Innovation

Unlocking the future

Final report of the
Innovation Summit Implementation Group

August 2000

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Foreword

Australia has much to celebrate as we approach the Centenary of Federation in 2001.

Our nation has prospered with ingenuity and determination.

We have built an international reputation in areas as diverse as the arts, sport, education, science and technology.

But we cannot rest on our laurels.

We need to look to the future to ensure that we continue to prosper and secure Australia's well-deserved place in the global economy.

We must ensure we have the right mix of skills and knowledge, strong industries, a robust and flexible economy, and most importantly, a culture of innovation.

Innovation will be the driving force behind business prosperity and economic growth in the next 100 years of nationhood.

We must grasp opportunities to develop the necessary partnerships between education, research, business and government to generate and act on ideas.

This is why leaders in these sectors came together in February 2000 for the National Innovation Summit.

It is my pleasure to present this final report of the Innovation Summit Implementation Group, which we have titled "Innovation – Unlocking the future".

This report is the culmination of 18 months of analysis of the strengths and weaknesses of our capacity for innovation. It identifies key recommendations that must be implemented to build a solid, sustainable research and development base from which ideas will grow.

The report is a blueprint for change and for how we can build on and succeed through innovation.

We recognise that it may not be possible to act on all the recommendations immediately and that there were, inevitably, important issues beyond the scope of the Group that we could not address.

Nevertheless, a start must be made soon in three critical areas if Australia is to retain its competitive edge in all fields of innovative endeavour.

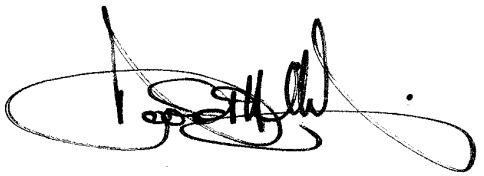
We must begin by grappling with what I regard as an area of past neglect, namely engendering a broad understanding of, and support for, the value of innovation, research and development. We can only achieve our goals of national prosperity and sustainable economic growth by understanding what innovation can do for us, openly acknowledging and rewarding those who achieve it, and by celebrating those achievements as a nation.

Secondly, we must have a world-class research base that will sustain long-term generation of ideas, the lifeblood of innovation.

And lastly and most importantly, we must be internationally competitive by translating our ideas into tradeable products, processes and services. With such commercialisation Australia will be an enviable innovative nation.

I would like to thank members of the Innovation Summit Implementation Group, the Innovation Summit Steering Committee and its working groups who dedicated countless hours researching, discussing and debating issues across the entire innovation spectrum.

I also congratulate the Business Council of Australia and the Commonwealth Government for having the foresight and initiative to establish the National Innovation Summit. I warmly commend this report for consideration.



David Miles
Chair
Innovation Summit Implementation Group

August 2000

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Introduction and terms of reference

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 comprehensive package of recommendations designed to enhance Australia's innovation system.

At the end of the Summit, Senator 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 (ISIG) was established to take the Summit's recommendations forward. The Group was asked to:

1. consider the ideas and recommendations made at the National Innovation Summit and:
   - refine proposals and remove duplication;
   - provide concrete potential actions;
   - identify relevant responsible groups;
   - provide adequate information to enable effective decision making; and
   - provide advice on the priority of actions, their timing and implementation so as to enhance innovation in Australia.
2. consult with relevant affected parties to test proposals and help establish priorities;
3. present an interim report for the June 2000 meeting of the Prime Minister's Science, Engineering and Innovation Council (PMSEIC); and
4. present the final report to the Ministers of the PMSEIC, by 30 August 2000.

This report recommends specific strategies, including the priority of actions, an estimate of costs and the parties responsible for driving them forward. It should be noted that while the Group has attempted to estimate costs wherever possible, these estimates are indicative figures only. Unless otherwise specified, costings specified relate to Commonwealth Government outlays.

The recommendations are complementary and interactive and represent a synthesis of the views of the Group. They are shaped around the recommendations of the Summit and are tailored to produce a truly world-class innovative nation. Further details on the recommendations can be found on the Department of Industry, Science and Resources website at: www.isr.gov.au/industry/summit

Readers should note that the August 2000 Science Capability Review discussion paper, *The Chance to Change*, addresses related and complementary issues.

Executive summary

Setting the scene

Australia's future depends on investing wisely today in the foundations of economic competitiveness. Increasingly that competitiveness rests on the ability to develop and utilise new ideas and technology.

To be successful we will need a world class research base, easy pathways for the commercialisation of new ideas and good access to the latest ideas and technology. Equally importantly we need a culture where innovation is actively pursued and encouraged in all businesses and in every research establishment.

Australia has a solid base upon which to build. It has a track record in developing leading-edge products and services and has in place some of the necessary research infrastructure and innovation support mechanisms needed to generate and act on ideas.

However, we can not be complacent. There are areas in which we lag behind when it comes to innovation. When we benchmark our performance against international standards, it is obvious that we do not yet have a winning score card. Further other countries are boosting their efforts. It is clear that we need to act now if we are not to be left behind.

Innovation—Unlocking the future is based upon the recommendations of the National Innovation Summit. It presents recommendations in three critical areas: creating an ideas culture; generating ideas; and acting on ideas.

Together, these recommendations form an integrated and comprehensive package which will strengthen Australia's research and development capability and enable us to shine as a truly innovative nation. They require a significant investment by Government and business.

We recognise that many recommendations will take time to implement fully, but believe that all the key recommendations need to be addressed quickly and decisively.

Creating an ideas culture

Innovation thrives in a culture that is not afraid of risk-taking, promotes the value of experimenting, and rewards enterprise.

We need to create the right culture to support us in our efforts to become better innovators. For example, improving our vision, attitude and strategic approach to innovation, the entrepreneurial expertise of our managers, and our graduates' skills in creativity, oral business communications and problem solving.

To build a solid appreciation of the importance of innovation to our economic prosperity, the Group recommends a National Innovation Awareness Program. It would be based on a call-to-action across all sectors and include a national awards and recognition system to provide incentives for our innovators to pursue their ideas through commercialisation and to promote innovation 'champions'. The program would require involvement of leaders at the highest level in business, government and the education sector.

To capture young people's interest in and enthusiasm for innovation, we recommend that the Commonwealth Government and business support a program for young entrepreneurs. The program would strengthen networks for young entrepreneurs, and recognise excellence. An enhanced program for graduates to take part in industry placements would complement this.

To enhance teacher capability, the Group recommends that business and government work together to support a new program of Enterprise and Innovation Scholarships for teachers. This program would encourage teachers to take up learning opportunities with innovative businesses, and provide them with direct experience so they are better positioned to transfer this knowledge to students.

The Group recommends a suite of related initiatives, including a national review of teacher education, development of online curriculum, additional structured courses on innovation and commercialisation for students, enhancing data collection on innovation performance, and the development of appropriate ways to measure the significance of intellectual property and intangibles.

Generating ideas

New ideas are fundamental to a dynamic and growing economy. A high quality and well-resourced research capacity is critical to Australia's ability to compete.

However, studies show that Australia's investment in research and development (R&D) has been declining for several years. This is particularly marked in relation to business R&D. When compared to 24 other nations, we ranked seventh lowest in terms of business investment in R&D. Australian businesses invest less than one per cent of our Gross Domestic Product (GDP) in R&D. By contrast, business in many other Organisation for Economic Co-operation and Development (OECD) countries is investing more and more in R&D.

To turn the tide, the Group recommends restructuring the Commonwealth Government's R&D Tax Concession to encourage more R&D by business. The Group recommends that the R&D Tax Concession base rate be increased to 130 per cent; that a cash-out option be created for small to medium sized enterprises; and that an incremental R&D Tax Concession rate of between 170 per cent and 200 per cent for R&D over and above a company's current level of expenditure on R&D be made available.

Australia's current level of public research funding will not be enough to keep us internationally competitive in the future. The situation is changing rapidly as other OECD countries announce major R&D initiatives involving significant outlays of funds.

To strengthen Australia's research base, the Group also recommends an increase in research funding, including doubling the Australian Research Council's funding and increasing funding for infrastructure in universities.

Again, the Group recommends a suite of related initiatives, including more effective promotion and stimulus for philanthropy for science and research, more streamlined access to available innovation support programs through a one-stop access point and an advisory service for businesses.

Acting on ideas

Australia has a patchy track record of acting on good ideas. We sometimes struggle for a number of reasons, including:

- many small firms are less able to compete in export markets;
- lack of sufficient skills to take new ideas to market;
- a relatively new and immature venture capital market, especially at the seed end; and
- difficulty in accessing research and technologies developed outside Australia.

The Group believes that Australia needs to strengthen its understanding, management and commercialisation of intellectual property.

While the availability of seed capital in Australia has quadrupled in the past year, and other early-stage technology markets are also growing, this component of our capital market is quite small when compared to those of our trading partners.

To increase the growth and competitiveness of new technology firms, the Group recommends doubling funding now for the Commonwealth Government's Commercialising Emerging Technologies (COMET) Program which supports early growth firms to maximise their potential to trade in new services and products.

Successful commercialisation depends not only on the individual performance of players, but also on how they interact with each other. Knowledge flow in Australian innovation is vital, including relationships amongst business, government, research agencies, non-government organisations and universities. To better coordinate and foster links between research organisations and business, the Group recommends that the Commonwealth Government develops a national technology incubator program.

International R&D and other collaboration should be boosted to better tap into the 98 per cent of the world's research that is taking place outside of Australia. The Group recommends support for increased technology diffusion, international business R&D collaboration including through Cooperative Research Centres (CRCs), and more widespread business and researcher mobility and exchange.

We need to maximise commercialisation of research conducted by Australian universities and other public research institutions by having the right incentives in place. Establishment of a pre-seed fund, access to appropriate commercialisation advisory services and appropriate research staff incentives would be major steps forward.

Under this heading the Group also recommends a suite of related initiatives, including a stock take of world best practice in innovation for Australian small businesses, strengthening Australia's intellectual property protection system, minimising the regulatory burden for innovative start-up firms, ensuring that venture capital and start-up firms are not constrained by entity taxation in Australia, and ensuring that we take full advantage of the opportunities available for new businesses to develop through government purchasing.

key recommendations

The Innovation Summit Implementation Group identified a number of key recommendations that need to be given priority.

Creating an ideas culture

A. To raise awareness of innovation as a driver of technological and economic competitiveness, business and government lead a program involving:

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

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

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

Generating ideas

A. 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;
- raise the rate of the R&D Tax Concession to between 170 per cent and 200 per cent for the increment of R&D, which is over and above a threshold base. To qualify, businesses would need to increase their level of R&D by an average of 10 per cent over the identified base rate determined by, for example, their previous claim history;
- introduce a cash-out option for small enterprises with a turnover of less than $1 million and an investment in R&D of less than $1 million, based on the 130 per cent rate.

B. 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.

C. Strengthen Australia's research capability by providing funding for infrastructure.

Acting on ideas

To speed up the conversion of Australian research and development into growing new competitive firms by:

- establishing a national technology incubator program, based on the Building on Information Technology Strengths Program (BITS) and international best practice models;
- establishing a competitive pre-seed fund for universities and other research organisations;
- doubling funding for the Commercialising Emerging Technologies (COMET) Program to supply business expertise and improved management of the commercialisation of emerging technologies; and
- encouraging a review of the remuneration arrangements and incentive structures governing the research activities of staff, to maximise incentives for effective commercialisation.

B. To build Australia's competitiveness through knowledge of and access to overseas science and technologies:

- increase support for international business R&D collaboration, including through Cooperative Research Centres;
- increase and focus showcasing of Australian innovation capability, to build awareness of Australia as a high technology receptor; 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.

Creating an ideas culture

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If Australia is to be a nation of successful innovators, we must promote an 'ideas environment'; a culture that nurtures good ideas and supports entrepreneurs.

This means rewarding experimentation and enterprise in new and existing businesses. It means understanding the potential risks involved in starting new businesses and, as a nation, being prepared to accept that not every new venture will be a winner. It also means a commitment to lifelong learning, and establishing creative working environments to sustain a highly skilled and motivated workforce where excellence in research and innovation can flourish.

Setting the scene

Various research studies benchmarking Australia's innovation performance against international standards tell the tale of a country that is lagging behind in many areas. Whilst we have achieved a great deal over the years, we must strive to do more, and quickly if we are to be on par with the 'best of the best' around the globe.

Results of a recent worldwide study on innovation management reveal that our innovation performance is not at best practice[1]. For example, we are well behind the United States and the Asia-Pacific region in terms of vision, attitude and strategic approach to innovation. Another study, on international competitiveness, concludes that the entrepreneurial expertise of our managers lags behind five other 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].

Our education system is vitally important to innovation. Second only to family, it exercises a strong influence on attitudes and culture from the earliest years of a person's life. We must have a well-resourced education and training system with skilled teachers and state-of-the-art curriculum materials designed to generate interest in business and develop young innovators with entrepreneurial acumen.

Australia's education and teacher training system needs additional support. A recent publication, for example, notes that at the end of 1998 there were skills shortages of secondary teachers in some geographical areas and in some disciplines, particularly in mathematics, physics, chemistry 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.

information technology[3]. A survey of how satisfied employers are with the quality of graduates entering the work force raises concerns about the adequacy of their skills in creativity, oral business communications and problem solving[4].

Changes in these areas can only be achieved with the support and commitment of the people of Australia. It is our collective responsibility to create an environment that cultivates new ideas, encourages development of entrepreneurial talent, rewards initiative and risk-taking, and builds the desire for a shared vision and direction. All sections of the community have a role to play in building a sustainable ideas culture in Australia, including education and training institutions, research organisations, business and government.

Proposed actions

Innovation awareness

Efforts to stimulate Australia's appreciation of innovation are not entirely new. Indeed, efforts to promote innovation across the country are underway nationally and in the States and Territories, in government support programs, education and skills training and entrepreneurial award systems. The creation of Innovation Councils[5] points to a positive move in the right direction. The Group recommends that existing initiatives relating to innovation be strategically linked to a clear national vision and reinforced by a coordinated set of goals and outcomes. Linking both public and private programs, developing a holistic and integrated approach, and raising public awareness of entrepreneurship will act as prime catalysts for an improved innovation culture.

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.

3 DEWRSB 2000 www.dewrsb.gov.au/employment/publications/skillshortages/default.asp

4 *Employer Satisfaction with Graduate Skills* (DETYA, 2000)

5 Most States and Territories have established Innovation Councils to oversee innovation issues

Young entrepreneurs

We need to recognise and value the 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 business lead the way with a business-based program designed to support the education and development of potential young entrepreneurs (aged 15 to 24) who demonstrate an interest in enterprise, design and innovation. This program would draw on initiatives such as the Young Achievement Australia Business Skills Program[6] and the Young Entrepreneurs' Organisation[7], but focus on a broader membership base. The new program to have four broad objectives:

- 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 business in finding and fostering young entrepreneurial talent.

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. Yet, according to the Prime Minister's Science, Engineering and Innovation Council (PMSEIC)[8], 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 practices.

The Group recommends a new program of Enterprise and Innovation Scholarships, to encourage and provide financial support to teachers to enhance their skills and knowledge through the pursuit of structured

6 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 to 24 weeks, the YAA Business Skills Program brings together 12 to 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.

7 The Young Entrepreneurs' Organisation (YEO) is a global, non-profit organisation based in the United States. Five Australian cities have YEO chapters. The Organisation 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.

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

workplace learning opportunities with innovative businesses. The Group also encourages the inclusion of business placements as a component of teacher training in the future.

Again business plays 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 online education, particularly for adult learners.

There is an urgent need for us to draw on our skills in developing online educational tools and to collaborate across State borders with business to reflect business needs.

The Group recommends that Australia capitalise on the educational benefit and business development potential made possible by recent advances in information and communications technology. The Group also recommends that priority be given to a comprehensive program of online content development in education and training in a number of curriculum areas, especially in science and technology and business.

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 and technology and business education.

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

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

The need for high-quality teaching

Participants at the National Innovation Summit noted that significant questions continue to be raised about the quality of teaching in many Australian schools, and about the quality of science and technology teaching in particular.

The Group accepts that this is a complex issue with no single or simple solution. However, the Group believes that broad-based strategies are needed to achieve significant and lasting improvements in the quality of Australian teaching. These strategies include the need to have enough flexibility in the system to ensure we can achieve the outcomes we are seeking, and must involve:

- promoting teaching as an attractive and rewarding career option for talented young Australians;
- improving the quality and design of initial teacher education courses;
- making further major commitments to the professional development of the current teaching force; and
- developing incentives and career structures which provide teachers with the ability to keep their skills up-to-date and which reward excellence in teaching.

The Group recommends a comprehensive review to address these issues. The review, drawing on existing reviews, should be completed within a year, with the results and commitment to action being widely publicised.

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

The quality of our skills base and the knowledge systems that support it, will largely determine how well we, as a country, can grasp and create new opportunities from technology developments and innovation. Our ability to stand tall as an innovative society with an advanced economy will determine the extent to which foreign investors and skilled migrants are attracted to Australia.

While Australia already has in place much of the framework required to enhance innovation through its skills base, a great deal remains to be done. The Group was informed of changes underway in the education and training system. However, skills shortages exist and need to be addressed in the short term.

Like other countries, Australia is experiencing a shortage in the number of graduates in mathematics, physics, chemistry and information technology. Yet it is these skills which serve as core building blocks for basic research and development. Such skills shortages will affect the capacity of business to carry out research and development and to conduct knowledge-based activity and will be a significant constraint on investment in vital areas of the new economy.

One of the most serious shortages is in skilled information technology professionals, which poses a substantial threat to business growth and development—business estimates that 30 000 jobs in information technology and related areas will go unfilled if additional places in degree programs are not created now[9]. Skills shortages are best addressed through cooperation between business and educational institutions using frameworks such as those developed by the vocational education and training sector and the more recent IT&T Taskforce.

At the National Innovation Summit, submissions from business strongly supported the need for universities to tailor course content and develop appropriate educational solutions for emerging skills needs.

> Innovation thrives in a culture that is not afraid of risk-taking, promotes the value of experimenting, and rewards enterprise.

The Group recommends initiatives to increase the responsiveness of higher education institutions to skills shortages. Universities are to be invited to compete for targeted funding for additional places in priority areas, with the Commonwealth Government to meet half the costs and business to match this contribution.

An additional 2 000 places per year be provided from 2002, mainly in mathematics, information technology and related areas, with a rise to 5 470 per year by 2005.

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.

9 Submission to National Innovation Summit from Australian Information Industries Association and findings of IT&T Skills Taskforce.

In most universities, science and engineering students still need to be better educated on the commercialisation of technology and how innovation is a driver of economic competitiveness. Some students gain experience in industrial and commercial research through links with business and Cooperative Research Centres (CRCs) and all engineering students complete substantial work placements. Opportunities for students to gain this kind of experience need to be expanded. The Group recommends that all students, but especially final year and postgraduate students in business, science and engineering, have access to training in commercialisation of research.

Linking new graduates with business is important for technology transfer, skills development and innovation education. This is widely recognised overseas. In the United Kingdom, for example, talented graduates have a direct opportunity to develop careers in business. More than 1 000 graduates and 600 companies are currently benefiting from the United Kingdom's Teaching Company Scheme[10]. Under the scheme, graduates are employed for a fixed period to work on specific projects, such as developing new systems, products and processes, which result in benefits for the employing company. Small and medium sized businesses with the potential to grow can take advantage of academics and researchers in the tertiary education system, and the knowledge and skills of graduates working on a project central to the needs of the firm.

There is no equivalent to the UK Teaching Company Scheme in Australia. While other programs support links between businesses and research institutions, they do not specifically focus on graduates or are too small. We need to take new initiatives in this area.

10 The Teaching Company Scheme (TCS) places high quality graduates in companies for around two years. Graduates work on technology transfer projects that are central to the needs of participating companies. They are supervised by subject matter and business experts. Information shows that for each TCS Program involving even one Associate, the business benefits are worthwhile—on average an increase in annual profit of around £138 000; a one-off increase in profit of £98 000; 10 company staff trained; and four genuine jobs created. Source: United Kingdom Department of Trade and Industry, June 2000. www.tcsonline.org.uk

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.

The Group believes there is a need to improve incentives and remove barriers to individuals personally investing in education, training and skills development. For example, the requirement to pay full-cost, up-front fees in many postgraduate coursework programs represents a potential barrier for many students. These disincentives could be alleviated by extending the income-contingent loan arrangements under the Higher Education Contribution Scheme (HECS) to cover these cases or by introducing a more general scheme of income-contingent loans for tertiary students.

The Group also believes there is a need to review taxation arrangements for personal investment in skills and learning. Under current taxation law, money spent on self-education is a deduction only where it clearly and directly leads to the creation of additional skills or income in an individual's current occupation or employment. This is a short-sighted approach given the need for commitment to lifelong learning in a knowledge economy.

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

Measuring innovation can highlight the impact that it has on economic growth, international trade, business competitiveness, internationalisation of technology, investment in intangibles, and contribution to facilitating technologies. Statistics on how well we perform in innovation can bolster our image and promote our achievements overseas. The Organisation for Economic Co-operation and Development (OECD) says that for policy development, governments around the world need to monitor, as accurately as possible, recent trends and structural shifts pertaining to science, technology and industry, not only in their own countries, but also as they compare to others[11].

Australia needs to develop more accurate, standardised ways to measure innovation and to benchmark our efforts against best practice. Several measures are currently used to indicate whether a company or firm is involved in innovation, although none effectively measure or quantify the innovation itself.

11 Based on OECD *Science, Technology and Industry Scoreboard 1999, benchmarking knowledge-based economies.*

Participants at the National Innovation Summit concluded that while Australia has a long history of contributing to international statistical collections, there is no strategic approach to collecting or reporting on innovation statistics. The Group, therefore, recommends that an Expert Panel be established to develop a National Innovation Data Strategy to ensure Australia's innovation performance is accurately and effectively managed.

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 OECD[12] says that to improve competitiveness, countries must move beyond relying only on traditional assets, such as financial capital and physical facilities, to a new class of intangible assets, including human capital, intellectual property, business infrastructure, brand names, databases, and relationships with customers and suppliers. Indeed, the ability to create, distribute and exploit knowledge and information is increasingly important and is often regarded as the most important factor underlying economic growth and improvements in the quality of life.

Business needs to include both types of assets on the balance sheet and develop a proficient method of reporting on intangible assets. The Group recommends that business and the Commonwealth Government, as a matter of some urgency, work with regulatory authorities to develop adequate reporting techniques for intellectual capital and intangible assets.

12 Based on OECD *Science, Technology and Industry Scoreboard 1999, benchmarking knowledge-based economies*

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.

Generating ideas

Continued generation of new ideas is essential for business growth in a globally competitive world. They lead to new processes, products and outcomes with commercial value. They generate new business opportunities, jobs, profits and enhance the wealth of the nation.

To create ideas, Australia must seriously invest in research and development. We must maintain a world-class research base, operate in world-class facilities, and access world-class skills.

Setting the scene

Australia's total expenditure on Research and Development (R&D) was around $8.8 billion in 1998-99. To put that in context, it represents about one thirtieth of the level of R&D investment in the USA, the world's largest economy or only some 16.5 per cent more than IBM's expenditure on research, development and engineering.

Our expenditure on R&D as a share of Gross Domestic Product (GDP) in 1998-99 was 1.49%, placing it in the mid-range of Organisation for Economic Cooperation and Development (OECD) nations. However, our R&D intensity has fallen in recent years, running counter to the general OECD trend.

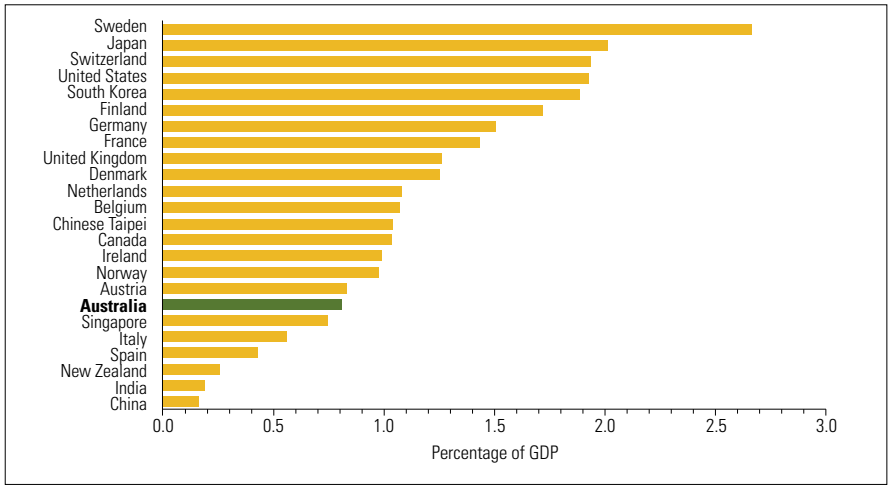
Australian expenditure on R&D as a share of GDP in the university sector grew from 0.34% in 1990 to 0.44% in 1998. This growth has not continued in more recent years according to recent Budget data[13] . Expenditure in government research organisations has declined in relative terms since the early 1990s, despite generally increasing in absolute terms over the past decade.

The situation for R&D expenditure in the business sector is different again: in this case, there has been both an absolute decline in R&D expenditure since the mid-1990s and a relative decline expressed as a share of GDP. Figures 1 and 2 tell the story. Australian business expenditure on R&D as a share of GDP is markedly lower than the OECD average (ranking seventh lowest out of 24 OECD nations), and is falling while the average for OECD countries continues to rise.

Without strong public and private sector funding for research and development, Australia is at risk—we will not be able to compete in a modern, knowledge-based economy. Downward swings, which go against international trends or Australia's own past performance, should ring alarm bells. It is in this context that the Group recommends actions to improve the way we generate ideas.

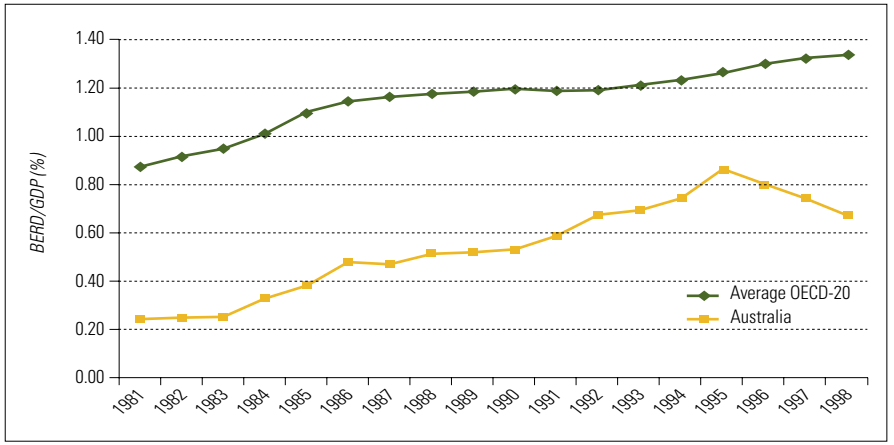
13 Science and Technology Budget Statement 2000-01

Figure 1: Business Expenditure on R&D as a percentage of GDP - International Comparison



Source: Department of Industry, Science and Resources: based on OECD data and also on Australian Bureau of Statistics and other national data.[14]

Figure 2: Business Expenditure on R&D as a percentage of GDP - Time series



Source: Department of Industry, Science and Resources, Australia, based on OECD and Australian Bureau of Statistics data.

Proposed actions

The Research and Development (R&D) Tax Concession

The R&D Tax Concession is the Government's prime incentive for increasing the level of business research and development in Australia. The current level of our R&D Tax Concession attracted a great deal of attention at the National Innovation Summit. Most business participants acknowledged that it is broad-based, market-driven, and promotes businesses to invest in research and development. Access to it does not depend on a competitive process and it, therefore, provides certainty in forward planning. However, 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.

14 Latest available data for each country.

Summit participants recommended that the concession be enhanced to stimulate more investment by business in Australia's research and development. 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 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. 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 to maintain the amount 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 research and development 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 (actual) 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 research and development[15]. For every dollar invested in research and development, companies would receive a 39 cent payment. This option would be 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[16].

Claim history data on the current 125 per cent Tax Concession has enabled costing of the 130 per cent Tax Concession proposal. The higher premium rate and cash-out options have not been costed[17].

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

16 Based on past claims history through the R&D Tax Concession.

17 It has not been possible for the Group to estimate costs of the premium rate and cash-out options without access to the modelling facilities of the Commonwealth Government.

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

Publicly funded basic research plays an important role in supplying much of the knowledge, skills and new ideas critical to a competitive and innovative economy. A high-quality research system is the key to successful innovation.

High quality basic research is undertaken by Australian universities and public research institutions. The Commonwealth Government's recently released policy statement, *Knowledge and Innovation*, indicated that funding for research and research training in Australia would be provided through competitive research grants for individuals and teams, through such mechanisms as the Australian Research Council (ARC), and through performance-based block grants to institutions to give them the flexibility to adapt to new opportunities and to set their own priorities.

In contrast to Australia, other countries, including Canada, Finland, France, Germany, Japan, Singapore, the United Kingdom and the United States, have recently announced significant increases in their level of public investment in research. In 1999 in the United States, for example, funding for the National Institute of Health and the National Science Foundation was increased by 15 per cent and 7.1 per cent respectively.

In line with views expressed at the National Innovation Summit and during subsequent consultation, the Group recommends that Australia's investment in high-quality research be maintained at internationally competitive levels across a broad range of disciplines.

Competitive research grants

By international standards, support provided by the ARC for competitive research grants is low. The ARC supports only 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 $55 000, an amount which is inadequate to meet the full direct costs of research. 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$192 500 and A$432 500 (including funding for research infrastructure).

The Group believes it is imperative to increase support for national research grants schemes administered by the ARC. 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.

The Group recommends that funding available for ARC competitive grants be doubled over five years to place Australia's investment in higher education research on a par with international levels across a broad range of disciplines.

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

Having world-class research infrastructure is essential for innovation. Australia's Chief Scientist has released a discussion paper, *The Chance to Change*, reviewing Australia's science capabilities. The paper recommends to expand funding for university research infrastructure and to establish a new, competitive major national research facilities program.

To perform world-class research, researchers need access to world-class infrastructure, including state-of-the art instruments and computers, the latest developments in knowledge, and support from technical staff who are expert at using highly sophisticated equipment.

However, insufficient infrastructure funding has long been identified as one of the most pressing concerns facing Australian universities and research organisations. A declining proportion of funding is being spent on new capital items, and the number of journals and monographs being purchased by research libraries has declined. For example, in 1990-1991, universities spent just over 16 per cent of their research and development money on fixed assets, such as land, buildings and other capital items[18]. By 1998, this proportion had declined to below 7 per cent[19]. Now it is estimated that universities and public research organisations typically spend only 5 per cent of their total budgets on new capital items, which is barely sufficient to cover the rate of depreciation.

18 ABS 1993, 1990-91 Research and Experimental Development - all Sector Summary, Australia, p3.

19 ABS 2000, Research and Experimental Development - Higher Education Organisations, 1998, p7.

Public research agencies and universities are finding it increasingly difficult to attract grants that can be used beyond day-to-day research staff costs and overheads. Sufficient funding must be provided for infrastructure to underpin the increased research that will result from the additional resources being recommended for ARC grants (Recommendation 12).

In addition, without full-cost grants, it is difficult for these public institutions to maintain, let alone update and upgrade, their research infrastructure. Recent increases in funding for health and medical research did not include funding increases for infrastructure support.

A substantial injection of funds for both purposes will maximise the contribution of Australian universities and public research institutions to the broader innovation objectives. Stronger financial support will enable universities and public research institutions to support their total portfolio of research, to enhance the quality of teaching with world-class facilities, and provide development opportunities for research and teaching staff.

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[20] 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 five years to support research infrastructure is warranted, and that decisions on its allocation per year be determined by the Commonwealth 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.

20 Provided through research quantum of university operating grants.

We must maintain a world-class research base, operate in world-class facilities, and access world-class skills.

Improving access to government programs

The Group believes that access to existing support programs, such as the R&D Tax Concession and R&D Start, needs to be improved. The Group recommends that a nationally integrated, Internet-based single point of access be created, to make it faster and easier for business to apply for support. This new point of access should be supplemented by an advisory service and self-diagnostic tool through which businesses can seek customised advice on which programs best meet their specific needs. The advisory service should also help business match the stage of the innovation cycle to the most appropriate innovation support program.

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.

Encourage philanthropic investment

Philanthropy for science and research is another area in which Australia needs to improve its performance. Hard-data comparisons show that philanthropic donations as a percentage of GDP are significantly higher in the United States than they are here (double in the private non-profit sector). In the United States, innovators and business benefit from many tax and other incentives for philanthropy. In Australia, the incentive environment for philanthropy for R&D is more limited by comparison to that for culture and the arts.

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 Commonwealth 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

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 other 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[21] the Commonwealth Government made health and medical research such a priority.

21 Entitled *The Virtuous Cycle: Working Together for Health and Medical Research, December 1998.*

The Commonwealth Government's *Knowledge and Innovation: A policy statement on research and research training in 1999* outlines a new funding framework for higher education research and research training, including two performance-based funding schemes to be implemented in 2002.

1. The *Institutional Grants Scheme* will support the general fabric of institutions' research and research training activities, and assist them to respond strategically and flexibly to their environments. Universities will receive funding under a formula that recognises past success in attracting research income, ability to attract research students, and quality and output of research publications.
2. The *Research Training Scheme* will fund research training places in universities according to a three-part formula—the number of research students completing degrees; the amount of research income generated by students; and the quantity and quality of research publications produced.

The Group, therefore, believes that Australia has advanced in setting priorities and in allocating scarce research funding. However, it is essential performance in this area be constantly and closely monitored.

Acting on ideas

Coming up with good ideas is one thing. Being able to commercialise and successfully bring them to market is another, requiring a particular set of skills, alliances and a supportive environment.

Many of Australia's companies 'innovate in the dark', wasting time and money, sometimes unaware that assistance is available. Companies need better, faster access to technologies developed overseas and in Australia. They needs strong links with each other and public sector research institutions.

Australian companies operating at the forefront of best practice have a competitive edge that allows them to act on their good ideas for commercial advantage, and compete successfully with their international counterparts. We need to share knowledge and experience and support best practice in the management of intellectual property, marketing and finance if we are to profit from our ideas in world markets.

Setting the scene

Australia is recognised as a creative and educated country. Whilst some of our enterprises are up there with the best in the world, our overall performance in translating ideas and knowledge into commercial and economic gain needs to be increased. Despite our best intentions, our national focus on innovation remains highly fragmented, frequently operating at a sub-optimal scale with too few linkages and active coordination[22].

We must improve in several broad areas which impact on our ability to act on our ideas.

Spin-off companies

Some small innovative Australian firm could be tomorrow's Microsoft. Firms that live up to the dreams of their founders will become generators of profits, employment, exports and national wealth.

22 Department of Industry, Science and Resources, *Shaping Australia's Future Innovation—Framework Paper*, 1999, page 35.

A recent study reveals that Australia has the capacity to create at least 100 start-up firms per year from our universities and other public research organisations. The study finds, however, that the present number is about 10 per year[23].

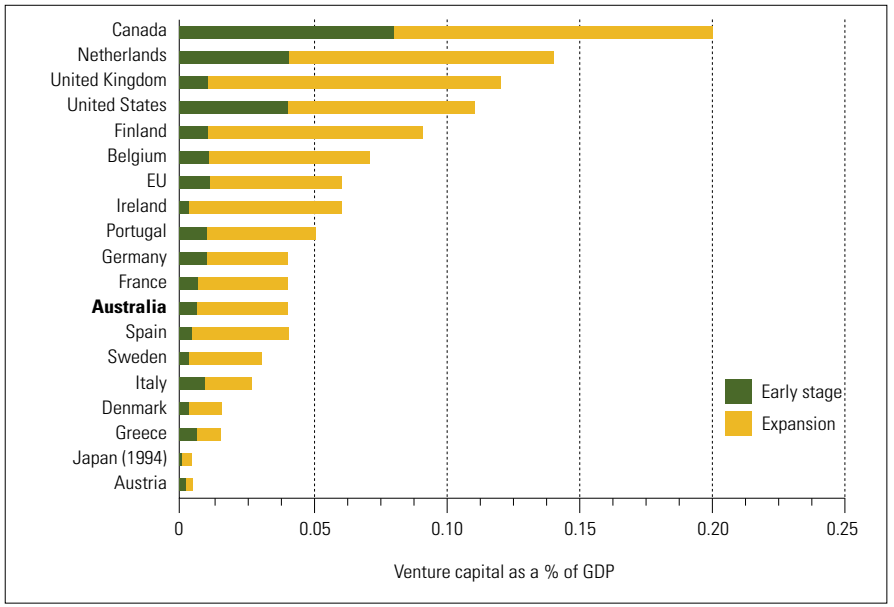
Venture capital market

Whilst Australia's venture capital market is immature, it has grown quickly in recent years and continues to do so. However, the amount we invest in the early stage of our venture capital market is small compared to international levels (see Figure 3).

Investment in the early stages of the venture capital market in the United States is 100 times that in Australia. Furthermore, the number of deals is greater and the deal size is, on average, ten times larger than in Australia. Without access to early stage finance, businesses have little hope of developing an initial concept, developing prototypes or forming management teams to drive innovation forward.

23 Research in the National Interest Commercialising University Research in Australia, Australian Research Council, July 2000.

Figure 3— Comparative venture capital markets



Source: OECD STI Scoreboard, 1999—Benchmarking Knowledge Based Economies.

Skilled managers

Australia has a shortage of managers skilled in innovation and entrepreneurship who are capable of handling a start-up firm or new venture[24]. Such a shortage means we do not manage our ideas to their full potential. Also, firms with less skilled managers will have less success in attracting investment funds. According to PricewaterhouseCoopers, most asset consultants only recommend investment with managers who have a track record, 'a rare species in the Australian early-stage capital sector'[25].

Technology transfer

Existing businesses need better access to new ideas and technology to rejuvenate their operations.

In Australia, technology can be inaccessible to those who need it. We represent only one per cent of the world economy[26] and only develop a small proportion of the globe's new technologies and practices. The competitiveness of our firms, therefore, substantially depends on accessing new technologies developed overseas. Also, technology developed in Australia may be locked up in public research institutions and often unavailable to existing firms and for the spawning of new enterprises. Freeing up technology and making it readily accessible increases the chances of growing new enterprises and having a competitive advantage.

24 This is a conclusion of a recent survey by PricewaterhouseCoopers for the Department of Industry, Science and Resources, entitled *Benchmarking Australian Institutional Investment in Domestic Venture Capital 2000.*

25 PricewaterhouseCoopers for the Department of Industy, Science and Resources—report entitled *Benchmarking Australian Institutional Investment in Domestic Venture Capital 2000.*

26 According to the World Bank.

Intellectual property

Participants at the National Innovation Summit found that Australia needs to develop stronger intellectual property (IP) skills, a crucial component of the strategy needed to take a product or process to market. Indeed, IP Australia's continuing market research shows that an extensive understanding of the value of intellectual property and how to protect and enhance that value, both nationally and internationally, is essential for the success of Australia's firms.

Proposed actions

Supporting new, innovative firms

The success of small innovative firms depends on access to appropriate forms of finance and suitably skilled managers.

Seed funding is fundamental to the survival of new innovative businesses. Both the Commonwealth Government and State and Territory Governments have programs designed to stimulate the availability of seed capital and to remove impediments to the commercialisation of innovative ideas.

Australia's Innovation Investment Fund (IIF) encourages private sector investment in high-risk start-up firms, contributes to the growth of Australia's private-sector venture capital market and the development of skilled fund managers. A revolving facility for the IIF was established in March 2000, enabling the Commonwealth Government to reinvest the returns on investments into further early stage support in conjunction with the private sector. The Group applauds this initiative and supports the aims of the IIF.

The federally funded Commercialising Emerging Technology (COMET) Program is an example of Commonwealth Government support for young firms. COMET supports firms in their early growth stage, including spin-offs, through the key steps of the innovation process (for example, developing sound management skills, creating an effective management team, conducting market research, and developing a well thought through and achievable business plan).

Although COMET is relatively new, it has experienced a much higher than expected take-up rate and is extremely well regarded by firms. Demand and take-up is so strong for COMET, that the Group recommends immediate doubling of funding as our innovative firms cannot wait two years for a review of the program.

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

Maximising the outcomes of our investment in public sector research will create new business opportunities, jobs and exports. However, there is a perception that public sector research in Australia is somewhat less than commercially oriented and that this needs to be addressed. Where there is commercial orientation, there is often a lack of expertise in valuing and managing intellectual property, business planning and business management. If we do not have the skills to manage commercialisation well, we cannot expect healthy returns from our investment and efforts.

These broad issues manifest themselves in four areas in Australia, all of which require attention.

The first area of concern is that many public sector research ideas follow the licensing route to commercialisation. Whilst this may in the short term appear to be easier and faster, returns are rarely substantial. The Group believes we must encourage commercialisation through creating spin-off firms. This requires more concentrated effort over a longer term, but the benefits will be far greater.

A second issue is remuneration arrangements for research staff. The Group believes that incentives should be available to these staff, to encourage them to play a major role in taking their research through the commercialisation process. In other words, research staff need to be actively encouraged to focus on commercialisation once research is complete and not fear the loss or modification of benefits and entitlements.

There is also a need to extend and improve upon our capabilities in commercialising emerging technologies from universities and public research agencies. The Group is supportive of universities developing intellectual property plans and, in that context, notes a recent proposal that, as a condition of competitive funding, all material generated through university-based research be reviewed for IP content prior to its release into the public domain[27].

To strengthen access to advice and skills in commercialisation strategies, it is recommended that a pilot scheme of five Innovation Centres be developed as outlined in the Chief Scientist's discussion paper, *The Chance to Change*. The Centres would be the first point of contact for university researchers seeking to take their research further down the commercialisation track by providing advice and assistance on IP, commercialisation options, business plans, and access to venture capital.

Finally, there is an urgent need to fill a gap in the amount of funding available to universities for 'proof of concept' work and for testing and evaluating concepts for their potential. The Australian Research Council calls this the 'innovation progression gap'. Such funding would enable the securing or enhancing of intellectual property, support for additional R&D, construction of prototypes, preparation of a business plan, and cover legal costs. These activities are essential to enhancing opportunities to commercialise our public research.

27 The National Health and Medical Research Council has released draft IP Guidelines.

Recommendation 17

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

- *encourage the exploration of 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 incentive 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

Links between businesses and between businesses and researchers are required to build a critical mass in excellence and capability throughout Australia. The following quote from the Organisation for Economic Co-operation and Development (OECD) supports the Group's belief that today, more than ever before, Australian business and research need to be more 'connected':

> 'Innovation relies much more on networking and cooperation… technology alliances and related cooperative arrangements allow firms to share costs, extend product range and access new knowledge and markets'[28].

Successful innovation depends on how firms interact with each other, researchers and financiers. Collaboration helps business innovate in many ways: technology diffusion; the ability to leverage the knowledge of businesses and research institutions; the sharing of strategic advice; peer mentoring; unlocking expertise from within; and developing the critical mass necessary to bring new ideas to market.

28 OECD, *Innovation and Economic Performance*, March 2000.

The Group identified many examples of 'collaboration in action', including technology parks, global innovation alliances and Cooperative Research Centres. The Group believes we must build on these initiatives and assist Australian firms and innovators to collaborate.

The Group believes that business incubators[29] are another way Australia can build on existing initiatives. The growth of business incubators is a well-known and a large, international trend[30]. In Australia, many State and Territory Governments have supported incubators. In addition, the Commonwealth Government recently launched the Building on Information Technology Strengths (BITS) Program, to build on the strength of Australia's information industries sector. BITS provides $78 million over four years to support incubators for information technology and telecommunications (IT&T) small to medium enterprises.

The Group recommends that Australia capitalise on BITS and other positive initiatives by establishing a coordinated national incubator program.

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 Governments, business and research institutions.

Diffusion of leading-edge technologies

The OECD, in *Innovation and Economic Performance—Developing the Links* (December 1999), observed that firms that collaborate are more innovative than those that do not. It also noted that technological alliances between firms, particularly from different countries, lead to reduced research costs, an extended range of products and knowledge, and direct access to new markets[31].

Australia's competitiveness is also dependent on the ability of our research and business communities to access the 98 per cent of scientific research carried out overseas. We need strong international links across the innovation spectrum, including enhanced business and research collaboration. This could build upon the successes of the Cooperative Research Centres program.

Also, we must build awareness of Australia as a source and receptor of high technologies by showcasing our capability overseas.

As a result, the Group recommends that Australia better position itself to access leading edge knowledge and the latest technologies.

29 Business incubators are designed to help firms flourish through access to a range of business skills, training and sources of finance. They are usually small work units that provide an instructive and supportive environment to entrepreneurs at the start-up and early stages of business development. Incubators aim to maximise the formation and survival of businesses with the potential for growth.

30 In the United States, for example, a National Business Incubation Association survey found that North American incubators have created nearly 19 000 companies which are still in business and over 245 000 jobs.

31 OECD *Science, Technology and Industry Scoreboard 1999: Benchmarking Knowledge-based economies*, 1999.

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).*

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

Best practice

'Best practice is not about re-inventing the wheel. It is about identifying and describing the best wheels'[32].

Small to medium enterprises, in particular, can be disadvantaged if they are not well informed of best practice in innovation and the management tools available. Governments and business can help by providing tools for business to access best practice information and by assisting innovators to benchmark against international best practice.

The Group's consultations demonstrated a need for more information about best practice, how it can improve business operations and what approaches are of most benefit to firms in the innovation and R&D markets. The Group believes that smaller firms have the greatest need for best-practice information. As a result, the Group recommends that this gap be filled.

32 Australian Research Council— Commissioned report No 60, *University research: technology transfer and commercialisation practices, 1999.*

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).*

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

Intellectual property (IP)

Recent reviews of Australia's IP system conclude that it is generally competitive with similar systems overseas. The reviews identified positive improvements to our IP system, including the development of more effective ways to protect industrial designs and replace the petty patent system with an 'innovation patent' for quick, inexpensive protection of minor inventions. Government has agreed to implement these improvements, although in both cases, relevant legislation is yet to be enacted.

The Group believes that Australian businesses need to be better educated on how to protect and capture the benefits of their innovations and how to develop effective IP strategies. The Group acknowledges that this can be sometimes challenging since information on IP can be difficult to find, with five federal departments sharing policy responsibility for the area.

Some small innovative Australian firm could be tomorrow's Microsoft.

On a positive front, Australia is considering accession to the Madrid Protocol[33], which will make it easier for our firms to register trade marks in major markets worldwide. Our major trading partners have joined, or are in the process of joining, the protocol, so it is important that Australia follow suit. We do not want our firms disadvantaged as they market products internationally.

The Group recognises that the global economy presents tremendous opportunities to exploit Australia's technologies in new and distant markets. Entering foreign markets will be simpler as nations continue to pursue international IP integration and harmonisation. As a result, the Group believes that Australia should continue to be active in seeking international IP integration and harmonisation through participation in exercises coordinated by the World Intellectual Property Organization, the World Trade Organisation and the Asia-Pacific Economic Cooperation Group (APEC).

The Group believes Australia needs a robust and flexible intellectual property system, which allows for contemporary enhancements to be made when necessary.

33 The Madrid Protocol allows trade mark owners seeking protection for their marks in countries party to the treaty to do so by filing a single application and paying one set of fees.

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.

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

Identify and remove regulatory impediments to entrepreneurship

Participants at the National Innovation Summit concluded that Australia's regulatory environment needs to be improved so it is more transparent, predictable and easier and cheaper to work within for those with new ideas. Otherwise, regulation can be an impediment to researchers, developers and businesses committed to innovation.

The Group supports this conclusion and recommends that compliance costs associated with regulation need to be reduced and that businesses be provided with opportunities to gain a better understanding of the regulatory environment.

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).*

Responsibility for action: Business and Commonwealth Government.

At the Summit, concerns were raised about entity taxation[34], which currently dissuades national and international investors from investing in Australia. Access to the recently-announced 50 per cent capital gains tax (CGT) discount for individual investors and the CGT exemption for overseas pension funds are especially important.

The absence of a suitably innovation-focussed taxation system could retard the growth of our domestic venture capital market and reduce overseas venture capital investment.

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).

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

34 Venture capital entities (including the IIFs) are typically structured as trusts and sometimes as partnerships. The income and capital gains of trusts and partnerships are currently taxed in the hands of the investors rather than in the hands of the entity. From July 2001, trusts will be taxed as companies and will not be eligible for the recently announced 50 per cent capital gains tax discount. Partnerships can also be unattractive as they do not allow limited liability.

Government purchasing

The Group believes that there must be benefits to be gained from supporting innovation through Commonwealth Government and State and Territory Government purchasing. Government can benefit through better-value outcomes in purchasing and the opportunity to improve policy coordination and delivery. Business gains opportunities to showcase products to prospective buyers and develops valuable contracts.

Government agencies can be risk averse in purchasing, tending to favour well-known or established products. This can deny government access to innovative goods and services available through less well-known companies, even though these may be technically superior or more economical. It can also deny small innovative companies the opportunity to develop sales and grow through business with governments.

The Group recommends that governments maximise the opportunities available through government purchasing.

Recommendation 24

Establish a new Commonwealth and State Government Purchasing Program including:

- *self-help technical resources to analyse and assess risk;*
- *a facilitator network to assist innovative small to medium sized 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.

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

Establishment

At the conclusion of the National Innovation Summit held in Melbourne in February 2000, hosts Senator Nick Minchin, Minister for Industry, Science and Resources, and Mr Campbell Anderson, President, Business Council of Australia, announced the establishment of the Innovation Summit Implementation Group.

They issued a public communiqué to broadly outline the Summit findings and the way forward. The communiqué is provided in full, as originally issued, below.

The Group was then requested to refine, assess and prioritise the 140 recommendations that emerged from the Summit.

Mission statement

The Group adopted the following mission statement:

To identify the optimal mechanisms to enhance Australia's competitiveness through innovation. In doing this, to encourage commitment from the industry, research and government communities to a set of innovation targets to be achieved over the next eighteen months, with a sustained and ongoing effort thereafter, that will raise the capacity to generate ideas and turn them into national wealth, and provide high quality business and employment opportunities.

Membership

Chair

Mr David Miles, Senior Partner, Corrs Chambers Westgarth, Lawyers

Members

Dr Robin Batterham, Australian Chief Scientist

Mr MA (Tim) Besley, AO, President, Australian Academy of Technological Sciences and Engineering

Dr Ruth Dunkin, Vice-Chancellor Designate, Royal Melbourne Institute of Technology University

Mr Peter Grant, Deputy Secretary, Department of Education, Training and Youth Affairs

Dr John Keniry, Chairman, Ridley Corporation

Mr Christopher Knoblanche, Chief Executive Officer, Regional Managing Partner – Australasia, Arthur Andersen

Mr John Spasojevic, Deputy Chief Executive Officer, Department of Industry, Science and Resources

Mr Peter Thomas, Executive Director, Planning and External Affairs, Holden Ltd.

National Innovation Summit Communiqué

Melbourne
9-11 February 2000

Australia faces a crossroad.

We have done well in the past in using our ingenuity and natural resources to build a strong and robust economy.

But we are in the midst of a revolution from which a new order is emerging. The solutions of past decades will not suffice in the new knowledge age. Intangible assets—our human and intellectual capacity—are outstripping traditional tangible assets—land, labour and capital— as the drivers of growth. If we are to take the high road, a road of high growth based on the value of our intellectual capital, we need to stimulate, nurture and reward creativity and entrepreneurship.

Today's National Innovation Summit acknowledged this challenge. Leaders from the business, research, education and government sectors were united in their recognition of the importance of innovation to our economic prosperity and social well-being. Over 500 participants from all areas of the Australian innovation system met in Melbourne to develop a consensus for the way forward.

They agreed to work in partnership to develop and implement a comprehensive range of activities to harness Australia's innovative potential and to ensure that all Australians share in the benefits that innovation brings.

The fact is that Australia has the potential to become an international innovation high achiever, but sustained effort will be needed to create a more innovative culture. This will require recognition that innovation is more than just R&D or technological change. It demands the courage and foresight to take risks and make decisions in very short time frames, while investing strategically for long term gains. It must be driven by a clear focus on the users of innovation, allowing our innovation system to better respond to global market needs. It needs to understand, measure and manage intellectual capital. Intensive flows of information and knowledge lead to hotbeds of innovation.

Increased globalisation and the rapid rate of change have placed firms in a highly competitive environment, where new markets and new competitors are consistently on the horizon. Companies that neglect investment in innovation put their future at risk.

The production and transfer of knowledge is revolutionising our education and research sectors. Our institutions should deliver excellent research, taking into account both scientific opportunities and commercial applications. And they must do so in a dynamic, flexible way that responds to our economic and social needs.

Our governments must provide leadership and vision, and champion the cause of those who are prepared to take risks. They must themselves be innovative, in the way they develop, deliver and coordinate their activities. And they must create the environment in which innovation can flourish.

The Summit successfully captured valuable insights from all delegates and drew animated debate. Some issues were not resolved, and this reflects the broad range and complex nature of many of the topics under consideration.

With direction from the national Steering Committee, six expert Working Groups explored innovation in Australia and reported on the gaps and opportunities in the Innovation system. The six Working Groups

focussed on: Industrial Innovation; Managing Intellectual Property; the Human Dimension; Institutional Structures and Interfaces; Innovation and Incentives; and Resource and Infrastructure Consolidation and Cooperation.

Debate was also informed by over 70 general submissions and a collection of sectoral submissions.

The Summit findings

Thirteen breakout sessions were developed to explore the main innovation issues for Australia. These sessions invoked discussion around three broad themes:

- creating a competitive environment;
- investing in new ideas; and
- building industry-research linkages.

The broad findings of each theme are:

Creating a competitive environment

Australia's innovation system must be competitive in the global business environment. It was recognised that both business and government have a key role in facilitating the continuous improvement of the competitive environment. Innovation incentives, management of intellectual property, raising finance for innovation and the regulatory environment were all seen as critical aspects

We need to promote business confidence, by making sure risk taking is rewarded and regulation is not a burden. In addition, business needs to know how to leverage intellectual capital and should be able to rely on stable incentives. Innovation, intellectual property and investment skill must be developed.

It was agreed that a portfolio of internationally competitive incentives, including taxation concessions, grants, loans and venture capital support, were necessary to address the full range of innovation activities. Both broad-based and targeted programs are required, with support by government and business for very early stage investment being a priority.

A number of potential improvements to the competitive environment were identified, which warrant further analysis. The current portfolio of incentives should be reviewed to identify gaps and overlaps, and to identify emerging needs, while recognising the benefits of simplicity and certainty. Regulations that impede innovation and regulatory duplication and inconsistencies within and between all levels of government need to be removed. The management of IP must be upgraded in both business and public research agencies. The complexity and disincentives to raising money at all levels for investment in commercialising innovation need to be reduced.

Investing in new ideas

The central theme of the 'Investing in new ideas' sessions was the need to create a shared vision that inspires and commits the nation to an action agenda. Major challenges were:

- The need to have an education system that is appropriate to a knowledge based economy—one that expects life-long learning will be the norm rather than the exception; one that responds to the needs

of business; one that expects and feeds off inputs from industry; and one that inculcates the concepts and fundamentals of entrepreneurism from an early age. The social impact of innovation needs to be understood in order to build a society capable of understanding and incorporating change.

The pervasive need to improve our linkages between and within all elements of the Innovation system—government, business, research and the education community and critically between the Australian and international systems. The key to successful innovation is the people who move across the boundaries and the hard and soft information and skills that are transferred as the result of these linkages.

- The need to move towards systems that reward innovative behaviours for individuals, firms, and organizations.
- The need to be able to measure innovation as an aid to improving our competitiveness: where we are in terms of the nation, sectors, regions and firms; and how we measure the innovation intangibles that do not appear on balance sheets.
- A sports-like pride and passion by the Australian community in our innovation achievements; and recognition of the need to start to invest in a world-class research environment as a foundation for the future. In a country the size of Australia this will mean focusing, concentrating, forming partnerships in global research networks and a rigorous approach to the provision of major research facilities.

Building industry—research linkages

Coordination of the National Innovation System and the linkages within are more about people, partnerships, behaviours, incentives and culture and less about the institutional structures themselves. Summit participants agreed that the linkages and coordination could be, and needed to be, significantly improved. They called for this to be facilitated through leadership at the highest levels articulating a vision for innovation and entrepreneurship in Australia.

Some of the specific changes identified as critical to the development of a more innovative and entrepreneurial culture in Australia included embracing customer driven values, recognition of the global imperative of speed to market and the creation of an environment that encouraged balanced risk taking. It was recognised that successful commercialisation depends on getting the risk, reward and downsides right for both business and researchers and that Australia not only lacked sufficient incentives for commercialisation, but imposed a number of financial and legal disincentives to risk failure which mitigated against business investment in innovation.

Particular linkage shortfalls identified by participants included insufficient funding to accelerate the movement of ideas to start up or early stage businesses, and for the provision of commercialisation skills and business services support especially in the areas of market research, conversion of ideas to concepts, technology planning, IP/licensing and spin-off company formation.

The way forward

In order to progress the findings arising from the Summit, a post-Summit high level Implementation Group will be established. Representation on the group will continue the partnership model of business, research, education and government, with three senior representatives from each sector. The Group will be chaired by Mr David Miles, Partner, Corrs Chambers Westgarth and Master of Ceremonies for the Summit, and will advise by 30 August 2000 on a prioritised approach on specific actions identified at the Summit. In doing so, the Group would assess the feasibility of proposals in consultation with affected parties.

Following receipt of the report the aim is that relevant parties would agree to an Innovation Action Agenda by the end of the year.

The impact and effectiveness of the actions arising from the Summit will be reviewed in two year's time.

Summaries of breakout sessions

The issues and recommendations identified under each of the 13 breakout sessions form the remainder of this document at Attachment A. These reports were drafted by the respective breakout session facilitators and represent the major findings of each breakout session. However, as mentioned above, the Summit is only the first step in considering innovation in Australia and all recommendations made by breakout groups will be considered in this process.

Interested parties are invited to refer to the Innovation Summit website for updated information on the Summit and post Summit activities at: www.isr.gov.au/industry/summit

As hosts of the event, we agree that this is an accurate record of the National Innovation Summit proceedings.

Senator the Hon Nick Minchin
Minister for Industry, Science and Resources

Mr Campbell Anderson
President, Business Council of Australia