global strengths.	**Addressed by Invest Australia**

Rec #	NIS Rec	ISIG Rec
123.	Approach large companies for inward investment where there are gaps	**Addressed by Invest Australia**
124.	Use normal portfolio evaluation cycles to refine and refocus Commonwealth/State/local activities supporting innovation - for Commonwealth State Advisory Council on Innovation to respond by September 2000	**14**
125.	Provide specialised information and advice services relating to technology management. Led by business, with some Government assistance	**16 & 20**
126.	Develop financial models for universities and other businesses to develop business people and increase innovation opportunity identification (eg through amending BITS, COMET)	**16, 17 & 18**
127.	Creation of a web-based innovators "Help Desk" that provides information and facilitates collaborative activities and partnerships.	**14**
128.	Manage IP to maximise value	**21**
129.	Identify means to develop and promulgate sector-specific best practice approaches to management of IP and corporate governance, including: • commercially evaluating IP at an appropriate stage of the development cycle to assist identifying the path to market • deciding on timing of publication and IP protection • promotion and commercialisation of publicly-funded IP • increasing linkages between public research institutions and industry and commerce, including through Cooperative Research Centres (CRCs) and spin-off companies • increasing sharing of risks and rewards of commercialisation of IP between public research institutions and researchers by appropriate commercial arrangements on a case-by-case basis according to the technology and their circumstances, including equity in spin-off companies • creating critical mass for provision of management services through various kinds of networks and alliances • active management by industry and commerce of technology transfer from public research institutions • developing best practice risk management strategies to assist enterprises deal with validity and enforcement issues.	**17 & 21**

Rec #	NIS Rec	ISIG Rec
130.	Assist firms to access to new technology sources (especially from overseas): • Identify suitable technology monitoring mechanisms that identify and source new technologies and ideas for Australian companies. For example, expand the NSW Technology Showcase to the national arena.	**19**
131.	Collect and analyse case studies of business-research and business-business interaction for lessons to improve collaborative arrangements for technology diffusion and transfer	**19**
132.	Assist firms to gain access to information networks: • Identify suitable cost-effective mechanisms and key information brokers for intermediaries, overseas ideas and overseas technical services. Benchmark internationally.	**19**
133.	Enhance international commercialisation linkages.	**19**
134.	Establish an international exchange program focussing on emerging technologies and the development of innovation skills. Establish a program to bring international industry leaders to Australia (to encourage more finance)	**19**
135.	Examine incentives for accessing overseas innovation (assess options as part of TDP)	**19**
136.	Incorporate international links in CRCs and other networking programs	**19**
137.	Undertake a comprehensive analysis of the opportunities and policy options to promote industry clusters and networks in Australia. This analysis should identify the major impediments to cluster and network formation in Australia, develop whole-of-government strategies to facilitate their growth and identify criteria to evaluate their effectiveness. It should emphasise the need to build links to global innovation networks.	**18 & 19**
138.	Develop an integrated infrastructure to promote networks. Develop and support internet virtual networks	**18**
139.	Compile and analyse information on cluster activity in various sectors for identification of opportunities, awareness raising, resource guide and the basis of a forward agenda. Use action agendas or similar to identify adjustments to programs and policies needed to promote clustering.	**14 & 18**
140.	Enhance the integration of, and interfaces between players in the innovation system. Key players to collaborate in reforming programs. New and additional programs to demonstrate and promote complex networks. Provide seed funding for cluster development. Increase the liaison between business and the research community	**18**

***** This list of recommendations was sources from participants in the National Innovation Summit. It aggregates the lists emanating from pre summit Working Groups, Summit Break Out sessions and Summit Plenary sessions.