The Parliament of the Commonwealth of Australia

Australian manufacturing: today and tomorrow

Inquiry into the state of Australia's manufactured export and import competing base now and beyond the resources boom

House of Representatives Standing Committee on Economics, Finance and Public Administration

July 2007
Canberra

ISBN 978-0-642-78960-0 (printed version)

ISBN 978-0-642-78961-7 (HTML version)

Front cover images

Image of 'ceramic membrane tubes for oxygen generation' by Mr Mark Fergus, supplied by CSIRO, CSIRO Manufacturing and Materials Technology Division.

Images of manufacturing at Austal Ships, Western Australia and at Melba Industries, Victoria, photographed by Mr Andrew Dawson, House of Representatives Media Liaison Officer.

Chair's foreword

As we move through the first decade of the 21st century, in an increasingly globalised market, the nature of manufacturing is changing. How, what and where manufacturing is being undertaken is in flux; in some cases rapidly and quite remarkably.

The composition of manufacturing within developed countries has changed over the past twenty years, in tandem with the growth of services. In most industrialised economies the growth in the manufacturing sector has not matched that of the services sector, an evolution of industrialisation and higher living standards. But what often goes unnoticed is the continued growth in manufactured output and exports. Australia's manufactured exports presently account for around 20 per cent of its total exports—on par with services and agricultural export shares.

Contemporary industrial revolutions in developing countries, in particular China, have left an irrevocable footprint on the developed world's manufacturing trade. China's unprecedented economic growth has manifested itself in a voracious demand for resources. For a mineral rich Australia, this has led to elevated terms of trade and a surge in the value of the Australian dollar since 2003. The appreciating exchange rate consequently reduced the competitiveness of Australia's manufactured exports.

In May 2006, in this context of change, the Treasurer, the Hon Peter Costello MP, referred to the committee an inquiry into 'the state of Australia's manufactured export and import competing base, now and beyond the resources boom'. Within it, the committee was asked to focus on the challenges and opportunities for Australia's manufacturing sector arising from both the resources boom and the expansion in global trade.

The resources boom has been a price-led boom due to world-wide supply shortages. As mining capacity expands and volumes rise, prices will stabilise, but are likely to remain at high levels due to ongoing demand from China and India. The resources boom has therefore reinforced the need for Australian

manufacturers to adopt an alternative competitive strategy to that of price, whilst recognising the importance of production efficiencies. Similarly, protection measures, which were unsupported in evidence, serve only to mask uncompetetiveness.

The committee's primary recommendation is that the Australian Government develops a national manufacturing strategy in response to the sector's current and expected future transformations. In line with this, the committee recommends that manufacturing-oriented federal government programmes are reviewed to improve their relevance and accessibility and to dovetail with the national manufacturing strategy.

Only a few Australian manufacturers will be able to produce solely for the small-scale domestic market. Manufacturers must develop export survival strategies appropriate for their line of production. That may mean producing components off-shore; entering global supply chains within or outside Australia or having certain niche or high-value goods which enable profitable local production. To assist these strategies, the committee has made recommendations to improve the certainty of funding from the export market development grant scheme.

The committee also recommends that the Australian Industry Productivity Centres have a manufacturing focus and are adequately resourced to provide business diagnostics and expert advice to manufacturers across Australia. Importantly, this initiative would incorporate a one-stop-shop manufacturing advisory portal with a focus on providing information on production, process and entrepreneurial developments; forums and key global issues.

New scientific and technology-based industries are producing stand–alone high-tech products. Significantly, frontier manufacturers are also providing an avenue for traditional manufacturers to value-add by utilising new–age applications. However, the committee heard that innovative Australian manufacturers are often confronted with start-up funding difficulties. The committee therefore recommends a number of venture capital reviews to improve data and knowledge of this market in Australia. Likewise, the committee recommends that the design of the research and development tax concession scheme is examined, given that inquiry evidence raised doubts about the effectiveness of concessions in prompting additional research and development activity.

The emerging frontiers of manufacturing are demanding more scientific, electronic, design and environmental expertise. It is therefore vital that Australian students are kept abreast of emerging technologies and that industry and government communicate the opportunities the evolving sector offers. Similarly, the committee encourages post secondary vocational education providers to foster

partnerships with cutting-edge industry to give apprentices access to the latest technology in trade training. The committee also notes that Australian firms should be able to take advantage of CSIRO and university-based research and has recommended the CSIRO receive more funding to employ staff dedicated to manufacturing-based liaison.

In all, the evidence received and examined during the inquiry points to a consolidated yet vibrant and innovative manufacturing sector after the softening of the resources boom. It indicates that with adaptability and creative thinking, there are opportunities for Australian manufacturing to seize in the globalised market.

On behalf of the committee I would like to thank all those individuals and organisations who gave their time to participate in the inquiry.

The Hon Bruce Baird MP
Chair

Contents

TABLES

FIGURES

Membership of the committee

Chair	Hon Bruce Baird MP	
Deputy Chair	Ms Sharon Bird MP *(member of committee from 7/2/07 & Deputy Chair from 1/3/07)*	
Members	Mr Steven Ciobo MP	Mr Joel Fitzgibbon MP *(member of the committee to 7/2/07)*
	Dr Craig Emerson MP *(Deputy Chair to 1/3/07)*	
	Ms Sharon Grierson MP	
	Mr Michael Keenan MP	
	Mr Stewart McArthur MP	
	Mr Patrick Secker MP	
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Committee secretariat

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Terms of reference

On 3 May 2006 the Treasurer, the Hon Peter Costello MP, asked the committee to inquire into and report on the state and future directions of Australia's manufactured export and import competing base, focusing on, but not limited to:

- Australia's dominance in commodities exports and the impacts of this on the economy following the resources boom;
- the state of the country's manufacturing sector (and the goods and associated services) including opportunities and challenges from the expansion in global trade (in particular by China); and
- policies for realising these opportunities.

List of abbreviations

A3P	Australian Plantation Products and Paper Industry Council
AATSE	Australian Academy of Technological Sciences & Engineering
ABS	Australian Bureau of Statistics
ACCI	Australian Chamber of Commerce and Industry
ACIS	Automotive Competitiveness and Investment Scheme
ACTU	Australian Council of Trade Unions
AEEMA	Australian Electrical and Electronic Manufacturers' Association
Ai Group	Australian Industry Group
AIPC	Australian Industry Productivity Centres
AMWU	Australian Manufacturing Workers' Union
ANSTO	Australian Nuclear Science and Technology Organisation
ANU	Australian National University
APAF	Australian Proteome Analysis Facility
APEC	Asia-Pacific Economic Cooperation
ATO	Australian Taxation Office
AUSFTA	Australia-US Free Trade Agreement
AusIMM	Australasian Institute of Mining and Metallurgy
BEP	Business Entry Point
BHP	Broken Hill Proprietary
CEO	Chief Executive Officer

CFO	Chief Financial Officer
COAG	Council of Australian Governments
COMET	Commercialising Emerging Technologies (programme)
CR	Commercial Ready (programme)
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry
DCITA	Department of Communications, Information Technology and the Arts
DEST	Department of Education, Science and Training
DEW	Department of the Environment and Water Resources
DEWR	Department of Employment and Workplace Relations
DFAT	Department of Foreign Affairs and Trade
DITR	Department of Industry, Tourism and Resources
DSL	Digital Subscriber Line
DSTO	Defence Science and Technology Organisation
EMDG	Export Market Development Grants (scheme)
ESVCLP	Early Stage Venture Capital Limited Partnership
EU	European Union
FDI	Foreign direct investment
FSF	Foreign Superannuation Fund
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GSP	Gross State Product
GVA	Gross Value Added
HECS	Higher Education Contribution Scheme
IAP	Intermediary Access Programme
IBM	International Business Machines

ICIP	Industry Cooperative Innovation Programme
ICN	Industry Capability Network
ICT	Information and communications technology
IFF	Innovation Investment Fund
IP	Intellectual property
ISO	International Organization for Standardization
KPI	Key Performance Indicator
LM	Lean Manufacturing
MAS	Manufacturing Advisory Service (UK)
MCEETYA	Ministerial Council on Education, Employment, Training and Youth Affairs
MEP	Manufacturing Extension Partnership (US)
MIC	Management and Investment Companies (programme)
NIEIR	National Institute of Economic and Industry Research
NIH	National Institutes of Health
NMF	National Manufacturing Forum
NTB	Non-tariff barriers
OECD	Organisation for Economic Cooperation and Development
OH&S	Occupational Health and Safety
OPAL	Open Pool Australian Light-water (reactor)
P3	The Pharmaceutical Partnerships Programme
PC	Productivity Commission
PDF	Pooled Development Funds
PSF	Pre-seed Fund
QMI	Queensland Manufacturing Institute (Solutions Ltd)
R&D	Research and Development
RBA	Reserve Bank of Australia
RMIT	Royal Melbourne Institute of Technology

SAMP	Supplier Access to Major Projects
SIA	Science Industry Australia Inc.
SIP	Strategic Investment Program
SME	Small/Medium Enterprises
TAFE	Technical and Further Education
TCF	Textile, Clothing and Footwear
TCFL	Textile, Clothing, Footwear and Leather
TFIA	Council of Textile and Fashion Industries of Australia Ltd
UK	United Kingdom
US	United States
VCLP	Venture Capital Limited Partnership
VET	Vocational Education and Training

Overview

The future of Australian manufacturing: the committee's view

Based on this inquiry, the committee has formed the view that Australian manufacturing has a strong future beyond the resources boom. For the last two decades, Australian manufacturing has been making the transition from an inward-looking sector producing for a protected domestic market to an outward-looking sector competing in tough international markets. Despite large reductions in protection, the challenge from China and the high exchange rate associated with the resources boom, the Australian manufacturing sector as a whole has managed to survive and expand—albeit not at the rate of the overall economy.

In order to succeed against increasingly intense competition from China and other low-cost manufacturing countries of the region, Australian manufacturing will need to be globally oriented. Some Australian manufacturing activities and businesses will decline or close, but others will expand and new ones will emerge.

What is the optimal policy approach to the manufacturing sector?

The historic debate has been between protectionism and a hands-off, laissez faire approach. Protectionists argued for tariffs and quotas on imports of manufactured goods to insulate local manufacturing from international competition. Laissez faire advocates argued that there should be no government involvement beyond ensuring that markets are free by creating enforceable property rights and preventing anti-competitive behaviour.

During the course of the inquiry, the committee heard no compelling evidence in support of a protectionist approach. As a middle-sized, trade-exposed economy, it is not in Australia's interests to prop-up uncompetitive businesses. As far as the committee is concerned, protectionism belongs to a bygone era; protectionism as a policy approach has failed and should not be revived.

Neither does the committee support a completely laissez faire approach of standing back and allowing the market to adjust to life beyond the resources boom. Instead, the committee supports an approach of capacity building.

Building the capacity of the manufacturing and other sectors of the Australian economy involves removing impediments to their growth and correcting for genuine market failure. Avoiding and removing impediments can include maintaining macroeconomic stability; easing skill shortages; reducing overbearing regulation at all government levels; enabling greater access to new technology; providing export marketing assistance and encouraging entry into global supply chains.

Market failure can occur when particular activities generate positive or negative spill-overs. Activities generating positive spill-overs are those that create benefits for the wider community that cannot be fully captured by private businesses responsible for those activities. Classic examples are research and development and education and training. If left totally to the private sector, too little activity producing positive spill-overs would occur. The opposite is true of negative spill-overs, such as air and noise pollution.

A legitimate role for government exists to support activities offering positive spill-overs. This is the basis of government support for research and development, education and training.

As an island continent, Australia can benefit from manufacturing industries that have strategic importance, such as steel making and defence equipment manufacturing. However, these industries need to be efficient and competitive if they are to contribute to national wellbeing.

In summary, the committee does not support protectionism or a totally laissez faire approach to industry policy. Instead, it supports capacity building through removing impediments to growth and correcting for genuine market failure.

List of recommendations

3 The role of government in the manufacturing sector

National manufacturing policy

Current industry policy is sector-neutral and does not specifically provide for a manufacturing policy. A manufacturing strategy provides a sector-specific direction for manufacturing. It clearly defines the government's objectives and justifies why support programmes exist. The committee concludes that a national manufacturing policy, which also considers regional issues, would supplement the current broad industry approach.

Recommendation 1

The committee recommends that the Government develops a strategic Australian manufacturing policy, including regional strategies, to supplement existing industry policy.

Action Agenda approach

Action Agendas are the foundation of current industry policy—supplemented by general industry assistance and more targeted assistance programmes. The process appears to build cooperation and trust within industries that participate. However, only those sectors with sufficient resources or viable size can be involved. Industry collaboration through the agenda process appears to be short-lived given that unresolved issues are not always actioned after government facilitation ends.

The Action Agenda strategy has now been in place for a decade with the majority of manufacturing sectors having completed agendas: The committee therefore believes it is time to conduct a review of this 'industry-up' approach to manufacturing policy.

Recommendation 2

The committee recommends that the Government reviews the on-going need for an Industry Action Agenda approach.

Australian Industry Productivity Centres

The committee acknowledges that the new Australian Industry Productivity Centres (AIPC) initiative, modelled on the UK Manufacturing Advisory Service (MAS), will provide manufacturers with the necessary tools to build better business capability and global strategy. However, the committee is concerned that the multi-sector focus of the nascent AIPC may lead to resource dissipation and ultimately make it less relevant to the manufacturing sector. The UK MAS was customised for the needs of an evolving manufacturing sector—and this fit-for-purpose approach seems to be the key to its success. The AIPC should also forge links with the existing state-based manufacturing advisory agencies. This will ensure the national strategy takes account of regional issues.

Recommendation 3

The committee recommends that the Australian Industry Productivity Centres initiative be finetuned to ensure that:

- akin to the UK Manufacturing Advisory Service it maintains a manufacturing focus so as not to dissipate resources;
- it is well promoted and easily accessible;
- Australian regions are sufficiently resourced and that there is one centre in every large manufacturing region;
- there is appropriate liaison with state-based manufacturing advisory agencies.

Jurisdictional regulatory over-lap

Overlapping regulations at the local, state and federal government levels continue to create unnecessary compliance burdens for manufacturing businesses. Where possible, compliance reporting requirements and timing of information returns for jurisdictions should be identical. The committee heard the most evidence about lack of coordination between federal and state/territory occupational and health and safety standards and how this created an unnecessary impost on manufacturing businesses.

Recommendation 4

The committee recommends that through the Council of Australian Governments (COAG), the States, Territories and the Commonwealth harmonise standards particularly in regard to occupational health and safety issues such that compliance and regulatory burdens for manufacturers are reduced, without compromising safety standards.

4 Manufacturing strategies — mixing the old with the new

Benchmarking to world's best practice

The committee supports 'benchmarking' and the use of diagnostic audits and various management tools to improve business weaknesses identified through it. Firms analysing their deficiencies is a positive step towards productivity and efficiency gains. The committee therefore endorses the diagnostic analysis that the Australian Industry Productivity Centres are proposing to offer and hopes that small to medium enterprises will be exposed to well-founded manufacturing-based methodologies suitable for their business type.

Recommendation 5

The committee regards benchmarking as a vital activity of the nascent Australian Industry Productivity Centres and recommends that the Government ensure the Centres are adequately resourced to provide this service to a wide range of companies across Australia.

Export Market Development Grants scheme

The main government support for exporting is the Export Market Development Grants (EMDG) scheme.

A problem with the EMDG scheme is that even applicants with strong applications are not sure how much they will be reimbursed when they are deciding on promotion spending, which limits the incentive the scheme provides to undertake additional marketing. The suggestion to allow a smoothing arrangement whereby unspent scheme monies could be carried over into future years would reduce this uncertainty. Increasing the budgeted amount for the scheme would reduce the uncertainty further, by increasing the probability that eligible applicants would receive their reimbursement even in years with high demand.

Recommendation 6

The committee recommends that the Government increase the amount budgeted for the Export Market Development Grants programme each year and, in line with a recent Austrade review, allow the carry forward of any unspent budgeted funding to be used in future programme years of high applicant demand.

5 Developing and funding emerging manufacturing

Australian synchrotron

Nanotechnology offers great scope for both improving traditional manufacturing processes and developing new manufacturing industries. The Australian Synchrotron is an important facility for nanotechnology (and has broader uses). It will bring national benefits. It is noted that, around the world, synchrotrons are substantially funded by governments, partly due to their high cost and use in basic research. It is important that the Australian synchrotron be placed on a sound financial footing.

Recommendation 7

The committee recommends that the Australian Government commits to annual direct funding of the Australian Synchrotron given its importance to manufacturing innovation through cutting-edge research.

Venture capital

The committee notes claims that innovative manufacturing is being held back by an underdeveloped venture capital market in Australia, meaning that viable projects are not being funded. However, on the information currently publicly available, it is hard to assess this. More information is therefore required.

Recommendation 8

The committee recommends that the Australian Bureau of Statistics, in conjunction with the Australian Taxation Office and the Department of Industry, Tourism and Resources, improve the available data on venture capital, including by distinguishing better between venture capital and other forms of private equity, and compiling performance data.

Recommendation 9

The committee recommends that an inter-departmental working party, headed by the Department of the Prime Minister and Cabinet, report publicly on the issue of whether there are market failures hindering the development of the venture capital industry. The report of, and submissions received by, the Venture Capital Industry Review, should be made available to this working party and be allowed to be cited in their report.

If, in the light of this further study, it is concluded that the venture capital market is unduly limited in Australia, it would be worth examining the available tax concessions. These appear to 'reward' successful investors and 'punish' the unsuccessful, which may be reinforcing rather than offsetting any tendency towards investors being unduly risk averse.

Recommendation 10

The committee recommends that the Department of Industry, Tourism and Resources and the Treasury prepare a paper outlining the implications, including cost, of allowing participants in the Venture Capital Limited Partnership and Early Stage Venture Capital Limited Partnership schemes to deduct losses in these schemes against other income.

Regardless of whether substantial changes are deemed necessary to the venture capital tax concessions, the existing schemes are unduly complicated and lack criteria for judging their success.

Recommendation 11

The committee recommends that the venture capital tax concession schemes—such as the Venture Capital Limited Partnership scheme and the Early Stage Venture Capital Limited Partnership scheme—be merged and simplified, and clear objectives set.

Another possible impediment to new companies accessing venture capital is a lack of knowledge about how and where to obtain it. The nascent Australian Industry Productivity Centres could play a role here.

Recommendation 12

The committee recommends that the Australian Industry Productivity Centres ensure they have adequate information about venture capital funds to assist new manufacturers in accessing this source of funding.

6 Manufacturing careers and training

Image of manufacturing employment

Difficulties in attracting new employees to fill skills shortages in manufacturing are exacerbated by the sector's poor public image. Whilst the committee recognises that some old-style manufacturing industries remain, there may be insufficient community awareness of the many manufacturers offering attractive and increasingly interesting working environments.

Recommendation 13

The committee recommends that the manufacturing industry, with the support of the Australian Government, develop a coordinated communications strategy for promoting the career opportunities in manufacturing, especially in innovative, knowledge based manufacture.

Science and technology education

Good quality science education is critical for the future growth and development of Australia's innovation and manufacturing sectors. It is of great concern, therefore, that science education is experiencing a decline in Australia—in terms of secondary and tertiary student uptake, quality of teaching and relevance of curricula.

The committee notes the importance of practical and interesting (not just 'core') primary and secondary curricula that engage students, equip them with up-to-date science and mathematics skills, and encourage the pursuit of science and innovation related careers. However, such curricula must be backed by adequate resources and appropriate teacher training.

Recommendation 14

The committee recommends that the Ministerial Council on Education, Employment, Training and Youth Affairs consider the necessary resources provision and teacher training needs to introduce updated primary and secondary school science curricula with a focus on practical and up-to-date information about emerging technologies.

Industry–TAFE technology and skills exchange

The committee notes the importance of three-way training partnerships between individuals/schools, educators and industry. The success stories it heard in evidence involved TAFE brokering training partnerships with industry—to harness up-to-date equipment and to gain an understanding of skills that trainees require for the workplace. In addition, group training organisations should be mindful of exposing apprentices to technologically advanced equipment by ensuring a good spread of host employers are involved in the scheme.

Recommendation 15

The committee recommends that post secondary vocational education providers continue to seek out opportunities to form training partnerships with companies that own costly state-of-the-art equipment—to give apprentices access to the latest technology and maintain the skills of TAFE trainers.

7 Business engagement with researchers

CSIRO

While the committee commends CSIRO for the steps it has taken to improve its liaison with business, more needs to be done to ensure Australian firms are able to take full advantage of CSIRO's research.

Recommendation 16

The committee recommends that CSIRO receive additional funding to employ more staff dedicated to liaising with individual (especially small and medium-sized) businesses, business organisations and the new Australian Industry Productivity Centres. The liaison officers should inform potential partners of relevant work within CSIRO and seek information on possible future CSIRO work that could lead to developing new products and processes useful to Australian manufacturers.

Universities

While the primary focus of university research should remain independent basic research to push out the frontiers of knowledge, there is scope for better cooperation between universities and industry. In some cases this might lead to university researchers doing more applied work with more obvious commercial applications. In some cases they might learn from the experience of TAFEs in working with industry. However, universities should not be placed under funding pressure so that they feel a need to undertake commercial research to fund basic research and teaching.

Recommendation 17

The committee urges universities to consider appointing more 'industry liaison officers' to facilitate contacts between universities and local industry (including via the new Australian Industry Productivity Centres). They could look for opportunities to share equipment and arrange short-term secondments in both directions.

8 Innovation and research and development

Research and development

The committee accepts that fundamental research which benefits the broader economy, rather than just the company undertaking it, may be undersupplied in the free market so there is a case for government support. This can be provided through a competitive grants scheme along the lines of Commercial Ready. The scheme should focus on R&D with wide benefits that would not be undertaken otherwise. It need not be limited to smaller enterprises, although they may often better fit these criteria. Consideration should be given to making contingent loans as well as grants, as this will replenish the available funds and so allow more encouragement for R&D. The scheme should be simple for firms to access, with straightforward compliance requirements.

Recommendation 18

The committee recommends that successful Commercialising Emerging Technologies (COMET) and Commercial Ready grant applicants are linked up with the CSIRO to foster better industry applied research at the small to medium manufacturing level.

Research and development tax concessions

There are doubts about the extent to which the existing R&D tax concessions are effectively inducing additional R&D, especially given the reduction in the company tax rate. The concessions may not be the optimal form of incentive. Replacing the concessions with increased grants would allow for a more targeted approach, although grants may have disadvantages, such as administrative costs and risks of favouritism.

The committee recognises that there may be benefits to Australia from conducting R&D here, even if the intellectual property rights are held offshore. R&D and design activities, rather than production, will increasingly form the basis for Australia's involvement in global manufacturing. The committee commends the recent decision to allow companies holding intellectual property offshore access to the 175 per cent premium concession and believes the same argument is applicable to the standard 125 per cent scheme.

Recommendation 19

The committee recommends that the design of the R&D tax concession scheme be examined in the light of the recent report by the Productivity Commission and the evidence assembled in this inquiry. The examination should include the eligibility rules, in particular the extent to which foreign-owned companies conducting R&D in Australia are able to benefit from the concession.

If such an examination leads to the R&D tax concession being reduced then the funds saved should be used for increased grants where a convincing case can be made for them.

9 Government assistance to manufacturing

Improving assistance programmes

Many grant programmes relevant to the manufacturing sector are of a similar nature and could be streamlined. Business confidence in support programmes is lost when eligibility criteria and processes are changed frequently.

Assistance programmes should be presented within an overarching manufacturing strategy. This would make it easier for manufacturers to determine what industry programmes best fit their circumstance. This approach provides manufacturing sector relevance to general industry programmes; thus limiting the growth in programmes.

The Committee accepts that merit-based grants require a high degree of transparency and accountability—but should not unduly interfere in the operation of businesses. Grant programmes which require laborious ex-post evaluations should instead introduce a staged funding approach which would align with business milestones.

Recommendation 20

The committee recommends that the Department of Industry, Tourism and Resources review assistance programmes with a view to:

- rationalisation, simplification and programme stability;
- dovetailing programmes into a manufacturing sector strategic approach; and
- conducting grant programmes in consecutive stages where evaluation of outcomes is more readily apparent.

A stand-alone manufacturing portal

It is not easy for manufacturers to access manufacturing specific policy information. The Committee therefore recognised a need for a manufacturing webpage on the Department of Industry, Tourism and Resources web site with a link to a stand-alone, user-friendly manufacturing portal.

The portal would support the manufacturing-based Australian Industry Productivity Centres network, offering a comprehensive resource for manufacturers, beyond programme information. Clear home page links to Austrade, Invest Australia, Industry Capability Network, Business Entry Point and the Export Hub should be on this site. The UK's Manufacturing Advisory

Service portal and the US's Manufacturing Extension Partnership portal both have good features that could be used as models for site development.

Recommendation 21

The committee recommends that a dedicated manufacturing advisory portal be developed as the internet face of the manufacturing-based Australian Industry Productivity Centres, linking to a manufacturing webpage on the Department of Industry, Tourism and Resources website. Features of this would include:

- streamlining of other information portals so there is a one-stop-shop for the manufacturing sector;
- prominent home page links to the industry agencies and the generic 'business entry point' and 'export hub';
- an on-line venture capital information service; and
- a focus on sector specific issues beyond assistance programme advice including information on production, process and entrepreneurial developments; forums and key global issues.

1

Introduction

Background

1.1 Australia's resources sector is experiencing its most prosperous economic cycle in over a century. Consequently the terms of trade are the strongest since the 1950s, which has led to the Australian dollar's rapid appreciation since 2003. Such rapid sectoral and economic changes affect all sectors of the economy, some more than others. In tandem with this, and the reason behind these shifts, the dynamic industrialisation of a handful of developing countries, in particular China, is driving world production and trade strategies.

1.2 These global changes are affecting not only the Australian manufacturing sector, but those of all Western economies. However, Australia is experiencing the dual impact of China's industrialisation given it is resource rich and with an established manufacturing sector.

1.3 The Australian manufacturing sector now confronts further challenges and yet is being exposed to new opportunities. The very nature of manufacturing is transforming. In view of this, on 3 May 2006 the Treasurer, the Hon. Peter Costello MP, asked the House of Representatives Standing Committee on Economics, Finance and Public Administration to inquire into and report on the state of Australia's manufactured export and import competing base now and beyond the resources boom.

Conduct of the inquiry

1.4 The inquiry was advertised nationally on 31 May 2006 and subsequently received 50 submissions from a broad cross section of interested parties. The inquiry was conducted concurrently with an inquiry into the current and future directions of Australia's service industries and much evidence received applied to both inquiries.

1.5 Between July and November 2006 the committee conducted manufacturing site visits in Melbourne, the Gold Coast, and Newcastle and Hunter regions. In February 2007 a site visit was held in Perth. A total of 13 public hearings were held in Canberra, Sydney and Melbourne between August 2006 and March 2007.

1.6 A list of submissions, exhibits and public hearing witnesses can be found at Appendices A, B and C respectively.

1.7 Submissions received and transcripts of hearings can be found at the committee's website: http://www.aph.gov.au/house/committee/efpa/manufacturing/index.htm

Impact of the resources boom on manufacturing

1.8 The rapid expansion of the Chinese manufacturing sector in the last twenty years has led to unprecedented global demand for raw materials and a consequent increase in the price of these; most notably in the last three years when the rest of the global economy was also growing strongly. Australia, being a resources rich nation, has experienced an increase in its terms of trade and a significant increase in the value of the Australian dollar.

1.9 Flowing from this, as the mining sector's profitability has surged, it has attracted employment from Australia's manufacturing sector. The impact of this has been skills shortages especially for skill-sets common to both sectors.

1.10 China has caused the Australian resources boom. China's industrialisation started in the low-value, high-volume manufacturing sector where they could manufacture at very low per unit cost as they transferred surplus labour from agriculture to manufacturing.

1.11 What is happening in China is the 'industrial transition phenomena' whereby developing countries' economic focus shifts over time from agricultural, to manufacturing production, and finally to providing services. In Western economies this change spanned the 19th and 20th centuries. China is now undergoing this transition—at a much later stage, but on a massive scale[1] and at a much faster pace.[2] Essentially, the boom we are experiencing is a result of a 21st century industrial revolution.

1.12 The Committee heard repeatedly that the appreciated exchange rate has undoubtedly hurt the manufacturing sector. Most thought the resources boom has been a significant contributor to this appreciation.

1.13 Apart from the impacts on the exchange rate the other impact of Chinese industrialisation on Australian manufacturers has been competition from cheaper imports. This has either led to the rise of 'off-shoring'[3] of low-value production or the replacement of domestically produced component parts with imported component parts from developing countries.

1.14 However, evidence to the inquiry indicates that irrespective of a resources boom, manufacturing would have grown less than services, and so its share of the economy would have declined. Manufacturing's long run trend of losing employment to the services sector would have continued.[4] But, even if the sector accounts for a decreasing share of employment, it may still contribute to increased Australian prosperity.

Does Australia need a manufacturing sector?

1.15 The evidence received by the inquiry to date shows that no industrialised country has a magic formula to ensure a country grows or maintains a specific sector or sectors. It appears that free-market developed countries naturally gravitate towards those sectors in which they have a comparative or competitive advantage, although a number of countries have

1 The population of China is around 1.3 billion; during the United Kingdom's industrial revolution the UK population was 21 million (in 1820). Sourced from Angus Madison, *The World Economy – A Millennial Perspective*, OECD 2001.

2 It took the UK about 35 years to double its output due to the industrial revolution (1820-1855) but it has only taken China 12 years (1987-1999).

3 Off-shoring refers to manufacturing production being relocated in a lower cost country (usually where low-cost labour is plentiful).

4 Manufacturing has seen rationalisations and improvements in labour productivity that the services sector has not.

'artificially' created these advantages.[5] Whether these countries' strategies will ensure long-term prosperity is unproven.

1.16 Presently the manufacturing, services and agricultural sectors each contribute around 20 per cent to total Australian exports, with the booming resources sector contributing around 40 per cent. This is a sectoral mix that has changed markedly over recent times; in particular the current 'level pegging' of services, manufacturing and agriculture. Services have increased their share of exports, with a further expansion of this sector expected in the future (although some services are not easily globally traded).[6] The Treasury indicated this trend is worldwide:

> Typically, an economy will start off being largely agricultural. Then, over time, manufacturing—secondary industry—develops, and then later on the tertiary sector develops.[7]

1.17 Some countries are still 'industrialising' and so their manufacturing sector is significantly larger than their other sectors—Korea is an example. There are also other countries revitalising their manufacturing sectors, like Ireland. These types of countries may have explicitly interventionist programmes to achieve the rapid growth in the sector. Often such government policies are justified as policies of economic necessity, where there are no other succeeding or alternative sectors.[8]

1.18 The big difference between countries like Ireland and Korea and most of the established industrialised nations is the focus of their manufacturing growth. The former's manufacturing sectors are concentrated in high value-added or advanced manufactures.[9] In many cases, policy programmes have been targeted to support these manufactures.

1.19 In established manufacturing centres with less interventionist governments, market mechanisms are relied upon to move the sector into more competitive areas. These areas tend to be the high-end, specialty, and science and technology sectors. As a consequence, many old-style manufacturers lose their competitive edge as their products can no longer

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5 Through attractive corporate tax levels, lucrative grants, subsidy programmes and highly directive public sector policy. Ireland, Singapore and Taiwan were mentioned as examples of countries that set out to build up specific manufacturing industries. Refer Appendix F.

6 Child care and aged care are two good examples of services that will increase significantly in the domestic market but are not easily globally tradeable.

7 Mr J Hawkins, the Treasury, *Transcript*, 1 December 2006, p. 9.

8 Ireland, for example, was in an economic recession when the Irish Government instituted a manufacturing revival strategy and, unlike Australia, had no resources sector.

9 Some established countries like Finland and Germany do concentrate manufacturing in the high-end market.

compete on price with industrialising *and developing* trading partners, like China and India.[10] The developing and rapidly industrialising countries operate under protectionist and interventionist regimes but their biggest asset in world trade is a steady supply of low-cost labour and weaker regulatory frameworks (be they socially desirable or not).

1.20 There will, therefore, be a natural resource shift intra-sector (although skills transfers from low-value to hi-tech manufacturing are not as smooth) and inter-sector from manufacturing to services or resources. The shift within the sector is likely to be limited as the niche high-end sector will be lean, highly automated and demanding different skill-sets.

1.21 If the manufacturing sector is to remain it will be because it is globally competitive and the goods produced are globally in demand. Australia will have a manufacturing sector if it contributes to higher living standards for Australians. To achieve this, firms will need to be innovative in not only their end-product but also in their production and the delivery of their end-product (including integrating supply chains and after sales relationships).

1.22 The committee heard evidence of many examples of innovative Australian manufacturing activity, including during committee site-visits. These manufacturers were succeeding in the global arena.

1.23 Participants in the inquiry process, including the Treasury, noted that the biggest risk an economy faces when it allows resources to move from manufacturing to their most efficient use at a point in time is the difficulty in returning appropriate resources to the diminished sector when the global market demands:

> And once a factory is shifted overseas, or a contract lost, it may be difficult to expand manufactures or other non-resource exports again even if, after the resources boom fades, the exchange rate appreciation is reversed.[11]

1.24 Resources move from manufacturing into the mining, services or agricultural sectors with relative ease. It is, however, more difficult for resources to move freely from the other sectors back to manufacturing; particularly if the sector lapses for more than one locally trained and

10 Others include Brazil and Russia—the so called 'BRIC' countries.

11 The Treasury, *Submission no. 21*, p. 13.

sourced skill generation.[12] The market would finally restructure but it would be a lengthy and costly process.

1.25 There was, therefore, almost universal agreement amongst participants that there is a pro-active but not protective role for government in manufacturing.

1.26 The Australian Government's future role in the sector will be to provide a sound macroeconomic framework; assist adjustments to structural and sectoral change; provide public infrastructure to support the development and utilisation by industry of advanced science and technological platforms; facilitate research and innovation transfers between the public and private sector; and ensure the business environment, including transport systems and regulation, are uniform and stable across the nation.

What is the outlook for Australian manufacturing?

1.27 The future composition of the sector will be different from what it is now. Based on evidence received by the inquiry, with limited government intervention, the sector will select its own winners and ultimately cull its losers.

1.28 The industries that will survive are likely to be those at the technological frontier; those manufacturing industries that embrace these new technologies; and some naturally protected by high transport costs for their type of good.

1.29 It must be borne in mind that the industrialising nations will not produce only low-value high volume products indefinitely. China is already investing in science and technology expertise through its strategy of 'endogenous innovation' ('zi-zhu-chuang-xin'). These countries are increasingly competing in markets for sophisticated manufactures and their ability to reach quality standards should not be underestimated. Western world manufacturers will need to be vigilant to ensure they retain a market edge in sophisticated or niche products.

1.30 The other aspect of Chinese industrialisation is that it will be a very long time before the Chinese 'run out of cheap labour' to produce low-end products. There is a much touted 'barbeque view' that as China industrialises and its standard of living increases, so too will its wage

12 Along with the loss of direct skills is the loss of specialist training skills. Ireland was able to reinvigorate its manufacturing sector because it could still capture the skills needed for the sector from a willing expatriate labour force.

structure and consequently its input costs will rise to meet those of industrialised nations. This argument is flawed (even with the political regime aside); because even if this is happening in some parts of the Eastern seaboard like Shanghai, China's immense agricultural-based population will supply low-cost labour for many generations.

1.31 Despite the bad press manufacturing often receives because of the changing fabric of the sector, that very change brings with it vibrant opportunities and as such it is an exciting arena for Australians to operate in. This was succinctly expressed by the National Manufacturing Forum in its October 2006 report:

> Australia should generate a feeling of excitement and confidence about its manufacturing prospects in the global economy. This involves thinking, engaging and competing locally and capturing all the opportunities that flow from there.[13]

1.32 Challenged as it may be, given the right tools, the Australian manufacturing sector has many opportunities to seize.

13 National Manufacturing Forum, *Strategic actions to boost Australian manufacturing–a report by the National Manufacturing Forum to State and Territory Ministers responsible for manufacturing*, Melbourne, October 2006, p. 14.

2

Australia's manufacturing sector and the resources boom

Introduction

2.1 The manufacturing sector plays an important role in the Australian economy. It accounts for a little over a tenth of Australian employment and output, but over a fifth of exports. The manufacturing sector exports around a quarter of its output. Manufacturing employs 1.1 million people, about half of whom worked for firms employing under 100 people.

2.2 Within manufacturing, food products[1] account for about a fifth of production, machinery almost a fifth, and manufactures intensively using mining resources[2] over a third (in terms of gross value added in 2004–05).

2.3 At a finer degree of disaggregation, Australian manufacturers are moving up the value chain. For example, clothing production now only accounts for less than three per cent of manufacturing and what remains is increasingly high-end fashion or specialist wear such as fire-resistant clothing.

2.4 Compared to other sectors, manufacturing has less educated workers and so offers lower wage rates, but due to the prevalence of traditional full-time employment, offers higher incomes.[3]

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1 Including beverages and tobacco.

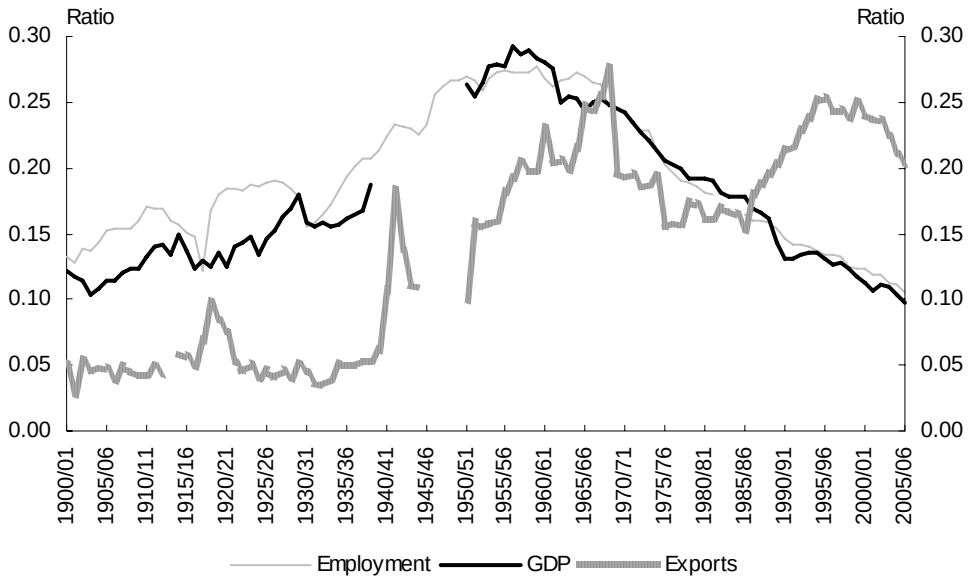
2 Petroleum, coal, chemical, non-metallic mineral products and metal products.

3 Productivity Commission, *Trends in Australian Manufacturing*, April 2003, pp. xxv, xxvii, 102.

Long-term trends in Australian manufacturing

2.5 Australia's manufacturing sector has undergone many changes as it has grown over the decades. Until around the middle of the 20th century, it grew faster than the rest of the economy, notably the rural sector, and so its share of output and employment increased (Figure 2.1).

Figure 2.1 Australian manufacturing sector's share of employment, GDP and exports



Source: Updated from the Treasury, Submission no. 21, p. 3.

2.6 Subsequently, while manufacturing output has continued to increase, the services sector has grown much faster. As a consequence, manufacturing now accounts for a smaller share of GDP and employment (Figure 2.1).

2.7 A portion of the decline reflects outsourcing.[4] For example, the cleaners and cafeteria staff in a factory may once have been classified as employed in manufacturing, but are now recorded as working in the services sector as they are employed by contractors. But this effect is not large enough to cause the overall trends evident in Figure 2.1.

2.8 This 'rise and fall' in manufacturing's share of the economy is not unusual. The typical pattern of economic development across most advanced economies has been that the manufacturing sector initially increases its share of the economy at the expense of the agricultural sector and then is later itself displaced by the growth of the services sector (Table 2.1, p.11).

4 The Australian Chamber of Commerce and Industry (ACCI) note this in *Submission no. 33*, p. 14.

2.9 Manufacturing employment has fallen in most OECD economies since 1990 and has fallen as a proportion of total employment in almost all of them. The decline in manufacturing's share of output is reinforced by the general tendency for the price of manufactures to fall relative to services over time (which is related to the tendency for faster productivity growth in manufacturing than services).[5]

Table 2.1 Proportion of employment in manufacturing[6] (percentage)

	Australia	Canada	France	Netherlands	United Kingdom	United States
1700	n.a.	n.a.	n.a.	n.a.	22	n.a.
1870	33	28	28	29	42	24
1950	37	36	35	40	47	33
1973	35	30	39	36	42	32
2005	21	22	23	20	22	20

Sources: A Maddison, Dynamic Forces in Capitalist Development; a Long-run Comparative View, 1991; OECD, Labour Force Statistics 1985–2005, 2006.

2.10 This pattern of a gradual decline in the share of agriculture and rise in the share of services as economies mature is consistent with the observation that food accounts for most of the consumption of poor households, but as they become more affluent a greater share of spending is on services.

The composition of the manufacturing sector

2.11 Australian manufacturing output has grown at a modest rate over recent years. However, this masks substantial variations within the sector (Table 2.2, p. 12). In particular, there has been a large decline in clothing and textiles, which have been most affected at the low-value end by the growth of textile manufactures in economies with low labour costs.[7] But there has been solid growth in more sophisticated goods such as machinery, and some mineral products (e.g. bricks, cement) used by the construction industry to meet the housing boom and then the mining boom.

5 D Pilat et al, 'The changing pattern of manufacturing in OECD economies', *OECD Science, Technology and Industry working papers*, no. 2006/9, p. 11.

6 In this table, 'manufacturing' includes mining, construction and utilities.

7 Textile and metal products have been the weakest areas of manufacturing employment in the G7; Pilat et al, 2006, p. 8.

2.12 Even within textiles there are some areas of growth in more sophisticated products. For example, Bruck Textiles explained how it had moved from manufacturing standard blinds to specialising in flame-retardant blinds.[8] Scientific advances are giving scope for more innovative products. For example, the CSIRO is a leader in nanotechnology which can be used in producing advanced textile products.

Table 2.2 Manufacturing GVA (chain volume measures); percentage change 1997–98 to 2005–06

Non-metallic mineral products	62	Wood and paper products	8
Machinery and equipment	26	Metal products	5
Printing, publishing and recorded media	13	Petroleum, coal, chemical	5
Other manufacturing (mostly furniture)	12	Textile, clothing, footwear	-49
Food, beverage and tobacco	10	**All manufacturing**	**11**

Source: Australian Bureau of Statistics, Australian National Accounts: National Income, Expenditure and Product, March quarter 2007, Cat. No. 5206.0.

2.13 Many Australian manufacturers have moved their production offshore, to remain competitive in international markets. These manufactures are no longer recorded in the manufacturing gross value added (GVA) reported in Table 2.2 and nor are they recorded as manufacturing exports in the balance of payments. However they still contribute to the well-being of Australians as the profits from the manufactures accrue to Australian shareholders. These profits appear in the income account of the balance of payments and add to gross national income in the national accounts. Furthermore, often it is the basic manufacturing process that is now conducted offshore and the more high-value design and management functions remain in Australia.

Manufacturing exports before the resources boom

2.14 As discussed earlier, manufacturing generally increased its share of Australian exports in the first half of the 20th century and its share declined from around the mid-1960s, largely paralleling movements in manufacturing's share of output and employment (Figure 2.1, page 10).

2.15 There was a surge in manufactures' share of exports from the mid-1980s until around the start of the resources boom around 2005. There are a number of factors which likely contributed to the surge, although views differ about their relative importance. Global economic activity expanded

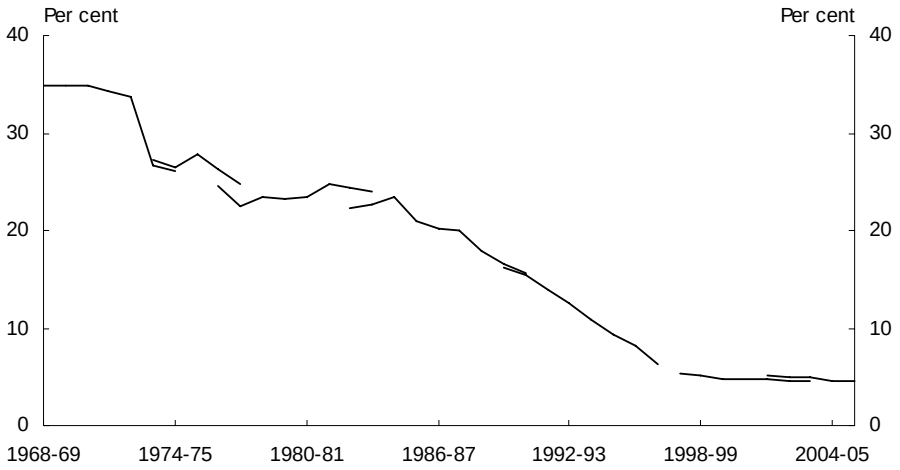
8 Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, pp. 6 and 16.

more strongly in the 1980s and 1990s than it had during the 1970s. There was a marked depreciation in the Australian dollar in the mid-1980s, which made Australian exporters 'super-competitive'. This encouraged them to incur the fixed costs necessary to enter export markets. Government industry plans and assistance were also targeted at helping manufacturers seek out foreign markets.

2.16 A further spur to exporting came from the reduction in tariffs (Figure 2.2). As a recent study by John Edwards put it, the tariff cuts:

> Forced manufacturers to either meet import competition or cease business. If they could meet the competition of foreign producers at home, they could meet it elsewhere. Australian manufacturing began exporting.[9]

Figure 2.2 Effective rate of assistance for Australian manufacturers



Source: Updated from the Treasury, Submission no. 21, p. 10.

2.17 There were also attitudinal changes, as detailed by the Treasury:

> From the mid-1980s, there was a cultural change among Australian manufacturers — a growing belief in 'internationalisation'. A 'new breed' of manufacturers adopted a more outward outlook, and increased the proportion of production they exported… There were 'demonstration effects' as newly successful exporters encouraged others to enter export markets. There may also have been a 'vanguard effect' whereby exporters entering new markets (establishing a 'beachhead')' made it easier for others to follow, such as by sharing their experiences.[10]

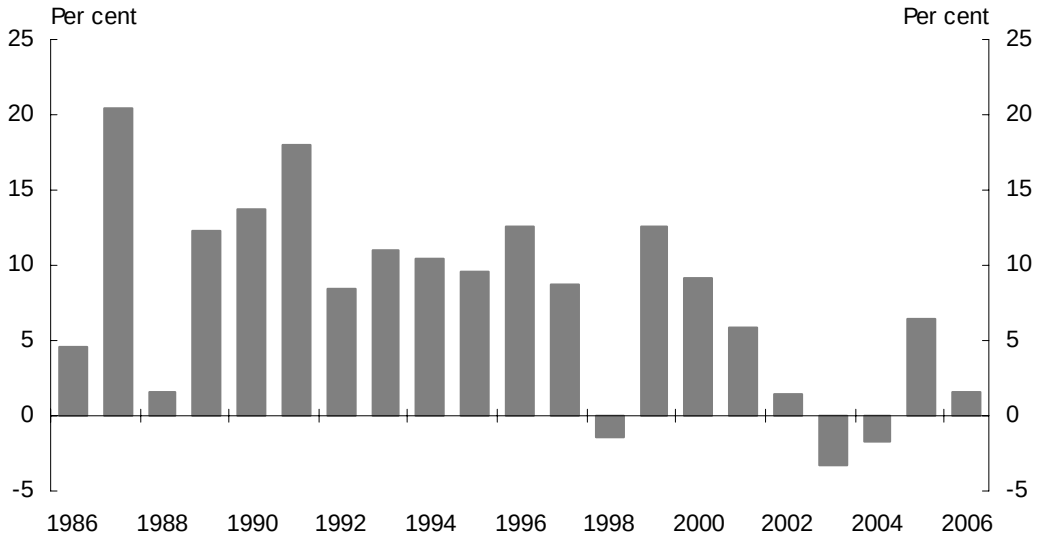
9 J Edwards, 'Export weakness, investment strength', *CEDA Competing from Australia Project Paper*, no. 2, 2007, p. 4.

10 The Treasury, *Submission no. 21*, p.9.

2.18 The beachhead effect could also involve establishing the 'Australian brand' in a new market, making potential customers receptive to Australia as a source of 'cutting edge' designs and innovative products.

2.19 Since around 2000 there has been a slowing in manufacturing export volumes (Figure 2.3). As with manufacturing production, there were differences between different categories of manufacturing exports (Table 2.3, p.15). There were absolute declines in exports of basic manufactured products such as iron and steel, while exports of more sophisticated equipment continued to grow.

Figure 2.3 Australian manufacturing export volumes; annual percentage change



Source: Updated from the Treasury, Submission no. 21, p. 4.

2.20 While manufacturing export growth slowed since 2000 compared to its strong growth in the 1990s, it has been respectable compared with its peers. The Department of Foreign Affairs and Trade submission noted:

> Over the past decade Australia's manufacturing export growth has not been dissimilar to that of other OECD countries. Since 1995, in US dollar terms, Australia's manufacturing exports have grown on average, each year, by 3.4 per cent, compared with 3.2 per cent for the UK, 3.6 per cent for the US and 2.6 per cent for Japan.[11]

2.21 To some extent the slowdown was inevitable as some of the one-off changes mentioned previously had led to very strong percentage growth in the 1990s off a low base (you can only start exporting once). But it also reflects the effect of the resources boom.

11 Department of Foreign Affairs and Trade, *Submission no. 38*, p. 8.

Table 2.3 Australia's manufacturing export volumes

(annual average percentage change; chain volume measure)				
	1986 to 1994	*1994 to 2000*	*2000 to 2006*	*(% of total 2006)*
By type				
Machinery	15	6	2	(21)
Metals	9	4	-3	(27)
Transport equipment	8	13	1	(13)
Medicine and pharmaceuticals	19	20	10	(11)
Scientific & photographic equipment	11	16	3	(5)
Other	15	5	2	(23)
By input-intensity				
Agricultural	14	7	-2	(3)
Resources	9	5	-3	(28)
Labour	13	4	3	(28)
Mixed	12	11	4	(22)
Knowledge	18	17	4	(18)
By use				
Consumer goods	15	13	4	(36)
Capital goods	12	6	3	(25)
Materials	10	5	-2	(39)
Total	**12**	**8**	**2**	**(100)**

Source: Updated from the Treasury, Submission, no. 21, p. 3.

China leads to a global resources boom

2.22 The main cause of the current resources boom is the industrialisation of China and its re-emergence since around 1980 as a leading participant in the international economy. China's increased demand for raw materials has driven up mining commodity prices the world over. At the same time, the expansion of China's exports of manufactures has driven down (or at least moderated the growth of) the global price of manufactured goods.

2.23 Most experts expect China's economy to continue to grow strongly for many years. For example, a Reserve Bank of Australia assistant governor pointed out that:

> The process of catch-up in China and India may well have quite a way to run. Both Japan and Korea were able to sustain growth rates in the vicinity of 10 per cent per annum for around three decades. But China took off from a much lower base than either

> Japan or Korea. This means that today, even after three decades of high growth, it is still well behind the relative income levels of those countries when they started to slow down.[12]

2.24 There are still hundreds of millions of Chinese agricultural workers who can be brought into manufacturing plants in China. It is likely that, as labour becomes more expensive in coastal cities like Shanghai, manufacturing activity will move inland. This implies that China's demand for raw materials may continue to grow for many years. Strongly growing demand is also likely from other large emerging economies.

2.25 However, this growing demand will not necessarily maintain commodity prices at recent highs because the supply of raw materials is also growing. Over the past five years Australian mining operators have invested over $55 billion to increase capacity, and production volumes are starting to rise. Other coal and iron ore producers, such as Brazil, China, India, Indonesia, Russia, South Africa and the United States are also ramping up production. Prices may drop before this process is completed if the predominant market sentiment becomes that supply is starting to outpace demand. In the unlikely event that the Chinese economy slows markedly, prices could drop sharply.

2.26 This impact of increased global supply on world prices could more than offset the increase in Australian export volumes, bringing an end to (or at least moderating) the 'resources boom' in Australia.

The effect of the resources boom on manufacturing

2.27 The adverse impact of the resources boom on the manufacturing sector, particularly through its impact on the exchange rate, was referred to by manufacturing industry bodies, trade unions and government.

2.28 The Australian Industry Group's submission stated:

> The conditions facing Australian manufacturers in 2006 are particularly challenging. Part of this is the strength of the minerals boom. The surging commodity prices have strengthened the exchange rate, have helped absorb spare capacity and have drawn resources—particularly skilled labour—away from non-booming

12 M Edey, Address to *Australia & Japan Economic Outlook Conference 2007*, March 2007.

> sectors such as manufacturing. Australian manufacturing is undergoing a bout of 'Dutch disease'.[13]

2.29 The Department of Industry, Tourism and Resources (DITR) noted that, as Australia is a resources-exporting country:

> The increase in resource commodity prices also results in a $A exchange rate higher than would otherwise be the case, and this, in general, adversely affects the international competitiveness of those export industries not enjoying increased prices.[14]

2.30 The phenomenon described by DITR is known as the 'Dutch disease' as it was first raised in the context of the effect the development of natural gas in the 1960s and early 1970s had on manufacturing in the Netherlands.[15] With the development of North Sea oil, and the decline of the UK manufacturing industry, in the 1970s and 1980s, the term was much used in Britain. In Australia it is often referred to as the 'Gregory thesis' as it was described by the ANU economist Bob Gregory in a 1976 paper.[16]

2.31 Movements in Australia's trade-weighted (or 'effective') exchange rate (in 'real' terms, i.e. adjusted for relative inflation rates) are compared with our terms of trade in Figure 2.4 (p. 18). Increases in commodity prices had been sufficiently correlated with appreciations of the Australian dollar from its float in 1983 until around 1999 that the dollar is often labelled a 'commodity currency'.[17] This suggests a 'resources boom' would usually lead to an appreciation, with adverse consequences for manufacturing.

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13 Australian Industry Group (Ai Group), *Submission no. 36*, p. 2. More recently, Ai Group reported that in a survey most manufacturers claim they would be uncompetitive with the dollar above US$ 0.85. 'The Australian dollar and manufacturing exports: shaping earnings and prospects', June 2007, as viewed 5 June 2007, <http://pdf.aigroup.asn.au/publications/reports/exports_report_june2007.pdf>. The Australian Manufacturing Workers' Union also argue the resources boom has driven up the exchange rate; *Submission no. 34*, p. ii.

14 Department of Industry, Tourism and Resources (DITR), *Submission no. 31*, p. 6 and their Appendix B. A similar point is made by Department of Foreign Affairs and Trade, *Submission no. 38*, p. 19 and the Treasury, *Submission no. 21*, p. 8.

15 The expression was apparently coined by *The Economist* in its 26 November 1977 issue. More academic versions, by Australian international trade specialist Max Corden, were published in 'Booming sector and de-industrialisation in a small open economy' (co-authored with J Neary), *Economic Journal*, volume 92, 1982 and 'Booming sector and Dutch disease economics: survey and consolidation', *Oxford Economic Papers*, volume 36, 1984.

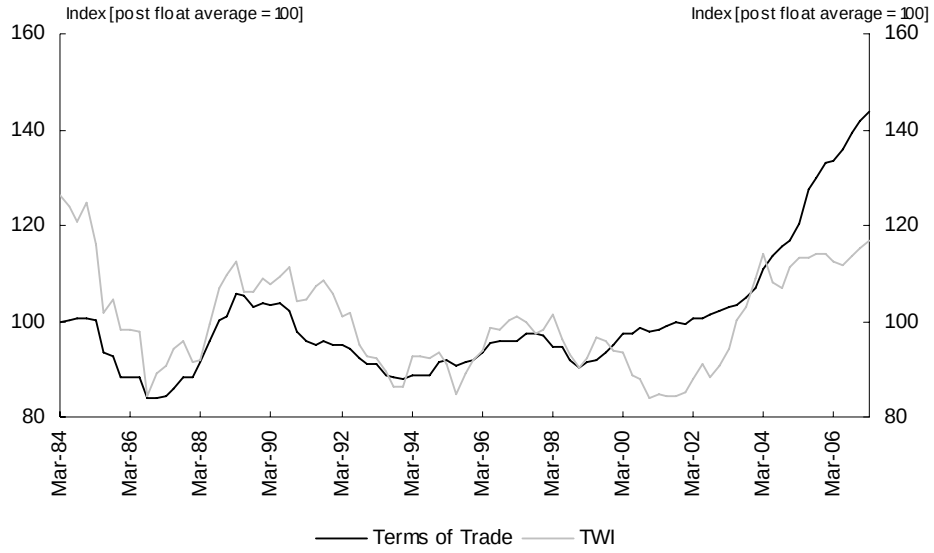
16 R Gregory, 'Some implications of the growth of the mineral sector', *Australian Journal of Agricultural Economics*, vol 20, no 2, August 1976, pp. 71–95.

17 D Gruen and T Kortian, 'Why does the Australian dollar move so closely with the terms of trade?' *Reserve Bank of Australia Research Discussion Paper* 9601, May 1996.

2.32 The behaviour since 2000 is less clear-cut. The dollar depreciated in 2000, without a fall in the terms of trade, and then appreciated from 2001, before the resources boom affected Australia's terms of trade.

> The foreign exchange market at the time was presumably making its best guesses about likely future developments … the exchange rate was rising strongly because the market was anticipating that the gathering strength of the world economy would sooner or later generate significant rises in the terms of trade of raw material exporting countries like Australia. And as events unfolded, that anticipation turned out to be broadly correct.[18]

Figure 2.4 Terms of trade and real trade-weighted index of the exchange rate



Source: *The Treasury*

2.33 This would imply that had the resources boom *not* eventuated, the exchange rate would have *depreciated* over recent years.

2.34 A similar phenomenon is occurring across regions. The resource-rich states are benefiting most from the resources boom. While some of the profits accrue to shareholders in the south-eastern states, some of their manufacturers supply mining companies, and they receive a share of the increased tax revenues; the associated exchange rate appreciation has hurt manufacturers and service exporters in those states. The Victorian Government reported an attempt at quantifying this effect:

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18 D Gruen, 'A tale of two terms-of-trade booms', *Economic Roundup*, Summer 2006, p. 25. Another view is that "during the period 2002 to 2005 when US official interest rates ... were well below those in Australia the value of the $A was very strong … as footloose capital sought out the higher yields offered by Australian securities"; DITR, *Submission no. 31*, p. 29.

> The modelling results show that the boom in commodity prices has reduced annual Victorian and NSW GSP growth by up to half of one percentage [sic] in the short term.[19]

2.35 However, it is not unusual for there to be differences in growth rates across states.[20] Indeed the relative uniformity that occurred between the Olympics and the resources boom was the unusual pattern.

2.36 Global interest rate movements may have moderated the response of the Australian dollar to the resources boom. DITR stated:

> It must be acknowledged in this respect however that fortuitous timing of the US (and global) economic recovery together with the associated increase in US interest rates has meant that the $A exchange rate is not as high as it might otherwise have been had the US recovery been slower in arriving.[21]

2.37 As discussed above, it is hard to judge whether the rise in commodity prices, and the strong Australian dollar, will be sustained. If it only lasts a short while, this could cause problems. The Treasury notes that:

> There are concerns expressed that the resources boom may be short-lived. And once a factory is shifted overseas, or a contract lost, it may be difficult to expand manufactures or other non-resource exports again even if, after the resources boom fades, the exchange rate appreciation is reversed.[22]

2.38 However, the Treasury go on to say:

> Governments are no better placed than firms and investors, responding to signals in the market, to determine whether a shock is temporary. Instead, the government can more effectively help the economy achieve its productive potential by allowing the market to operate unimpeded and allow resources to flow to their most efficient use. This will achieve improved productivity, economic growth and expanded national income in the long term.[23]

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19 Victorian Government, *Submission no. 40*, p. 2 and Attachment A.

20 M Edey, Address to the *Australia & Japan Economic Outlook Conference 2007*, March 2007.

21 DITR, *Submission no. 31*, p. 21.

22 The Treasury, *Submission no. 21*, p. 13. A further difficulty would arise if commodity prices fall but this is not accompanied by a depreciation. Ai Group's interpretation of Figure 2.4 is that 'the terms of trade can fall a long way before downward pressure will be exerted on the exchange rate', 'Balancing the Risks: Building Australian's Economic Resilience,' Ai Group, *Exhibit no. 7*, p. 27.

23 The Treasury, *Submission no. 21*, p. 13. This argument is developed in K Henry, 'Implications of China's re-emergence for the fiscal and economic outlook', *Economic Roundup*, Winter 2006, pp. 39–58.

2.39 Furthermore, even if commodity prices do not remain high for long, it was noted that the Dutch 'disease' was not a terminal disease:[24]

> The non-resources sector of the Dutch economy recovered reasonably quickly, after suffering from the early to mid sixties from the discovery of oil and gas.[25]

2.40 Similarly in Australia, the 'Dutch disease' effects may not be that severe. The Australian Chamber of Commerce and Industry downplayed the effect of the appreciated exchange rate on manufacturers:

> We do not necessarily see that it is a problem. Obviously, a strong resources sector influences the exchange rate, but that also has major benefits for the manufacturing sector in that a lot of their inputs are cheaper than they otherwise would be.[26]

Conclusions

2.41 The committee notes the changes in the nature of Australia's manufacturing sector and its export performance. It welcomes the shift within manufacturing towards more knowledge-intensive activities.

2.42 The committee notes that the resources boom has been associated with a reduction in the relative importance of manufacturing, reinforcing a longer-run trend. It believes that attempting to resist this natural decline in manufacturing's share of the economy would be a mistake, just as it would have been a mistake to try to have preserved Australia as a predominantly agricultural country. Allowing market forces to direct Australia's labour and other resources into their best uses is likely to result in Australia having a more sophisticated manufacturing sector, with a growing share of the economy provided by services.

24 Chair, *Transcript*, 1 December 2006, p. 13.

25 ACCI, *Submission no. 33*, p. 17.

26 Mr G Evans, ACCI, *Transcript*, 2 March 2007, p. 22.

3

The role of government in the manufacturing sector

The role of governments in a global market

3.1 The level of government assistance to the manufacturing sector differs considerably amongst developed nations. However, most share a common feature—declining overt government assistance, particularly the removal of trade barriers, yet the maintenance of some form of industry support.

3.2 The Australian Government provided around $6.9 billion[1] in total manufacturing assistance in 2004–05. This is equivalent to around 7.2 per cent of manufacturing's total contribution to GDP[2], but some manufacturing industries far exceed this rate.[3] States offer further assistance to manufacturing industries in their jurisdictions, last estimated by the Productivity Commission in 2001–02 at around $93 million.[4] A list of budgeted Australian Government assistance is in Appendix D.

3.3 While the manufacturing sector is still around 12 per cent of the Australian economy, its share has been declining. Coupled with this sectoral

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1 Productivity Commission (PC), *Trade & Assistance Review 2005–06*, Canberra, April 2007, p. 2.11.

2 Manufacturing contributed $96 366 million to GDP in 2004–05. Refer: ABS, *Australian System of National Accounts*, Cat. 5204.0, 200506, Industry Gross Value Added, p. 33.

3 For example the textile, clothing and footwear sector's assistance is 19.2 per cent of their GDP contribution. Refer: ABS, *National Accounts* and PC, *Trade & Assistance Review 2005–06, Annual Report Series*, April 2007, Table 2.2b p. 2.5 & Table 2.4b, p. 2.11.

4 PC, *Trends in Australian Manufacturing*, 2003, p. 214.

adjustment most OECD countries have embraced more open and unimpeded trade policies, leading to greater manufacturing exports and less emphasis on import substitution (and their protection).

3.4 Australia's effective rate[5] of assistance to manufacturing has declined considerably over the last 40 years from around 35 per cent in 1967–68 to around five per cent in the new century (Figure 2.2, p. 13).[6] The reduction in Australian protection commenced in 1973 with an across the board reduction in tariffs of 25 per cent. A gradual decline has occurred since then with only two sectors remaining under transitional protection regimes; the automotive and the Textiles Clothing and Footwear (TCF) sectors.

3.5 Tariffs in the automotive industry are currently ten per cent, down from 57.5 per cent in 1988. On 1 January 2010 the tariff rate for passenger motor vehicles will reduce to five per cent. [7]

3.6 The TCF tariff rates are more complicated. Those for clothing and some finished textiles are currently 17.5 per cent; cotton sheeting, woven fabrics, carpet and footwear stand at 10 per cent, while sleeping bags and table linen are 7.5 per cent. The latter categories will reduce to five per cent in 2010. The clothing category will not reduce to five per cent until January 2015 but will transition to ten per cent in 2010.

3.7 Australia lagged behind most of its trading partners in the early stages of the trade liberalisation process, but now has average tariff levels comparable to those in the US, European Union and Japan. With APEC's goal of free trade access to developed countries by 2010, transitional programmes of tariff reduction should not be protracted.

3.8 Despite the natural progression in sectors as nations advance, a number of advanced economies have policies designed to ensure the manufacturing sector of their economy is viable and prosperous.[8] This is often predicated on a desire for a 'balanced economy' with representation from all sectors of the economy, despite comparative advantages in some sectors.

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5 The effective rate of assistance takes into account not only support directed at an industry but the amount of support indirectly received, or the tax paid, by the industry because the government has subsidised or taxed a supply industry.

6 PC, *Trends in Australian Manufacturing*, 2003, p. 148.

7 PC, *Trade & Assistance Review 2005–06*, Annual Report Series, Canberra, April 2007, p. 3.16.

8 Ireland; Germany; Sweden; Canada; Singapore and Korea focus on innovation and high-end manufacture. European Commission, Enterprise & Industry Directorate General, *The European TrendChart on Innovation*, 2006, as viewed 19 May 2007, <http://europa.eu.int/comm/enterprise/index_en.htm> and <http://www.trendchart.org>.

Australian Government industry policy

3.9 Australian Government industry policy is moving towards non-financial and more market-driven assistance. There are, however, a large number of discrete industry assistance programmes that provide direct support to the manufacturing sector.[9]

3.10 While the Australian Government's stated approach is sector-neutral, some programmes favour particular industries. In line with a world-wide trend, there is an increasing emphasis on supporting innovation, science and technology activities and recently, green technologies.[10] These activities are not manufacturing specific but probably have a greater applicability to manufacturing than other sectors. In addition, targeted support (and phased-out protection) to traditional manufacturing industries, like the automotive and textiles, clothing and footwear industries, continues.[11]

3.11 Sector specific support is mostly employed to overcome fast-paced sectoral change[12] or cushion the phase-out of protection measures.[13] However, there are other sector specific strategies which could be construed as backing particular industries within manufacturing.[14]

3.12 'Picking winners' is not desirable because, as the Treasury noted, governments are no better placed than firms to know what direction the market may take. The Treasury's submission also stated:

> The most effective initiatives are those that are broad-based, thereby limiting market distortions and allowing individual firms to select the most profitable investments.[15]

3.13 The Australian Chamber of Commerce and Industry (ACCI) stated:

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9 AusIndustry and Austrade together provide in excess of 20 programmes as listed in Appendix D.

10 As an example, the CSIRO Niche Manufacturing National Research Flagship is designed 'to help drive a new wave of niche industries based on nanotechnology'.

11 In 2005–06 motor vehicle & parts manufacturing had budgeted assistance of $585.1 million; of that $512.3 million was industry specific. Similarly, in 2005–06 TCFL received $209.8 million budgeted assistance; of that $179.9 was industry specific. PC, *Trade & Assistance Review 2005-06,* Canberra, April 2007, Table A.13-A.14 & pp. A.17-A.18.

12 Discussed further in this chapter under *Structural and Sectoral Change.*

13 PC, *Trade & Assistance Review 2005-2006*, Canberra, April 2007, Chapter 2, p. 10.

14 The Pharmaceutical Partnerships Programme (P3) and Food Innovation Grants are examples.

15 The Treasury, *Submission no. 21*, p. 11.

> The future of manufacturing does not lie in increasing government intervention, building higher tariff walls, providing greater subsidies or picking winners'.[16]

3.14 BlueScope Steel argued that government support for certain sectors '...amounts not to picking winners, but to helping winners do even better'.[17] Whilst there is an argument that comparative advantages be seized with the assistance of government, there is only a tentative case for overt government support for already succeeding manufacturers.

3.15 Action Agendas[18] could be said to foster industry picking its own winners. However, this strategy may result in industry sectors lobbying government to 'pick them'. Such behaviour is to be avoided as noted in discussions between the committee and the Australian Manufacturing Workers Union (AMWU):

> That is, the bureaucrats do not say, 'You got it and you didn't, because you are better lobbyists,' but because company A fitted the criteria well.[19]

3.16 The AMWU noted that Ireland, Singapore and to a lesser extent Germany have all nominated strategic industries.[20] The Australian Electrical and Electronic Manufacturers' Association's (AEEMA) supplementary submission also highlighted the successful industry targeting strategies in other countries, stating that :

> There are winners in other countries, Taiwan, Sweden, Belgium for instance, from which lessons can be learnt, and armed with this information we should not follow the losers.[21]

3.17 Mr Angus Robinson, chief executive of AEEMA said that the mining sector was a 'targeted winner' and that, over and above comparative advantages, the actions of supporting that industry made a difference. He noted that most other countries have mineral deposits, but they had not focussed policy efforts in that area:

> The industry asked the government to commit to railway lines, ports and infrastructure and work to develop supply chain

16 Mr G Evans, ACCI, *Transcript*, 2 March 2007, p. 18.

17 BlueScope Steel, *Submission no. 39*, p. 17.

18 Strategic plans for industry, facilitated and endorsed by the Australian Government are discussed further at paragraph 3.54 in the Chapter.

19 Dr C Emerson MP, *Transcript*, 29 August 2006. p. 86.

20 Mr P Conroy, Australian Manufacturing Workers' Union (AMWU), *Transcript*, 28 August 2006, p. 85.

21 AEEMA, *Submission no. 44*, p. 6.

> relationships ... and address the issues of getting mines to market. ... They picked winners in the mining industry...[22]

3.18 In contrast, the Western Australian branch of the Chamber of Commerce and Industry, hailing from the biggest mining boom state, disagreed, stating: '..."picking winners" appeared in practice to amount to spending huge sums shoring up ailing companies'.[23]

3.19 The Global Integration Background Paper indicates that supporting business capabilities is the new policy focus: 'In the industry policy arena, the focus has shifted from crude protectionism to encouraging capable businesses which can compete successfully in an open market.'[24] This policy may not actually be picking the winners, rather allowing the best to grow as enunciated by Mr Paul Laver, vice president of the Australian Academy of Technological Science and Engineering (AATSE):

> We have to allow the winners to flower and bloom on their own—but we have to provide an environment where the flowers can grow.[25]

3.20 The government's industry policy, as outlined in the Industry Statement 2007, concentrates on supporting industries to become more outward looking and integrated into world markets and global supply chains.

Strategic policy platform

3.21 The Department of Industry, Tourism and Resources (DITR) oversees the Government's industry policy. The department's current focus is on nine strategic priorities embodied in their Strategic Plan 2006–2009:

- implementing new measures;
- securing Australia's energy future;
- capitalising on Australia's resources;
- measurable reduction in compliance burden;
- commercialisation; collaboration and investment in innovation;

22 Mr A Robinson, AEEMA, *Transcript*, 7 December 2006, p. 6.

23 Western Australian Chamber of Commerce & Industry, *Submission no. 28*, p. 15.

24 DITR, *Global Integration Background Paper*, July 2006.

25 Mr P Laver, AATSE, *Transcript*, 28 August 2006, p. 41.

- Australia as a leader in platform technologies and industries of the future;
- skills development to meet business needs;
- global integration; and
- microeconomic reform and the business environment.

3.22 A number of these priority areas are the primary policy domains of other portfolio departments.

3.23 The current policy framework derives from the Government's 1997 industry statement, 'Investing for Growth'. In May 2007, after the committee had finished its hearings, Minister Ian Macfarlane released a new Industry Statement[26] which updated the outlook and strategy and established the industry policy framework for the next decade.[27]

Manufacturing policy

3.24 As previously discussed, Australia has a sector-neutral industry policy. Similarly, Canada has a broad industry policy platform, consisting of '...a fair, efficient and competitive marketplace; an innovative economy; and competitive industry and sustainable communities'.[28] In New Zealand, the Ministry of Economic Development's industry strategy is embodied in its 'Statement of Intent 2006–2009'.[29] This is a comprehensive document providing an analysis of their industry and identifying strategic trade partners—yet it does not contain a stand-alone manufacturing strategy.

3.25 In contrast, in 2002 the United Kingdom's Department of Trade and Industry introduced a specific manufacturing strategy,[30] as distinct from a broader industry strategy. This is a targeted policy which focuses on the unique issues facing their manufacturing sector. It is based on an appraisal of the country's manufacturing strengths and recognises its weaknesses. Notably, it is written in plain English with an absence of 'spin'.

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26 For the overview of the 2007 Industry Statement refer to Appendix G.

27 DITR Strategic Plan 2006–2009, as viewed 15 May 2007, <http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=84A3EE89-D757E9C1-4672E5245B463E67>.

28 The Department of Industry, Canada, 2007, as viewed 19 April 2007, < http://www.ic.gc.ca/cmb/welcomeic.nsf/ICPages/Department>.

29 Ministry of Economic Development, New Zealand, 2006, as viewed 19 April 2007, < http://www.med.govt.nz/upload/35379/soi-2006.pdf>.

30 Department of Trade and Industry, *Manufacturing Strategy* 2002, as viewed 19 April 2007, <http://www.dti.gov.uk/sectors/manufacturing/manufacturingpolicy/strategy/page25211.html>.

3.26 The AEEMA supplementary submission highlighted that some Australian states have specific manufacturing strategies:

> States such as Victoria, South Australia and Queensland have articulated clear manufacturing policy strategies about the critical place manufacturing occupies in overall economic development. [31]

3.27 Comparable countries to Australia have similar ministerial portfolio structures for industry[32] and also have no manufacturing portfolio per se. The State of Victoria is the only state or territory in Australia to have a specific Minister for Manufacturing.[33] One of the advantages of having a single minister for the sector is administrative simplicity—a single port of call for manufacturing issues may be created.

3.28 The committee considered the different roles of the Australian Government's industry promotional agencies and whether they should be merged. In response to this proposition the Australian Trade Commission (Austrade) asserted:

> It is probably up to all of us as agencies to work more closely together, and we are all government, so where we happen to sit does not really matter. As long as we are working and exchanging information and pursuing opportunities, then it is nominal.[34]

3.29 The merging of agency operations have been considered in the past, with independent reviews finding that it is better to keep different activities for the same sector in discrete agencies than to merge all activities for the same sector under one roof. For example the 2001 'Blackburne Review'[35] of Invest Australia determined that the agency should conduct all investment attraction operations. The subsequent 2005 review by the Allen Consulting Group agreed 'that the agency should remain whole and should not be merged with Austrade or anything of the kind ...'[36]

3.30 However, AEEMA noted at a public hearing that there is no mechanism to unify all departments and agencies serving the sector:

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31 Australian Electrical and Electronic Manufacturers' Association, (AEEMA), *Submission no. 44 (supplementary)*, p. 2.

32 Canada has a Minister for Industry; United Kingdom a Secretary of State for Trade and Industry and New Zealand a Minister for Industry & Regional Development.

33 The Victorian Minister for Manufacturing Industry was appointed in 2000.

34 Mr L Strangis, Austrade, *Transcript*, 1 December 2006, p. 25.

35 I Blackburne (Chair), *Winning Investment: Strategy, People and partnerships – A review of the Commonwealth's investment promotion and attraction efforts*, report to the Prime Minister, 2001.

36 Mr Jones, Invest Australia, *Transcript (Services)*, 1 December 2006, p. 35.

> DITR have these bureaucrats working through strategies in limited discussions with industry, and certainly you wonder about the extent to which there are discussions between them and Finance and Treasury, the central agencies. ...there needs to be some high-level mechanism for bringing together the best of industry thinking and the best of government thinking, setting some high level strategic goals for Australia in this area and working on some high-level national plans.[37]

3.31 A National Manufacturing Forum (NMF) was formed as a result of the National Manufacturing Summit held in Melbourne in December 2005. The summit was arranged because of a view that '...collective action is required for the development of a national manufacturing strategy—one that will secure the industry's future as an innovative global supplier'.[38]

3.32 The NMF comprised representatives of all state and territory governments; the manufacturing industry; unions and peak industry associations from across Australia. Although the Commonwealth government did not participate directly, the forum is informed by the Industry Capability Network (ICN)[39], an organisation supported by the federal government.

3.33 The NMF released its report *Strategic actions to boost Australian manufacturing* in October 2006. The report outlines a framework for government manufacturing policy centred on four key priorities: globalisation; investment; innovation and R&D; and skills.

3.34 In evidence to the committee, Mr Nigel Reeves, project manager, NMF, noted that regional manufacturing plans need to be developed using a national strategic plan approach:

> We have recommended to each of the state and territory manufacturing councils—groups of people who are manufacturers who engage with state and territory governments—a framework for them to go ahead and, within their own jurisdiction, do an analysis of what their particular strengths are. ...and that obviously leads to going about maximising those advantages.[40]

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37 Mr A Robinson, AEEMA, *Transcript*, 7 December 2006, p. 10.

38 National Manufacturing Forum, *Strategic actions to boost Australian manufacturing–a report by the National Manufacturing Forum to State and Territory Ministers responsible for manufacturing*, Melbourne, 2006.

39 The ICN provides support in all states and territories to import-competing industries and more recently, to those entering global supply chains. Its focus is on identifying project or supply chain capabilities.

40 Mr N Reeves, NMF, *Transcript*, 22 November 2006, p. 7.

3.35 The Geelong Manufacturing Council echoed this view, embedding regional strategy plans into the national strategy:

> Our national economy could be strengthened through the development of a 'National Manufacturing Strategy and Plan' to grow and encourage Australia as a manufacturing centre.[41]

3.36 An example of a national manufacturing-based plan embodying regional issues is the Swedish 'national strategy plan for regional innovation', which includes 'regional growth programs'.

3.37 The executive chairman of the NMF, Mr Robert Herbert, stressed the importance of a national framework for manufacturing policy, even if it incorporates regional plans:

> We recognised that states will have different needs and the composition of manufacturing in them will vary. ... But some things can be better coordinated nationally...[42]

3.38 Mr Herbert noted the problems associated with state operated freight as an example of why a national approach is required:

> In order for BlueScope to transport its product from Melbourne to Queensland there are some 15 stops along the way getting through the Sydney network. That is an Australian problem.[43]

3.39 In recognition of the work undertaken by the NMF, the South Australian Government's submission recommended:

> Given the Commonwealth control of the economic levers that drive growth, it is therefore recommended that the Commonwealth Government join State Governments in working toward the establishment of a National Manufacturing Strategy.[44]

Should the contraction in manufacturing be resisted?

3.40 While a global phenomenon, the long-term decline in the relative size of Australia's manufacturing sector has led to some concern. Some regard the tangible output of manufacturing as inherently more worthwhile than services, and employment in manufacturing as a 'real job'.[45]

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41 Geelong Manufacturing Council, *Submission no. 25*, p. 7.

42 Mr R Herbert, NMF, *Transcript*, 22 November 2006, p. 8.

43 Mr R Herbert, NMF, *Transcript*, 22 November 2006, p. 12.

44 South Australian Government, *Submission no. 26*, p. 21.

45 An extreme version of this view was that most services were excluded from 'net material product', the equivalent of GDP, by statisticians in the Soviet Union (and for a time China).

3.41 There are also views that it is desirable for an economy to have a mix of sectors, with a significant role for manufacturing. Mr Robinson from AEEMA argued:

> Our real concern is that the balance of GDP assigned to manufacturing is too low … our overall GDP mix is unbalanced and, from a risk management perspective, we need to review it.[46]

3.42 This argument could lead to a 'target size' for manufacturing. Mr Robinson continued:

> Singapore has quite a clear understanding of keeping its GDP manufacturing in the range of 20 to 25 per cent. ... Australia appears to have no similar strategic parameters.[47]

3.43 However, there was little support for such a target. Dr Peter Brain, executive director of the National Institute of Economic and Industry Research (NIEIR) commented:

> The size of the manufacturing sector you should aim at is a manufacturing sector that delivers your general macro outcomes of the supply of quality employment for your citizens, generates enough exports to ensure that we do not leave the next generation with massive piles of debt and so that we achieve some sort of balance of payments equilibrium; and a geographical distribution of economic activity that ensures that the resources in each jurisdiction and sub-jurisdiction are reasonably efficiently used.[48]

3.44 Some submissions referred to concerns that the manufacturing sector could drop below a minimum viable size and then contract markedly to negligible dimensions. The Geelong Manufacturing Council expressed concerns about the 'critical mass' needed for the manufacturing industry to be competitive being under threat as it is subject to 'hollowing out'.[49]

3.45 Blue Scope Steel's submission also discussed this issue:

> Loss of critical mass in key manufacturing sectors is of particular concern …. Supplying steel to this [automotive] sector requires continual investment in upgrading processes and in new steel products in order to meet the ever-tightening standards of the globalised auto industry. It is very important that the local

46 Mr A Robinson, AEEMA, *Transcript of Evidence*, 7 December 2006, p. 3.

47 Mr A Robinson, AEEMA, *Transcript*, 7 December 2006, p. 3.

48 Dr P Brain, National Institute of Economic and Industry Research (NIEIR), *Transcript*, 22 November 2006, p. 38.

49 Geelong Manufacturing Council, *Submission no.25*, p. 4.

> industry maintains critical mass – without it, BlueScope Steel would find it difficult to continue to invest to meet the demanding requirements of the sector. And a local automotive industry would, in turn, be difficult to maintain without a local steel producer.[50]

3.46 Some scepticism was expressed about the strategy of just keeping the 'smarter' parts of manufacturing, such as production of sophisticated components, and related services such as innovation, design, marketing and management within Australia, while shifting the more routine, labour-intensive, parts offshore. The AMWU felt this strategy was:

> Doomed to failure. Once a supply chain loses critical mass, firms along the chain are at a severe disadvantage.[51]

3.47 Mr Doug Cameron, national secretary of the AMWU, also remarked:

> In our view, you cannot keep the cream of manufacturing, you cannot do the R&D and the prototyping here and hope that you can keep it here.[52]

3.48 One argument for this was that much innovation originates on the shop floor and becomes less likely if assembly lines are located in different countries to management and design.

3.49 Another argument advanced for keeping a large manufacturing sector was that it was seen as having a stronger 'multiplier' impact on the rest of the economy as it requires many raw materials and services as inputs. This argument has less impact as the economy approaches full employment.

3.50 There is a view that manufacturing is being concentrated in a smaller number of large companies who operate on a global basis, but with key decisions being taken in their home country. This might give rise to concerns that Australia has fewer large manufacturers than do a number of much smaller economies such as Switzerland (home to Novartis, Roche, Nestlé), Finland (Nokia, Metso) and Sweden (Ericsson, Volvo, Electrolux).[53]

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50 Blue Scope Steel, *Submission no. 39*, p.9. Similar views are expressed by the Australian Steel Institute, *Submission no. 9*, p. 4.

51 AMWU, *Submission no. 34*, p. 25.

52 Mr D Cameron, AMWU, *Transcript*, 29 August 2006, p. 72.

53 All the companies named are larger than Australia's largest manufacturer and all the economies named have more manufacturers among the world's largest 2 000 companies than Australia, according to *Forbes* magazine's latest ranking.

3.51 However, the majority of economic policy advisers do not share these concerns about manufacturing becoming a declining share of the economy. A review by the Productivity Commission concludes that:

> It is also apparent from the empirical evidence that a high share of manufacturing in GDP is not essential to sustain high living standards or strong economic growth.[54]

3.52 The Treasury commented that if the government is:

> 'Going to prop this part of the economy up,' you are taking labour away from another part of the economy that wants to grow. You have to think pretty carefully about that and think about why you have, in some sense, some special knowledge about why that labour should not move compared to where business thinks it should go.[55]
>
> There was a group of economists called the physiocrats who argued that agriculture was the only true source of value in the economy and were greatly concerned when agriculture's share of the economy was falling. Similarly, there are people who see manufacturing as the backbone of the economy and are concerned when its share declines.[56]

3.53 But while most economists seem accepting of a relative decline in manufacturing, there remain community concerns, evident in public opinion polling.[57] These concerns may be exacerbated by media reporting which may underplay 'good news' about emerging innovative manufacturers. AEEMA commented:

> Many of these success stories take a while to get noticed publicly and they typically fly 'under the radar' so far as the media and community are concerned. 'Bad news' stories like plant-closures and re-locations of 'low value' product manufacturing operations to China naturally get attention from commentators...[58]

54 PC, *Trends in Australian Manufacturing*, Canberra, August 2003, p. 40.

55 Dr S Kennedy, the Treasury, *Transcript*, 1 December 2006, pp. 6–7.

56 Mr J Hawkins, the Treasury, *Transcript*, 1 December 2006, p. 8.

57 An opinion poll in 2006 found 93 per cent of respondents in marginal seats agreed that 'it is essential to maintain our manufacturing industries in Australia, even if they need some government support'. AMWU, *Submission no. 34*, p. 25.

58 AEEMA, *Submission no. 19*, p. 6.

Action Agendas

3.54 Action Agendas became a primary driver of industry policy in 1997, hailing from the Mortimer report.[59] They contain strategic directions for sectors of industry, set by government with industry input. Thirty-eight Action Agendas have been approved for development over the past decade, of which 22 cover a variety of manufacturing industries (listed in Appendix E). There are currently eight manufacturing agendas under implementation and a further fourteen have been completed.

3.55 Industries apply to participate in an agenda. DITR states that 'a key determinant [of participation] is the industry's willingness to commit the resources and energy to see the process through'.[60] While DITR provides secretariat support and a ministerial champion, there is no direct financial support for industry participation in the process. As such, only the most coordinated sectors of the industry (generally those with peak or professional associations) and those of sufficient size, participate.

3.56 After an industry receives ministerial approval to develop an action agenda, a group comprising industry leaders will meet regularly, over a two year period, to determine key issues for their industry. Working groups are formed to pinpoint strategies to deal with individual issues.

3.57 The end result is an Action Agenda Report, the recommendations of which, once signed off by Cabinet, become an Action Agenda. Industry, with limited secretariat support, then works on the implementation of the agenda over a three year period. At the end of this period, secretariat support ceases and the agenda is considered 'completed', however, in practice it may not be fully implemented.

3.58 The committee heard mixed views about the agenda approach. Some were complimentary, including Science Industry Australia (SIA), while others felt the arrangements, although having merit, were deficient. Mr Robinson from AEEMA proposed a more strategic manufacturing policy linking to the agendas:

> I seriously believe that we need to set up mechanisms where the government is actively engaging with the industry leaders beyond just the action agendas. This could be through consultative

59 D Mortimer, Review of Business Programs: *Going for Growth – Business Programs for Investment, Innovation and Export*, 30 June 1997.

60 DITR website, *About Action Agendas*, as viewed 27 April 2007, <http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectid=CC8A8D86-0597-412D-B105C70F98CC428B&indexPages=/content/sitemap.cfm?objectid=48A5B076-20E0-68D8-EDDA6165C0953D2F>.

> measures, some strategic planning ... so there is a shared understanding, a game plan ... in our key industry sectors of what we are trying to achieve.[61]

3.59 Mr Herbert of the NMF noted that when the secretariat involvement ceased '...the programme seemed to come to an end'.[62] He suggested the state-based manufacturing advisory councils could help maintain momentum:

> Can you extend the work that has flown from the action agendas through those advisory bodies to capture those who might be relevant to those action agendas, taking actions forward?[63]

3.60 The Government's Action Agenda Evaluation 2003 report, conducted by DITR, echoed these views. A weakness of the action agendas was reported:

> The follow up on commitments needs to be strengthened and there needs to be a more "whole-of-government" commitment to delivering outcomes. It is not just the responsibility of DITR.
>
> These sentiments were also echoed by the secretariats, who also noted some examples where they considered industry had not followed through sufficiently on implementation of recommendations. [64]

3.61 There were others who thought action agendas provided a good platform for industry to be pro-active, including the Department of Education Science and Training[65] and the Australasian Institute of Mining and Metallurgy.[66] SIA saw the development of their action agenda as an important contributor to sectoral cooperation, stating that their industry 'has been fragmented in the past and has, through the Science Industry Action Agenda, now started to come together'.[67]

3.62 The work undertaken in formulating an agenda was reported to shed light on industry weaknesses which enabled better sectoral strategies to be developed. AEEMA wrote:

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61 Mr A Robinson, AEEMA, *Transcript*, 7 December 2006, p. 10.

62 Mr R Herbert, *Transcript*, 22 November 2006, p. 4.

63 Mr R Herbert, *Transcript*, 22 November 2006, pp. 4–5.

64 DITR, *Action Agendas Evaluation: A review of action agendas and the action agenda process*, February 2004, p. 4.

65 DEST, *Submission no. 49*, p. 15

66 Mr D Larkin, Australasian Institute of Mining and Metallurgy (the Aus IMM), *Transcript*, 28 August 2006,p. 31.

67 Professor M Baker, Science Industry Australia (SIA), *Transcript*, 2 March 2007, p. 2.

> A major conclusion of the Electronics Industry Action Agenda Industry Working Group, led by AEEMA, has been that Australia's greatest weakness in innovation continues to be product realisation.[68]

3.63 The CSIRO[69] and SIA[70] believe the action agendas are facilitating better government–industry interaction on applied research.

3.64 Action agendas are designed to provide 'a whole of government approach to address issues across a broad range of portfolios, including innovation, investment, workplace relations, education, market access and development, regional development, regulatory reform and the environment'.[71] A case study was cited by the SIA showing how the action agenda, via a whole-of-government approach, had been the impetus for regulatory reform for the chemicals and plastics industry.[72] This was the only case of regulatory reform through Action Agendas cited in evidence.

A dedicated manufacturing advisory agency?

3.65 One of NMF's key report recommendations was the creation of a manufacturing advisory agency, modelled on the UK one-stop-shop, the Manufacturing Advisory Service (MAS), created in 2002.[73] An agency of this nature would provide comprehensive advice on all activities associated with manufacturing, including export and import competing issues.

3.66 This proposal differs from the current role of the DITR's main industry contact agency, AusIndustry, in two broad ways:

- it is manufacturing specific, having manufacturing oriented representatives in regional offices and contracting experts to assist with programmes in-the-field; and

68 AEEMA, *Submission*, p. 8.

69 Mr G Redden, CSIRO, *Transcript*, 22 March 2007, p. 10.

70 Professor M Baker, SIA, *Transcript*, 2 March 2007, p. 2.

71 DITR, *A Guide to Developing and Implementing Action Agendas*, July 2006, p. 2.

72 SIA, *Submission no. 7*, p. 20.

73 The UK MAS is not a unique approach. The US Department of Commerce liaises with its manufacturing sector in a similar way through its 'Manufacturing Initiative'; US Department of Commerce, *Manufacturing in America: A Comprehensive Strategy to Address the Challenges to US Manufacturers*, Washington, D.C, January 2004. The Manufacturing Extension Partnership (MEP) a not-for-profit organisation funded by US state, federal and local governments and operates in almost 350 US locations and its sole purpose is to provide small manufacturers with necessary services. The MEP network provides services to evaluate manufacturers' processes, skills-base, technologies and management capabilities and tailors programmes to address identified weaknesses.

- it provides a greater level of advice and information dissemination to the sector, far beyond assistance programme intricacies.

3.67 The Chair of the NMF also stressed that the proposed advisory agency should be a combined federal, state and territory initiative:

> The model we propose does not mirror that proposal [UK MAS] exactly. It can be shaped to the needs of Australian industry, and the interplay between the states and the Commonwealth would have a bearing on that. The Commonwealth and the states should come together to operate a body of this nature.[74]

3.68 Each state and territory government has a manufacturing advisory body. The NMF suggested linking them to a national advisory body to ensure Australia has a cohesive approach to national manufacturing issues yet may also capitalise on regional advantages.[75]

3.69 A manufacturing advisory agency would allow manufacturers to share knowledge and for the agency to provide information and education on manufacturing innovation, business strategies and emerging issues. The Australian Council of Trade Unions (ACTU) outlined the advantages of such an approach:

> By setting up the advisory service described above thousands of manufacturing firms (mainly SME's) will be afforded the opportunity to enhance their capabilities so that they have the capacity to reposition their activities in those niches with the most sustainable competitive advantages.[76]

3.70 The UK MAS contracts manufacturing specialists to work on-site with manufacturers to diagnose firm strengths and weaknesses, and to improve practices such as logistics, production operations and product marketing. There are shared cost elements to this support. The ACTU suggested a similar arrangement for an Australian equivalent programme for firms to work with consultants to diagnose the status of, and undertake work to improve, their management systems and organisational capability. Mr Nixon Apple, industry and investment policy advisor for the ACTU cited the Australian QMI Solutions organisation, which undertakes manufacturing capability assessments, as a model:

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74 Mr R Herbert, Manufacturing Advisory Forum, *Transcript*, 22 November 2006, p. 3.

75 NMF, 'Strategic Actions', *Exhibit no. 22*, p. 19.

76 ACTU, *Submission no. 27*, p. 22.

> The first visit is free; after that it is a shared cost arrangement. It is very low cost. It is very high bang-for-buck because you are improving firms' capabilities.[77]

3.71 In addition to building in-house business capabilities the MAS gives attention to building market strategies, mostly global. The National Manufacturing Forum's report stated that the three main components of the UK MAS were 'MAS regional centres, specialist support organisations and the MAS website'.[78]

3.72 The Australian government announced on 1 May 2007 an initiative called Australian Industry Productivity Centres (AIPC). The fact sheet available about the centres states: 'The programme is modelled on the well-regarded Manufacturing Advisory Service in the United Kingdom'.[79] The AIPC is not exclusively manufacturing focussed. It will 'target the nearly 50 000 trade-exposed manufacturing and service firms wanting to upgrade their capabilities or needing solutions to technical or process issues'.[80] The AIPC will not assume the independent roles of existing support agencies, but would disseminate information about them to the sector.

3.73 From the limited information available about the AIPC at the time of writing, it appears the programme mirrors the approach of the UK MAS, providing a free business diagnostic service at manufacturers' places of business, benchmarking firms against world's best practice, and providing fund matching of up to $20 000 for expenditure incurred on 'tailored advisory services' to confront issues raised in the business diagnostic. In addition, firms may receive matched funding of up to $20 000 to help solve technology problems and make process improvements.

3.74 Sharing other characteristics of the MAS, the AIPC will work cooperatively with industry, industry associations, publicly funded research institutions and centres of expertise in skills and training. These were all recommendations of the NMF's report. There is, however, no mention in the released material[81] about the initiative linking to state based manufacturing advisory bodies which was central to the NMF's recommendation and is key to the UK MAS.

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77 Mr N Apple, ACTU, *Transcript*, 22 November 2006, p. 16.

78 NMF, *Strategic Actions,* p. 35.

79 Australian Industry Productivity Centres fact sheet, DITR, as viewed 13 May 2007, <http://www.industry.gov.au/assets/documents/itinternet/Industry_Productivity_Centres20070504170851.pdf>.

80 Australian Industry Productivity Centres fact sheet, DITR, as viewed 13 May 2007, <http://www.industry.gov.au/assets/documents/itinternet/Industry_Productivity_Centres20070504170851.pdf>.

81 The Industry Statement 2007 and the AIPC fact sheet.

3.75 The ACTU noted that the level of funding required to support the UK's manufacturing advisory service amounts to roughly A$30 million per annum.[82] The AIPC initiative has a $352 million commitment over ten years, giving an annual commitment of around $35 million per annum. Given the UK agency serves a population of 60.2 million, almost three times the Australian population, the funding commitment indicates that the programme will be well resourced. However, while the Australian programme covers a much bigger geographic area, it has only five regional centres, compared with the UK's eleven.

3.76 Another fundamental difference between the AIPC and the UK MAS is that the UK agency does not cater for the services sector. The MAS considers associated issues, for example, value–adding through service provision, but its primary focus is the manufacturing sector.

Conclusions

3.77 Australian Government industry policy is predicated on three identified drivers of economic growth—innovation, investment and international competitiveness. The committee is supportive of this approach and believes an explicit manufacturing policy would strengthen this framework. In the UK, government manufacturing policy is clearly defined in their manufacturing strategy.

3.78 A manufacturing strategy provides a sector-specific direction for manufacturing. It clearly defines the government's objectives and justifies why support programmes exist. The committee concludes that a national manufacturing policy, which considers regional issues, would supplement the current broad industry approach.

3.79 Action agendas are the foundation of current industry policy—supplemented by general industry assistance and more targeted assistance programmes. The process appears to build cooperation and trust within industries that participate. However, only those sectors with sufficient resources or viable size can be involved and will therefore have a voice to lobby government. This could result in the exclusion of infant or micro-industries with much potential. Industry collaboration through the agenda process appears to be short-lived given that unresolved issues are not always actioned after government facilitation ends.

3.80 The Action Agenda strategy has now been in place for a decade with the majority of manufacturing sectors having completed agendas. The

82 Mr N Apple, ACTU, *Transcript*, 22 November 2006, p. 16.

committee therefore believes it is time to conduct a review of this 'industry-up' approach to manufacturing policy.

3.81 Governments and policy-makers are not better placed to determine the market winners or failures of tomorrow than industry itself. However, the committee recognised that governments may be mindful of international trends and industries which deliver public externalities, like medical and environmental breakthroughs.

3.82 The committee recognises that there are commonalities between different industry sectors, for example, global integration. However, unique needs and information requirements exist in each sector. This was recognised in the UK through the establishment of a dedicated MAS to support the opportunities and challenges confronting the manufacturing sector in the 21st century. The committee also notes the US government has a similar manufacturing support organisation.

3.83 The committee acknowledges that the new AIPC initiative, modelled on the UK MAS, will provide manufacturers with the necessary tools to build better business capability and global strategy. However, the committee is concerned that the multi-sector focus of the nascent AIPC may lead to resource dissipation and ultimately make it less relevant to the manufacturing sector. The UK MAS was customised for the needs of an evolving manufacturing sector—and this fit-for-purpose approach seems to be the key to its success.

3.84 The AIPC should also forge links with the existing state-based manufacturing advisory agencies. This will ensure the national strategy takes account of regional issues.

Recommendation 1

3.85 **The committee recommends that the Government develops a strategic Australian manufacturing policy, including regional strategies, to supplement existing industry policy.**

Recommendation 2

3.86 **The committee recommends that the Government reviews the on-going need for an Industry Action Agenda approach.**

Recommendation 3

3.87 **The committee recommends that the Australian Industry Productivity Centres initiative be finetuned to ensure that:**

- **akin to the UK Manufacturing Advisory Service it maintains a manufacturing focus so as not to dissipate resources;**
- **it is well promoted and easily accessible;**
- **Australian regions are sufficiently resourced and that there is one centre in every large manufacturing region;**
- **there is appropriate liaison with state-based manufacturing advisory agencies.**

Industry environment; transitions; externalities and impediments

3.88 Governments' involvement in the manufacturing sector is partly historical and partly political. Historically it is a legacy of the post-war strategy of 'populate or perish'—building up labour intensive industries for migrant workers and a desire for greater self-sufficiency in case of blockades in future conflicts. Politically there has always been the concern about 'protecting' jobs, always dubious, but the case for this is even weaker in a full employment economy.

3.89 History and politics aside, the Australian Government's essential role is to provide a framework for business activity, smooth market change, foster activities that are in the public interest[83] or assist where a market impediment has been identified. In setting this framework robust macroeconomic and microeconomic policy is essential.

83 Refer Chapter 8 for discussion on R&D spill-over effects. Productivity Commission, *Public Support for Science and Innovation*, Canberra, March 2007, covers externalities from science and innovation activities carried out by individual businesses.

Economic Framework

Macroeconomic policy

3.90 Australia's monetary and fiscal policies are transparent and accountable and broadly speaking, both enjoy bipartisan support; it has a history of stable governments; no civil unrest and the nation is currently enjoying its sixteenth year of economic growth. Australia also has a sound legal and parliamentary structure with rigorous regulation making processes. All these are necessary foundations for business activity and growth in trade.

3.91 Australia retains the confidence of international investors, with considerable inflows of foreign direct investment (FDI). The stock of FDI is equivalent to around 30 per cent of GDP, which places Australia around the median of OECD economies.[84] A smaller proportion of this FDI goes into manufacturing than in the average OECD economy, but this is unsurprising as Australia has a lot more mineral resources and farmland than the average OECD economy.[85]

3.92 One of the key macroeconomic issues for business is the corporate tax rate. Australia's statutory or 'headline'[86] corporate tax rate is 30 per cent, only slightly above the headline OECD unweighted average of 28.4 per cent.[87]

3.93 There was a notable lack of discussion on the Australian corporate taxation rate and its effect on the manufacturing sector across the submissions and at public hearings.

3.94 The committee heard from some that a lower corporate tax rate would assist the Australian manufacturing sector. In their *Manufacturing Futures* report the Australian Industry Group called for a reduction in the company tax rate from 30 per cent to 25 per cent over a five year period to 2011–12. They note the proposed cut:

> Would, on the surface, result in a reduction in company tax collections in the order of $8 billion, [but] ... a considerable portion

84 OECD, *OECD Economic Globalisation Indicators 2005*, p. 39.

85 Neither a high nor low level of FDI is necessarily desirable. A large stock of (net) international liabilities will result from a succession of current account deficits. Some of these liabilities will take the form of debt, some will be portfolio equity investment and some will be FDI. If returns on domestic assets are low, then FDI has the advantage that it does not involve a fixed payment burden. If returns are high, then debt is better as the excess returns are retained by the domestic economy.

86 Not including any offsets, deductions or concessions that may reduce the 'effective' rate of corporate tax.

87 Business Council of Australia, *Corporate Taxation: An international comparison (2006 update*), December 2006, p. 5.

> of this cost would be clawed back through the lower value of imputation credits in the hands of shareholders.[88]

3.95 ACCI's submission agreed, but also pointed out that the recent strong corporate tax collection ' ... is likely related to strong profits growth in the mining and minerals industries'[89], rather than over-taxing. They concluded that corporate tax reform was not a priority:

> While a company tax rate reduction could be considered in the future, the priority for the moment is reducing the high rates of personal tax, particularly as the difference between the company and personal tax rates (18.5 percent) is above the unweighted OECD average of 17.8 percent.[90]

3.96 A Council of Textiles and Fashion Industries of Australia Ltd (TFIA) member raised the corporate tax rate as an impediment to re-investment of after-tax income:

> The corporate tax rate and the entire regulation and structure of the corporate tax system are an issue. I have run large design businesses and micro-businesses. For a small business, both the administration and the collection of tax are a real burden. There are absolutely no incentives to reinvest in small business.[91]

3.97 In reference to attracting investment for manufacturing to Australia AEEMA remarked '...Certainly lowering the corporate tax rate would be prima facie a great incentive for growth in this country.'[92]

3.98 The Irish boom which occurred following a manufacturing strategy implemented by the Irish Government, which included a reduction in their company tax rate to 12.5 per cent, has been touted as the impetus for multi-national manufacturers to set-up in Ireland.

3.99 The committee heard that adopting this 'Celtic Tiger's' corporate tax approach could similarly attract multi-national subsidiaries and assist local manufacturers be more competitive. However, Ireland offered many advantages for foreign investors to manufacture there, over and above the

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88 Australian Industry Group, *Manufacturing Futures Achieving: Global Fitness*, Sydney, April 2006. Similar views were put by Council of Textiles and Fashion Industries, *Submission no. 17*, p.13 and BlueScope Steel, *Submission no. 33*, p. 37.

89 ACCI, *Submission no. 33*, p. 37.

90 ACCI, *Submission no. 33*, p. 38. (The top personal tax rate is now 45 per cent i.e. only 15 per cent above the company tax rate and from 1 July 2008 it will cut in at $180 000; likely to affect only a small proportion of taxpayers.)

91 Ms C Hawkins, Cinnabar Designs Pty Ltd, *Transcript*, 8 February 2007, p. 12.

92 Ms L Johnson, AEEMA, *Transcript*, 7 December 2006, p. 17

corporate tax incentive. Some of these included existing resources, like skills[93] while others came from strategic government policy.

3.100 Professor Roy Green, an innovation policy expert, with extensive first-hand knowledge of the Irish economy, highlighted that it was necessary for Ireland's manufacturing strategy to go beyond a corporate tax pull when other countries in the EU lowered their corporate tax rates also. He mused 'So if they are emulating the Irish model, what are the Irish going to do now?[94]

3.101 The average corporate tax rate in Western Europe fell from around 50 per cent in 1985 to 30 per cent in 2006. A number of Eastern European countries now have corporate tax rates in the 15 to 19 per cent range.[95] A European Commission paper concluded that the lowering of corporate tax rates in the EU resulted in a broadening of the corporate tax base and a narrowing of the personal income tax base. The attractiveness of a lowered corporate tax rate compared to the existing marginal tax rates induced more individuals to incorporate their business activities. This result implies that when corporate tax rates are reduced total company tax collection may not fall as much as anticipated, but that overall tax collection will fall. [96]

3.102 Dr Brain of the NIEIR stated that the corporate tax rate is more of a springboard for other industry policy than an end in itself:

> They [Ireland] have a very active manufacturing industry development policy. They also have a very low general corporate tax regime, which helps—but I would argue that what they do strategically helps leverage up from their low company tax regime to get a much bigger outcome... [97]

93 Professor R Green, private capacity, *Transcript*, 14 November 2006, p. 15.

94 Professor R Green, private capacity, *Transcript*, 14 November 2006, p. 15.

95 EU countries with relatively low corporate tax rates including Latvia and Lithuania at 15 per cent and Poland and Slovakia at 19 per cent. Refer: the Treasury, *Economic Round-up Spring 2004,* International trends in company tax rates—implications for Australia's company income tax, James Kelly and Robert Graziani, Canberra, 2004.

96 European Commission, *Corporate Tax Policy: Entrepreneurship and incorporation in the EU*, European Economy Economic Papers, Ruud A de Mooij and Gaetan Nicodeme, 2006.

97 Dr P Brain, NIEIR, *Transcript*, 22 November 2006, p. 38.

Microeconomic policy

3.103 Australia's microeconomic environment is in good shape when benchmarked internationally.[98] Reforms to National Competition Policy, regulatory review procedures, and infrastructure (particularly ICT) and transport improvements by governments at both the federal and state level, have improved Australia's productivity but more remains to be done. As the OECD's Chief Economist recently warned, there is always a danger for international economies in 'cyclical buoyancy' of being complacent about microeconomic reform. [99]

3.104 The committee heard examples of on-going microeconomic issues affecting the manufacturing sector, largely to do with poor harmonisation between the federal and state/territory systems, for example, non-uniform rail networks and compliance burdens arising from overlapping and inconsistent jurisdictional regulations.

3.105 Evidence was also received on the way states vie for investment attraction and conduct state-based export promotion activities which impedes a national approach.[100] The fact that it is necessary for Australian states and territories to sign an *Interstate Investment Cooperation Agreement*[101] highlights these cross-state rivalries. Deficiencies in the sharing of information between state and territory agencies also exist.[102]

3.106 The committee heard that regulatory requirements for small and medium enterprises are still onerous despite concerted government efforts to reduce compliance burdens and unnecessary regulation. This response accords with a 2006 report which details Australian business experience with compliance costs; paperwork burden; lost opportunities; and the cumulative burden of regulation.[103]

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98 From 2000 to 2005 Australia's real GDP grew faster than that of all the G7 (Group of Seven) economies. OECD, *Productivity Database*, September 2006.

99 Mr Jean-Philippe Cotis, press release for OECD, *Going for Growth* 2007*: Economic Policy Reforms,* February 2007, as viewed May 19 2007, < http://www.oecd.org/document/45/0,2340,en_2649_34325_38086509_1_1_1_1,00.html>.

100 Mr R Herbert, *Transcript*, 22 November 2006, p. 4.

101 Intergovernmental Agreement, *Interstate Investment Cooperation Agreement*, 30 March 2006. Queensland was not a party.

102 The Allen Consulting Group, *Evaluation of Invest Australia and its operations*, Final report to Invest Australia, July 2005.

103 Regulation Taskforce, *Rethinking Regulation: Report of the Taskforce on Reducing Regulatory Burdens on Business*, Report to the Prime Minister and the Treasurer, Canberra, January 2006, pp. 9–12.

3.107 Each of the three tiers of government has different regulatory regimes for the same or similar business activities and they also have overlapping requirements.

3.108 SIA reported the situation one of its member manufacturers faced complying with Commonwealth and various state government standards; as well as client specifications:

> These additional specifications impose a burden on suppliers such as Eppendorf who consider it to be more appropriate if there was consistency of all electrical equipment regulations across the Commonwealth, and all states and territories. By having consistency, suppliers would be able to distribute their products more readily without incurring the cost of making alterations for each client.[104]

3.109 Similar views were put by the Australasian Institute of Mining and Metallurgy[105] (the AusIMM), the Australian Plantation Products and Paper Industry Council (A3P)[106], and the TFIA[107]. The AusIMM submission encapsulated these views:

> It is critical to both [mining and manufacturing] industries that all three levels of government work to reduce the regulatory burden, maximise the efficiency of new regulation, identify priority areas of regulatory reform, reduce regulation and overlap, and increase national consistency.[108]

3.110 A3P also mentioned the duplication of compliance requirements *within* jurisdictions and the need for further compliance streamlining. [109]

3.111 The committee heard particular grievances about the disharmony of occupational health and safety standards (OH&S) across the states and at the federal level. This problem was raised in the report of the Regulation Taskforce 2006.[110] The situation is causing considerable confusion and red tape burden, particularly for manufacturers based in different states. AEEMA stressed this issue:

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104 SIA, *Submission No. 7*, p. 9.

105 The AusIMM, *Submission no. 16*, p. 7.

106 The Australian Plantation Products and Paper Industry Council (A3P), *Submission No. 14*, p. 4.

107 The Council of Textile and Fashion Industries of Australia Ltd, *Submission No. 17*, p. 12.

108 The AusIMM, *Submission no. 16*, p. 7.

109 A3P, *Submission No. 14*, p. 4.

110 Regulation Taskforce, *Rethinking Regulation: Report of the Taskforce on Reducing Regulatory Burdens on Business*, Report to the Prime Minister and the Treasurer, Canberra January 2006, pp. 36–37.

> Certainly at the state level we are, as I said earlier, working on those occupational health and safety regulations that differ from state to state. ... [OH&S regulations] are huge impediments to small industries and small businesses in particular. [111]

3.112 SIA gave an example of one member who has to deal with duplicative and conflicting OH&S standards in all Australian jurisdictions and an overlaid federal regulation on dangerous goods transport, storage and handling:

> Their regulation compliance staff must remain conversant with the regulations covering each of these areas not only in Victoria, but also in Australia's other states and territories and the countries in Oceania.[112]

3.113 Despite this, ACCI agreed that there are advantages in having the separate tiers of government, but that better coordination between them is required to harmonise and streamline regulation.[113]

3.114 Inconsistent greenhouse regulations were also raised. The A3P noted the compliance burdens of dealing with conflicting departmental requirements for greenhouse and energy reporting:

> 'Let's just have one single program for greenhouse and energy reporting.' Once you have worked out what that program is, you could drop away all the others and remove all the other state and Commonwealth obligations that are currently overlapping and duplicating.[114]

Conclusions

3.115 Australia's statutory corporate tax rate is broadly comparable to that of other OECD countries. There are mixed views about whether a reduction in the corporate tax rate is a priority for the manufacturing sector. While there has been a call for a reduction in the corporate tax rate from 30 to 25 per cent, this issue did not resonate throughout evidence (nor was much said about how it would be funded).

3.116 The committee concluded that although the reduced corporate tax rate in Ireland was a substantial boon for their manufacturing sector in initially attracting foreign investment, it was impossible to attribute long-term growth to this factor alone. Despite Ireland no longer being the only low

111 Ms L Johnson, AEEMA, *Transcript*, 7 December 2006, p. 18.

112 SIA, *Submission no. 7*, p. 19.

113 Mr P Johnson, ACCI, *Transcript*, 2 March 2007, p. 24.

114 Mr M Prosser, A3P, *Transcript*, 12 October 2006, p. 15.

corporate tax regime in the EU, the Irish manufacturing sector still has strong growth.

3.117 The unintended consequence of narrowing the personal tax base when corporate tax rates were lowered in the EU was noted by the committee. Such income-shifting behaviour has fiscal policy implications.

3.118 There is no prima facie justification for reducing the corporate tax rate to improve competitiveness in Australian manufacturing without considering other taxation reform aspects. An in-depth analysis of taxation issues was beyond the scope of the inquiry.

3.119 A co-ordinated approach is required between federal and state government agencies on regulatory concerns common to both governments. A national approach to regulation is performed on COAG formulated policy and overseen by the Office of Best Practice Regulation. The Office's role has recently been strengthened and should ensure better regulatory oversight for impacts on business at the federal level.

3.120 Overlapping regulations at the local, state and federal government levels continue to create unnecessary compliance burdens for manufacturing businesses. Where possible, compliance reporting requirements and timing of information returns for jurisdictions should be identical. The committee heard the most evidence about lack of coordination between federal and state/territory occupational and health and safety standards and how this created an unnecessary impost on manufacturing businesses.

Recommendation 4

3.121 **The committee recommends that through the Council of Australian Governments (COAG), the States, Territories and the Commonwealth harmonise standards particularly in regard to occupational health and safety issues such that compliance and regulatory burdens for manufacturers are reduced, without compromising safety standards.**

Structural and sectoral change

3.122 Australia's economy is currently experiencing dual structural change—the on-going dominance of the services sector and the resources led boom.

3.123 The Treasury stated that government support has its place for a number of reasons, including smoothing structural change as market equilibria are not immediately reached. The Treasury stated:

> It may be appropriate to implement: measures to address market rigidities and transitional costs as resources move to alternative uses; and measures to improve information available to market participants.[115]

3.124 The ACTU believes impacts of structural change may be ameliorated if government programmes are designed to smooth the path:

> Alan Blinder, a famous economist, said recently that if you look at the rate of structural change in manufacturing and what is going to happen to service activities in terms of off-shoring, you should give some serious consideration to your structural adjustment programs for those workers made redundant through global competition.[116]

3.125 The Victorian Government's submission also raises the issue of re-employment prospects for those once employed in traditional manufacturing:

> The causes of structural change include technological change, rising incomes and changing tastes. People losing their jobs in manufacturing have had lower re-employment prospects than in other industries – particularly in the TCFL [Textiles, Clothing, Footwear and Leather] sector due to factors of age, location and education levels.[117]

3.126 The manufacturing sector is also experiencing dramatic technological and scientific advances. When sectoral change of this type occurs at a rapid pace the knowledge that market operators have about new methods and applications varies enormously. Where manufacturers possess the knowledge, there may be vast differences in their ability to apply it to their production. A market failure may therefore arise when a sector is in dramatic flux.

3.127 Two sectors significantly affected by sectoral change are the TCF and automotive sectors. These manufacturers have been subject to ever increasing cost pressures from similar imported goods from low-labour cost economies whilst direct trade protection has fallen. They are still

115 The Treasury, *Submission no. 21*, p. 11.

116 Mr N Apple, ACTU, *Transcript*, 22 November 2006, p. 16.

117 Victorian Government, *Submission no. 40*, p. 11

under a transitional protection regime which accounts for the majority of assistance to the sectors. Net tariff assistance in 2005–06 was $542.5 million to the automotive industry and $319.1 million to the TCF industry.[118] However, these industries have also received substantial assistance to overcome sectoral change issues—measures to move them into niche or high value-add areas.

3.128 The Automotive Competitiveness and Investment Scheme (ACIS) was introduced in 2001 and is scheduled to end in 2015. The scheme credits import duties to registered ACIS participants based on their domestic production, investment and research and development activities. ACIS 'encourages strategic investment and research and development in the Australian automotive industry and the establishment of links between Australian producers and the global industry'.[119]

3.129 Australian automotive manufacturers have received approximately $3.4 billion[120] from the ACIS scheme to date. The final stages of ACIS, which commenced 1 January 2006, are worth $4.2 billion, including a $150 million Motor Vehicle Producer Research and Development grant scheme.[121] This is a sector-specific measure for the Australian auto industry to move it into specialty market niches.

3.130 A package of assistance measures valued at $747 million[122] is targeted at TCF manufacturing, the main component being the Strategic Investment Program (SIP). Grants from the SIP are designed to support capital investment and product innovation by TCF firms.

Market failure

Spill-over effects

3.131 The government may intervene in a market when, but for the public sector, certain socially desirable activities may not take place. Particular business activities may be considered worthy of government support because they generate public benefits ('positive externalities') in excess of those accruing to the firm and so will be under-provided in a free market.

118 PC, *Trade & Assistance Review 2005–06,* Canberra, April 2007, Table 2.25, p.25.

119 The Treasury, *Submission no. 21*, p. 11.

120 Productivity Commission, *Trade & Assistance Review 2005–06,* Canberra, April 2007, Table A.3, p. A.17 and *Trade & Assistance Review 2000–01,* Table 4.5, p. 86. DITR, Senate Standing Committee on Economics, Budget Estimates 2007–08, Tabled Document No. 3, 28 May 2007.

121 AusIndustry, Automotive Competitiveness and Investment Scheme, ACIS Post–2005 Arrangements (1 January 2006—31 December 2015).

122 TCF Post-2005 Assistance Package announced 27 November 2003.

3.132 Some manufacturing activities may lead to improvements in quality of life, for example health and medical advances; as such, the government may see societal benefits in supporting manufactures in this arena.

3.133 The manufacturing sector as a whole may create positive externalities that are not as easily identifiable, but which spill-over into the broader economy. Most of these accrue from new technologies. NIEIR noted that advanced manufacturing activities have positive impacts on the economy:

> If you have firms that are adopting new technology and skills, they are conduits for those through to the general economy and unleash a whole lot of positives to not only manufacturing but also the economy generally—business services and those sorts of exports that are important for fairly balanced overall growth.[123]

3.134 Nanotechnology Victoria spoke of the widespread support of nanotechnology activities by governments across the globe because of their broad applications beyond industry:

> The government was particularly concerned because there were major initiatives emerging elsewhere: the US, Germany and Japan. A whole host of other nations now have very coherent nanotechnology activities and are using that as one of the future stimuluses for their industry.[124]

3.135 The A3P suggested in their submission that some government provision of infrastructure to support manufacturing is in the public interest.[125] This rationale has been reflected in the 2007–08 budgeted supplementary funding for the Open Pool Australian Light water reactor, scientific infrastructure which ultimately benefits manufacturing, but which would have been unlikely to have been built by industry itself.

Other market impediments

3.136 Government intervention may be justified when the market is not operating as it should and a market failure exists. However, it is often difficult for governments to know whether a market failure actually exists or whether the market is just readjusting.

3.137 Markets may be poor information disseminators, within and between sectors. This is an issue when the global economy is changing rapidly and businesses rely on ever-increasing levels of knowledge and capital

123 Dr P Brain, NIEIR, *Transcript*, 22 November 2006, p. 36.

124 Dr P Binks, Nanotechnology Victoria, *Transcript*, 15 March 2007, p. 1.

125 A3P, *Submission no. 14*, p. 6.

sophistication. Difficulties accessing information about the market was a reason cited by the Industry Capability Network (ICN) for their inception:

> There was a market failure in that smaller organisations had no idea what was available, particularly in government procurement. And this organisation started to look at those opportunities.[126]

3.138 The Australian Manufacturing Workers' Union inferred that market failure may exist because individual manufacturers make operating decisions to boost their immediate bottom line; but this action does not necessarily assist the industry in the long-term:

> It is of course understandable that at the individual firm level reductions in output can lead to productivity advances via rationalisation. ... However, industry development policy framework in Australia has committed the most elementary errors in economics, namely the fallacy of composition. This occurs when one attempts to generalise from a relationship that is true for an individual or firm, but is not necessarily true for a group, or in this case an industry.[127]

3.139 Similarly, Mr Robinson of AEEMA remarked that individual manufacturers do not build industries and that not all manufacturing sectors have the resources to have representative bodies. He asserted:

> Individual firms will not do that because they cannot build industries. Individual firms have no capacity to build industries. Industry associations are limited because we only have limited resources. It is only governments that can make strategic decisions about what industries are going to create wealth for the country.[128]

3.140 In contrast, Professor Mark Dodgson, director of Queensland University's Technology and Innovation Management Centre—appearing in a private capacity—noted that government intervention in the manufacturing sector occurs in many countries but that worthwhile intervention does not necessarily mean greater intervention. In answer to the question of whether government should do more to encourage innovation he said:

> 'It should do things more smartly'.[129]

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126 Mr Lachlan, ICN, *Transcript*, 2 November 2006, p. 2. The ICN is a government funded organisation bringing together manufacturing capabilities with major projects.

127 AMWU, *Submission No. 34*, p. 24.

128 Mr A Robinson, AEEMA, *Transcript*, 7 December 2006, p. 13.

129 Professor M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 14.

Conclusions

3.141 The Australian Government takes an active role in supporting Australia's manufacturing sector over and above macro and microeconomic policies.

3.142 It provides substantial structural adjustment packages to sectors experiencing significant change, like the automotive and TCF industries. These industries have been most affected by the historic legacy of trade barriers and as tariffs fall structural assistance measures help sectors make changes to improve their competitiveness. The committee notes from the evidence received that structural adjustment programmes have played an important role in the economy, particularly with regard to retraining of employees as an industry automates and evolves globally. However, such industries should be aware that support of this kind is transitional only.

3.143 In addition, niche manufacturing activities have been supported for various reasons, one being that through their activities a positive public benefit may be conferred.

3.144 The committee acknowledges that it may be difficult to justify government assistance in areas of technological breakthrough where market success seems highly likely. If a 'truly original idea' has applications for many industries and all these returns can be captured through intellectual property protection, investment in this idea should be very attractive. However, if an idea is so revolutionary that it may be difficult for any one enterprise to reap the returns, then the activity will be underprovided by the market as investment in the project may not be as attractive. These latter business projects may have difficulty attracting start-up finance. Additionally, the costs of high-tech infrastructure for research and testing may be prohibitive for any one enterprise. The provision of key high-tech public infrastructure may enable industry-wide access to technology and innovation and foster collaboration—these are important determinants for global trade success.

3.145 One of the most important aspects of Australian government assistance is indirect, taking the form of information provision; advice; research and trade facilitation. This sort of support overcomes information asymmetry issues, an important aspect of the government's role at a time of rapid global change in the manufacturing sector.

Trade liberalisation

3.146 The committee recognises the Australian Government priority of negotiating multilateral trade agreements over preferential agreements.[130] In the absence of global or regional agreements, bilateral agreements may be negotiated.

3.147 While an in-depth investigation into Australia's trade policies was beyond the scope of this inquiry[131], free trade agreements (FTAs) were often mentioned in the evidence presented to the committee.

Existing FTAs

3.148 Bilateral FTAs have been signed with four of Australia's major trading partners—the United States, Thailand, Singapore and New Zealand.

3.149 These agreements have opened up new platforms for Australian manufacturers overseas as indicated by the 6.5 per cent increase in overall Australian exports of manufactures to the US in 2005-06.[132] However, issues with the implementation and short-term outcomes also provide salient lessons for current negotiations.

3.150 Rules of origin restrictions included in the Australia–US FTA (AUSFTA) have inhibited growth for the Australian textiles and clothing industry, particularly at the more innovative end of the market. Ms Christine Hawkins, director of Cinnabar Designs gave an ironic example of merino knitwear:

> It is all beautiful Australian wool, but there is no yarn processing in Australia—certainly not of the quality that goes into our knitwear. The Italians have the monopoly on that. So wool goes offshore; it is processed—it is spun—offshore. We bring the yarn in and turn it into fabric and finished product. That is excluded from the benefits of the free trade agreement also because of the yarn.[133]

130 Department of Foreign Affairs and Trade (DFAT), *Trade Statement 2007: A Statement by Warren Truss, Minister for Trade*, June 2006, p. v. DFAT website, <http://www.dfat.gov.au/trade/trade2007/trade2007.pdf>, as viewed 26 June 2007.

131 A comprehensive examination of these issues may be found in: Joint Standing Committee on Foreign Affairs, Defence and Trade, *Report no. 128, Inquiry into Australia's Free Trade Agreements with Singapore, Thailand and the United States: Progress to Date and Lessons for the Future*, 7 November 2005.

132 DFAT, *Submission no. 38*, p. 13.

133 Ms C Hawkins, Cinnabar Designs, *Transcript*, 8 February 2007, p. 3. Rules of origin restrictions in the US preclude Australian importers from preferential trading treatment, despite the AUSFTA.

3.151 Some manufacturers, including the motoring and textiles industries have reported they are yet to reap the promised benefits of existing FTAs as partner countries have increased restrictions, or have continued to favour local industries, highlighting the need for adequate enforcement and clear articulation of the FTA's goals. Regarding the AUSFTA experience, Mr Ashley Van Krieken, executive director of the Council of Textiles and Fashion Industries of Australia (TFIA) said:

> Certainly in the most recent agreements, we are not seeing a huge amount of benefit coming from them … According to our data there has been no growth in TCF [textiles, clothing and footwear] exports from Australia to the United States under the agreement.[134]

3.152 The Government has made efforts to maximise the impact and opportunity of FTAs. After the agreement of the AUSFTA in 2005, around 30 additional Austrade export facilitators were appointed to support the increased number of exporters interested in the US market, with modest success so far.[135]

3.153 FTAs have not had an homogenous effect on manufacturers—the textiles and motoring industries report they have been adversely affected by existing FTAs, while pharmaceutical products have had gains under the Australia-Thailand FTA and medical instruments, toys, games and sporting goods have increased under the AUSFTA.[136]

China and negotiating new FTAs

3.154 Australia is currently negotiating FTAs with other countries including China, Japan, Malaysia and Chile.[137]

3.155 The rapidly expanding Chinese economy accounts for only nine per cent of the market for Australian manufactures.[138] The potential FTA with China is perceived as both a challenge and opportunity by Australian manufacturers—largely due to China's different standards regarding intellectual property, non-tariff barriers and regulation—as BlueScope Steel noted:

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134 Mr A Van Krieken, Council of Textile and Fashion Industries of Australia Ltd (TFIA), *Transcript*, 8 February 2007, p. 2.

135 DITR, *Continuation of Export Facilitators Programme to Support the AUSFTA*, <http://www.industry.gov.au/assets/documents/itriinternet/Continuation_of_Export_Facilitators20070504170717.pdf>, as viewed 9 May 2007

136 Austrade, *Submission no. 18*, p. 8.

137 Australia and China commenced negotiations on a FTA on 18 April 2005.

138 The Treasury, *Submission no. 21*, p. 2.

> BlueScope Steel has significant concerns about the disparity between the very open Australian market ... and the distorted Chinese market, characterised by higher tariffs and trade barriers, extensive government intervention and ownership, and a range of overt and covert subsidies to steel manufacturers...[139]

3.156 Australian companies raised their concerns regarding China's transparency, regulatory uncertainty and poor intellectual property enforcement.[140] The Department of Foreign Affairs and Trade (DFAT) has not imposed a deadline on negotiations, stating it will spend as much time 'as is required' to negotiate a successful outcome.[141]

3.157 In countries such as China and Malaysia, there are a variety of non-tariff barriers, including import quotas, customs valuation methodologies and local content requirements (as well as in countries where FTAs have already been signed). Effective FTAs therefore need to identify any such barriers in the negotiation process along with clear processes for eliminating them.

3.158 Australia's strict intellectual property and regulatory standards are not matched by those of China. Effective FTAs therefore require a two-fold enforcement process—with Australian enforcement agencies fully operational by the time the agreement is ratified; and the encouragement of more stringent regulatory standards in China, as DFAT noted:

> There will be some areas where the Chinese will evade implementation, where they will implement according to the letter of the law but frustrate the objective. And there will be areas where the Chinese will just have to be pushed very hard to do what they have promised.[142]

139 BlueScope Steel, *Submission no. 39*, p. 17.

140 For example; Dr P Burn, Australian Industry Group, *Transcript*, 29 August 2006, p. 10; Australian Chamber of Commerce and Industry, *Submission no. 33*, p. 5; Mr D Cameron, AMWU, *Transcript*, 29 August 2006, p. 70; and TFIA, *Submission no. 17*, p. 10.

141 DFAT, *Launch of Negotiations*, <http://www.dfat.gov.au/geo/china/fta/facts/launch_negotiations.html>, as viewed May 9 2007.

142 Mr R. Wells, DFAT, *Transcript of Evidence*, 1 December 2006, p. 5.

4

Manufacturing strategies — mixing the old with the new

Range of manufactures require range of strategies

4.1 Traditional manufacturing industries cover a range of degrees of sophistication. Table 4.1 (p. 58) ranks them by value added as a percentage of final product. Unsurprisingly, the most value is added by sophisticated industries such as manufacturing scientific equipment while the least is done in manufacturing basic products such as petrol and flour.

4.2 The manufacturing sector is often divided into 'elaborately transformed' and 'simply transformed' industry, by somewhat arbitrarily dividing the industries based on the complexity of their output. Production and exports of elaborately transformed manufactures have grown much faster than the simpler products. For example, the Treasury demonstrated that export volumes have slowed across all categories since 2000 but only contracted for 'metals', 'resource-intensive', 'agricultural-intensive' and 'materials' categories.[1]

4.3 The more basic forms of manufacturing tend to make more intensive use of low-skilled labour and are therefore much more vulnerable to competition from economies such as China with plentiful cheap labour (and lighter regulation) and economies of scale. As simpler goods have

1 The Treasury, *Submission no. 21*, p. 3. An updated version appears as Table 2.3 in Chapter 2 of this report.

closer substitutes in world markets, and compete more on price, they are also more susceptible to the strong dollar.

4.4 Table 4.1 shows, however, that this analysis misses some of the transformation within the manufacturing sector. Clothing is generally regarded as a relatively simple product with relatively low value added. However, as the table shows, clothing is no longer such a product in Australia as clothing manufacturers here now specialise in high-end fashion and clothing for special purposes (e.g. fire resistant clothing).

Table 4.1 Selected manufacturing industries, ranked by value added as per cent of sales

	Value added as % of total sales and service income, 2004-05
Publishing	51
Medical and surgical equipment	44
Machine tools	43
Other electronic equipment	40
Recorded media	40
Telecommunications equipment	36
Professional and scientific equipment	36
Aircraft	36
Mining and construction machinery	35
Furniture	33
Clothing	29
Iron and steel	29
Aluminium smelting	28
Basic chemicals	26
Flour & cereal	25
Motor vehicles	20
Meat and meat products	20
Dairy products	18
Copper, silver, lead, zinc smelting and refining	18
Petroleum refining	9

Source: derived from data in ABS, Manufacturing Industry 2004–05, Cat. no. 8221.0, table 2.2.

4.5 Simple manufacturing industries are likely to survive if they are naturally protected by high transport costs. For example, the value of bricks and cement is low relative to their bulk and mass. Even if overseas manufacturers are able to produce them more cheaply, freight costs generally make imported bricks and cement uncompetitive.

4.6 Manufacturers of relatively basic products may survive despite higher costs if they offer exceptional service, customised products or very quick delivery of small orders.

4.7 Some Australian manufacturers may be able to sell goods priced higher than imported versions as the Australian goods have a better 'brand image'. For example, they may be seen as more reliable. Meeting Australian standards may give buyers more confidence in the domestic product.

Further processing of raw materials

4.8 A common argument is that Australia's extensive mineral resources should make it competitive in products that use these inputs intensively, or that it should at least process them further before exporting them.[2]

4.9 The committee characterised this as an issue of whether production is better located close to raw materials (or component manufacturers) or close to markets. A committee member stated:

> Presumably the key factor governing the extent to which it is viable to have further processing occur in Australia is the relative economics of manufacturing close to your predominant consumer market versus manufacturing close to your predominant resource input. I would have thought that one of the problems with the latter, manufacturing close to your resource input, is that there are other inputs …. isn't it unrealistic to expect that we are going to become major and powerful world fabricators of aluminium window frames or something like that simply because we have the bauxite to start with?[3]

4.10 The proposition was put to Mr Don Larkin, chief executive officer of the Australasian Institute of Mining and Metallurgy, who agreed that manufacturing was generally more likely to occur close to markets rather than close to raw materials.[4]

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2 This question was examined in a two-part report by the House of Representatives Standing Committee on Industry, Science and Resources, published as *Of Material Value* (March 2000) and *Getting a Better Return* (September 2001). They concluded that 'there appears to be strong potential for enhanced value-adding in Australia'.

3 Mr L Tanner MP, *Transcript*, 28 August 2006, p. 34, and 29 August 2006, p. 53.

4 A similar conclusion was reached by the Industry Statement 2007; 'there is also a trend to locate manufacturing and product development activity close to final markets – which in our region means North Asia and India', Department of Industry, Tourism and Resources (DITR), *Global Integration: Changing Markets. New Opportunities, Background papers*, no. 4, p. 7.

4.11 A related case is companies which need to be close to a range of suppliers of components to avoid excessive warehousing of inventories.[5] These companies may be slower to shift their operations to an economy with lower labour costs, at least until the cheaper economy also has component suppliers. However, if they do move, then the component makers may also close.

The way forward for traditional manufacturers

4.12 There is now broad consensus across unions and employers that the way forward is for Australian manufacturing to adjust to face the global challenges rather than retreating behind protectionist barriers.

4.13 For example, Mr Nixon Apple, industry and investment policy advisor for the Australian Council of Trade Unions said:

> The thing that we need to keep in mind more than anything we have done in the past is that it is about building better manufacturing businesses. I think that with tariffs and with other things we took our eye off the ball about what is involved in building better businesses with the organisational capabilities and management systems to succeed.[6]

4.14 A similar view was expressed by Mr Gregory Evans, director of industry policy and innovation for the Australian Chamber of Commerce and Industry (ACCI):

> Recent difficulties faced by manufacturing should not be used as an excuse to lead governments back to old, failed policies of protectionism and intervention. The future of manufacturing does not lie in increasing government intervention, building higher tariff walls, providing greater subsidies or picking winners … The future of Australian manufacturing lies with policies that strengthen the overall economy and support competition.[7]

4.15 For many traditional manufacturers, there are basically three strategies, although some firms will do more than one:

- Offsetting labour cost disadvantages in the existing product line by greatly improving productivity.

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5 This is discussed in House of Representatives Standing Committee on Employment, Workplace Relations and Workforce Participation, *Shifting Gears*, December 2006, p. 16.

6 Mr N Apple, Australian Council of Trade Unions, *Transcript*, 22 November 2006, p. 20.

7 Mr G Evans, Australian Chamber of Commerce and Industry (ACCI), *Transcript*, 2 March 2007, p. 18.

- Changing the nature of the product made to a more original, sophisticated, specialised, high quality 'niche' or 'boutique' product, that possibly cannot be made with a low-skilled workforce, and looking to export.
- Moving the assembly line aspects of production of relatively simple manufactures to cheaper centres overseas, while retaining the 'cream' in Australia. For some companies this may mean they retain only the high value aspects such as design and marketing domestically. For some companies this could involve specialising in making one component as part of a global supply chain.

4.16 These three strategies are discussed in turn in the following sections.

Improving productivity in making existing products

4.17 There appears to be scope for Australian manufacturers to raise their productivity in their existing product range by adopting 'world's best practice'. Labour productivity appears less than half that in much of western Europe (Table 4.2).

Table 4.2 Labour productivity (value added per hour) in manufacturing, 2000, US = 100.

Finland	107	Japan	70
United States	100	Canada	66
Belgium	96	United Kingdom	55
Netherlands	95	**Australia**	**39**
Sweden	95	Spain	38
France	93	South Korea (1998)	36
Germany	88	Taiwan (1998)	27

Source: Groningen Growth & Development Centre, ICOP Industry Database.[8]

4.18 However, even doubling productivity—a very ambitious goal—would only make Australian manufacturers roughly competitive with European and North American producers[9], who pay comparable wages and are

8 This database is compiled by a renowned research centre at the University of Groningen, Netherlands. The PC uses their data in *Trends in Australian Manufacturing*, August 2003. An alternative calculation estimates labour productivity in Australian manufacturing as 60 per cent of the US level in 2003 (but falling over time); Dolman, B., Parham, D. and Zheng, S. 2007, 'Can Australia Match US Productivity Performance?', *Productivity Commission Staff Working Paper*, Canberra, p. 28.

9 The difficulty of bridging the productivity gap with the US is discussed by Dolman, Parham and Zheng, 2007, who attribute much of the gap to 'fundamental factors of history and geography, including Australia's remoteness from large markets and its pattern of settlement'.

struggling themselves in many cases.[10] To compete with factories in countries such as China and Vietnam, where wages are much lower than Australia, productivity would need to be increased much more.[11]

4.19 As work by the Productivity Commission shows, labour productivity could be increased by investing in more capital equipment. The average amount of capital per worker in the Australian manufacturing sector increased more than fivefold between 1964–65 and 2001–02, accounting for about half the growth in labour productivity over this period.[12]

4.20 Australia's relatively small domestic market makes it difficult for Australian firms to achieve economies of scale and so match the productivity of European and American firms. Australian manufacturers therefore need to be exporting to achieve economies of scale. (A more cautious approach is to seek economies of scale in just one part of the production process, as discussed later in the section on global supply chains.)

4.21 Even without large investments, it may be possible to increase productivity by using existing workers and equipment more efficiently. This process can be assisted if critical overviews of internal capabilities are conducted. An external review may bring new ideas, and will at least lead the firm to reflect on its current procedures.

4.22 One management tool to improve productivity is 'benchmarking'; comparing the firm's performance at each stage of the production process to the world's best practice, so as to identify areas where improvement is needed. A number of organisations offer benchmarking services.

4.23 QMI Solutions Ltd is a not-for-profit company which diagnoses and benchmarks around 100 small and medium enterprise (SME) manufacturers a year.[13] An improvement programme is designed

10 There is limited scope to reduce labour costs given the need to compete with the booming mining sector for workers. In any case, for many manufacturers labour is not the dominant cost. Labour accounts for around 10–30 per cent of the total value of production for most Australian manufactured goods, compared to over 60 per cent for many services. Labour accounts for a higher proportion in some industries such as ceramics and footwear; around 15 per cent for car manufacturers and a much lower proportion in industries such as coal, petrol, and leather products (where raw materials is overwhelmingly the major cost).

11 In 2005 the hourly wage for an Australian worker in manufacturing was almost twice that of a similar worker in South Korea, almost four times that for a worker in Taiwan, 28 times that for a worker in mainland China and over 40 times that for a worker in India. Source: IMD, *World Competitiveness Yearbook 2006*.

12 PC, *Trends in Australian Manufacturing*, August 2003, pp. 156–7.

13 It was established by the Queensland Government, CSIRO and the Queensland University of Technology as the Queensland Manufacturing Institute in 1993.

collaboratively with the company to improve performance. QMI also arranges mentoring and runs seminars.

4.24 The National Manufacturing Forum was impressed by QMI and refers to its 'acknowledged success' in:

> Driving continuous improvement through technology diffusion, diagnostics, benchmarking and reviews. The QMI model was seen as an effective approach to productive performance, with potential to extend cooperatively its underlying principles to other states.[14]

4.25 A specific area where benchmarking may improve results is logistics. Dr Julie Wells, director, policy and planning, RMIT University made 'a plea for greater recognition of the importance of supply chain management and logistics in the manufacturing industry'.[15]

4.26 The UK Department of Trade and Industry has a number of benchmarking initiatives. They offer an internet-based self-assessment test on aspects such as innovation.[16] They also have 2000 trained advisers who can assist SMEs in conducting a more rigorous benchmarking of their performance using a database of over 150 000 companies.[17]

4.27 The UK model seems to have influenced the Australian Government's Industry Statement 2007, which announced that new Australian Industry Productivity Centres (AIPCs) would provide a:

> Free diagnostic service to help businesses assess their performance against world best practice and identify opportunities for improvement. Up to 2 000 businesses a year will use this service.[18]

4.28 Following from benchmarking activities, manufacturers may then implement programmes to improve areas shown to be deficient. A number of generic management philosophies, such as 'quality assurance' and 'lean manufacturing', were popularised in the early 1990s, having originated in manufacturing in the US and Japan some sixty years prior.

4.29 Management strategies aiming to improve the awareness of quality in all organisational processes are broadly referred to as 'Total Quality Management'. Quality Assurance is an activity which provides evidence

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14 National Manufacturing Forum, *Exhibit, no. 22*, p. 26.

15 Dr J Wells, RMIT University, *Transcript*, 28 August 2006, pp. 26–7.

16 The department also uses the results from this as a way of measuring the overall performance of the manufacturing sector.

17 Further information is available at <http://www.benchmarkindex.com.bi>

18 DITR, *Global Integration: Changing Markets, New Opportunities*, May 2007, p. 8.

that an organisation is applying these principles to provide adequate confidence that the product optimally fulfils customers' expectations.

4.30 Australian manufacturers use the International Organization for Standardization's (ISO) 9000 series of Quality System Standards.[19] This standard applies to all organisations regardless of size, industry, product or service. This standard is designed to encourage continual process improvement and efficiency and meet customer satisfaction by ensuring that business process controls are in place and apply in practice.

4.31 In addition to building customer confidence and improving productivity, Professor Mark Dodgson, director of the Technology and Innovation Management Centre, University of Queensland—appearing before the committee in a private capacity—stated that embracing international quality assurance accreditation improves firm capability and innovativeness. He said:

> The International Organisation for Standardisation's international accreditations are again very important. My survey showed that very few firms actually had the basic ISO 9000, which is a bit of a worry because that is basic entry-level stuff.[20]

4.32 Another approach to improving efficiency comes under the rubric of 'lean manufacturing' (LM). The Industry Statement 2007 refers to LM as a 'critical issue' and the AIPCs intend to disseminate information on it. TAFE courses are already being conducted on LM.

4.33 However, while there is much general talk about LM, understanding precisely what it means is very difficult. Articles about LM generally refer to a focus on eliminating waste and it is often associated with Toyota's manufacturing philosophy of 'continuous improvement' (or 'kaizen') and rigorous quality checks.[21] While reducing waste seems an obviously sensible idea, it is not a revolutionary new concept.

4.34 The UK's Manufacturing Advisory Service, on which the AIPCs are partly modelled, claims to employ LM techniques in their approach. While it refers to LM in numerous fact sheets, it provides no tangible examples of how LM is applied in practice. This may lead to confusion over what LM processes actually involve, as outlined by Dr John Blakemore, Blakemore Consulting International:

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19 The latest is AS/NZS ISO 9001:2000 Quality Management Systems – Requirements Standard.

20 Prof M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 16.

21 The committee witnessed the Toyota production line at the Altona plant. Japanese management practices in general became very fashionable in the 1990s, ironically just as the Japanese economy went from outperforming western economies to barely growing at all.

> We go down the path of what is called 'lean manufacturing', which is not the way to go. I will be very careful here because you can argue about what these terms mean … the American interpretation of the Japanese method is in error.[22]

Moving to 'boutique' manufactures and exporting

4.35 Many Australian manufacturers have moved 'up the value chain' to high quality, original or 'niche' products in the face of challenges to remain competitive in traditional products.

4.36 Germany is seen as an exemplar of quality in manufacturing. Professor Dodgson remarked to the committee that:

> They still have a very successful engineering and manufacturing sector … They still export more than any other country in the world ... The quality of the companies that you see—the BMWs of the world—is just so good … it gives them such a distinctive advantage. At a time when the car industry is going to hell in a hand basket in the United States, Germany is doing really well … because of the quality of their manufacturing and engineering.[23]

4.37 An important part of Germany's success in maintaining this quality edge is its interest in new technologies. The Australian Manufacturing Workers' Union (AMWU) describes Germany's:

> Single institute that has a budget of $1 billion per year whose job it is to scour the world for world's best technology and, if it is not already located in Germany, its job is to import it into Germany and to place it with local manufacturers.[24]

4.38 One of Germany's particular strengths is in production and export of capital equipment. This may be an area where Australia could excel by focusing on industries where we have extensive experience, such as mineral processing, medical and marine equipment. The question was posed during a hearing:

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22 Dr J Blakemore, Blakemore Consulting International, *Transcript*, 29 August 2006, p. 47.

23 Prof M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 16.

24 Mr P Conroy, Australian Manufacturing Workers' Union (AMWU), *Transcript*, 29 August 2006, p. 71–3. QMI Solutions also emphasised the importance of adopting new technology: 'Recognising that some 98% of the world's innovation occurs outside Australia, an important aspect of QMI's technology diffusion activities is the identification of technologies that are particularly relevant to Australia's diverse manufacturing sector'; *Submission no. 10*, p.1.

> Can we therefore think about producing low-volume, high-value manufactured goods, including those that might be used in the production of high-volume, low-value manufactured goods in other countries—for example, machine tools? Could we become the Germany of the Far East?[25]

4.39 Dr Wells from RMIT, replied cautiously that:

> It is a very interesting question. I guess it underpins the importance of engagement with industry in the skills development process. Obviously, there has to be a viable business case around it. In general terms, I would agree…. we have to locate the education and training effort more squarely in the workplace.[26]

4.40 Niche manufacturing tends to involve a more skilled workforce and emphasis on design and R&D. Nanotechnology applications are transferring from the pharmaceutical industry to the metal products and polymers industry and will lead to more 'niche' products of improved quality, longevity and functionality.

4.41 The Government has recognised the importance of niche manufacturing with the Industry Statement 2007 allocating $36 million over the next four years for CSIRO to establish a National Research Flagship for Niche Manufacturing. CSIRO describes the new flagship's role as being to:

> Help the Australian manufacturing industry to become more competitive in global supply chains, develop globally competitive medical products, identify next generation fabricated devices, capture value from new materials, help stimulate smart manufacturing enterprises, and consider the health, safety and environmental issues of nanotechnology research.[27]

4.42 As, by their very nature, the domestic market for niche goods is very much smaller than that for mass market goods, it becomes even more important that manufacturers become more focused on exporting.[28]

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25 Dr C Emerson MP, *Transcript*, 28 August 2006, p. 23.

26 Dr J Wells, RMIT, *Transcript*, 28 August 2006, p. 23.

27 CSIRO media release 07/73, 1 May 2007.

28 Increased exports of manufactures is therefore desired as a sign of a more productive manufacturing sector rather than being desired in its own right for some 'mercantilist' reason. It is consistent with the view expressed in the Industry Statement 2007 that 'exports are not inherently more meritorious than goods sold on the domestic market'; Department of Industry, Tourism and Resources (DITR), *Global Integration: Changing Markets. New Opportunities, Background papers*, no. 1, p. 21.

4.43 Back in the 1970s, less than a tenth of Australian manufactures were exported.[29] Firms lacked confidence to move into overseas markets. There were therefore likely to be 'spill-over' benefits to other companies from encouraging 'trail-blazers' to set an example of exporting to their peers. New exporters help promote the 'Australian brand' as well as their own products. Furthermore, in a regulated financial market where a small number of domestic banks rationed credit, it was often hard for small and medium enterprises to obtain funding to develop new markets.

4.44 For this reason, the government introduced the Export Market Development Grants scheme (EMDG) in 1974 to assist emerging and current exporters to promote their product in international markets. In the new century, exporting is much more common among Australian manufacturers and the financial system is now deregulated and highly competitive so credit availability is much less of an issue, especially for larger companies. In line with this change, the amount of funding for the EMDG scheme is now less generous than it had been.

4.45 Currently the scheme reimburses up to 50 per cent of expenses incurred on 'eligible export marketing expenses'[30], above a $15 000 threshold. The scheme provides for up to seven grants to each eligible applicant but imposes an income eligibility cap of $30 million in the grant year (which had been reduced from $50 million in 2003). The scheme involved around 1 300 grants, totalling $51 million (almost 40 per cent of the total), being paid to manufacturers in 2005–06.[31]

4.46 However, there is still a case for supporting 'trail-blazers' as there are new emerging markets that need to be opened up for Australian manufacturers.

4.47 By its very nature, the EMDG scheme rewards outward-looking rather than conservative and declining companies. It also has the advantage that by bringing grant recipients into contact with the Australian Trade Commission (Austrade), it increases the chances that such companies will hear about new market opportunities.

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29 J Edwards, 'Export weakness, investment strength', *CEDA Competing from Australia Project Paper*, no. 2, p. 3.

30 A variety of costs may be eligible—certain expenses incurred for an overseas representative; a marketing consultant; a marketing visit; communications; free samples; trade fairs, seminars and in-store promotions; promotional literature and advertising; and overseas buyers visits.

31 Austrade, *Submission no. 18*, p. 7.

4.48 The scheme was praised by the manufacturing sector, who unsurprisingly would like to continue to receive payments. ACCI's submission argued that the EMDG scheme helped participants:

> Overcome the single largest barrier to engaging in exporting - namely access to the necessary operating capital to fund their export promotion work.[32]

4.49 Some argued for the eligibility cap to be restored to the previous $50 million or even raised beyond this.[33] The committee heard that some high-tech and advanced manufacturers would only be able to undertake international promotional activities exceeding $15 000 per annum after their turnover exceeded the cap. However, ACCI agreed with a recent Austrade review supporting the current threshold.[34] The Austrade review had concluded that:

> Larger firms already have more export experience, have more ability to fund export promotion from their own resources, and have lower expectations about the benefits generated by increased export promotion.[35]

4.50 Since 1997, the EMDG scheme has had a limited budget for each year. Therefore, in years with high demand, successful applicants are paid only a proportion of the reimbursement for which they would normally be eligible (a process known as 'modulation') in order to keep total spending within the overall budget.

4.51 This process may substantially reduce the incentives to increase export marketing arising from the scheme, as it means firms have to decide on their promotional spending without knowing what proportion of the spending will be reimbursed. Both ACCI and the Austrade report suggested a 'smoothing arrangement' whereby in years of low demand the unspent commitment may be carried forward to cover high demand years.[36] This would reduce the frequency and extent of modulation but would still leave some uncertainty for companies about whether their spending will be fully covered.

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32 ACCI, *Submission no. 33*, p. 25.

33 For example, the Council of Textile and Fashion Industries of Australia advocated 'raising of the EMDG cap to $60 million to better capture medium sized businesses', *Submission no. 17*, p. 19.

34 ACCI, *Submission no. 33*, p. 25.

35 Austrade, *Review of the Export Market Development Grants Scheme*, *Looking at the EMDG Scheme,* June 2005, p. *26,* known as the 'Jollie Review' after its facilitator, Mr Peter Jollie.

36 ACCI, *Submission no. 33*, p. 5.

4.52 There were also some criticisms of the burden on applicants of proving that the promotional activity undertaken actually resulted in an increase in exports, but this has subsequently been addressed.[37]

4.53 Aside from marketing, another way an Australian manufacturer may win a contract over a foreign rival is by offering faster and better after-sales service such that the 'whole-of-life' cost of a domestic product is lower even when the initial purchase cost of the domestic good is higher than for an imported product. An example of offering extensive service is the Australian aluminium shipbuilder Austal, the world's largest builder of fast ferries, who provide assistance when the ferry arrives in the home port and continue to provide repairs and maintenance.

Global supply chains

4.54 A large proportion of world trade now takes place within, not between, industries. The Industry Statement 2007 notes that:

> Traded goods are now just as likely to be intermediate goods as finished products, often sold between affiliates of the same multinational enterprise.[38]

4.55 This trend has occurred with an increase in the global concentration of manufacturing companies. The Industry Statement 2007 refers to some estimates that only 500 firms account for 70 per cent of global trade, and that 40 carmakers in the 1980s have consolidated into 14 firms now.[39]

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37 Ms Johnson from the Australian Electrical and Electronic Manufacturers' Association (AEEMA) explained: 'I am sorry, I haven't got four months to spend on trying to convince Austrade that we should get approved body status, so now we are spending money on a consultant to do it. Really, it should be that I could sit down with Austrade and say: "We did all this. I can't tell you how the exports are going to increase but could you take it on faith, as we've taken 20 companies to Taiwan and about 10 of them have got contracts".' *Transcript*, 7 December 2006, p. 16. The *EMDG Legislation Amendment Act 2006*, which comes into effect for new applicants on 1 July 2007, removes export earnings criteria from the calculation of grant entitlements.

38 DITR, *Global integration: Changing markets, new opportunities*, 2007, p. 7. The Industry Capability Network has an even higher estimate; that about two-thirds of world trade is accounted for by the global supply chains of multinational corporations; *Submission no. 6*, p.3. Professor J Houghton claims that 'across OECD countries, intra-industry trade accounted for almost 70 per cent of total manufacturing trade between 1996 and 2003', but the share of Australia's manufactures trade which is intra-industry is much lower; 'Global chains: Australia's challenge in the evolving world economy', *CEDA Competing from Australia Project Paper*, no. 1, pp. 9-10. The Industry Statement 2007 also notes that foreign-owned firms account for about a third of manufacturing output in Australia and a large proportion of exports; p. 17.

39 DITR, 2007, pp. 17–8; and its *Background Paper no. 4*, p. 6.

4.56 The Industry Minister's forward to the Industry Statement 2007 refers to 'the concentration of trade in global supply chains' as one of 'the challenges of the global market'.[40]

4.57 The growth in global supply chains reflect a rethinking of how multinational corporations can most efficiently produce goods, driven in part by reductions in trade barriers. Whereas in the past, all stages of the production process were replicated in each economy (often to be inside tariff walls), now the production process is divided into stages, with operations in each economy specialising in the stage in which they have a comparative advantage and producing for the global market. This allows much greater economies of scale in each stage.

4.58 The Department of Foreign Affairs and Trade described the new process as follows:

> Companies are seeking to locate different stages of production in countries with the lowest cost structure. As a result, there is growing dispersion of production processes - with assembly operations migrating to relatively low-wage countries, and the production of components taking place in higher-wage countries.[41]

4.59 There are three ways in which Australian entities might be involved in global supply chains;

- Leading a supply chain with overseas firms contributing some links (Figure 4.1, p. 71). The committee heard an example of an Australian-controlled supply chain where Australian wool is sent to Italy for spinning and the yarn is then returned to Australia to be made into high-quality merino knitwear for sale in international markets.[42] With Australia making up less than 1 per cent of the global economy, Australian-led global supply chains are likely to remain uncommon.

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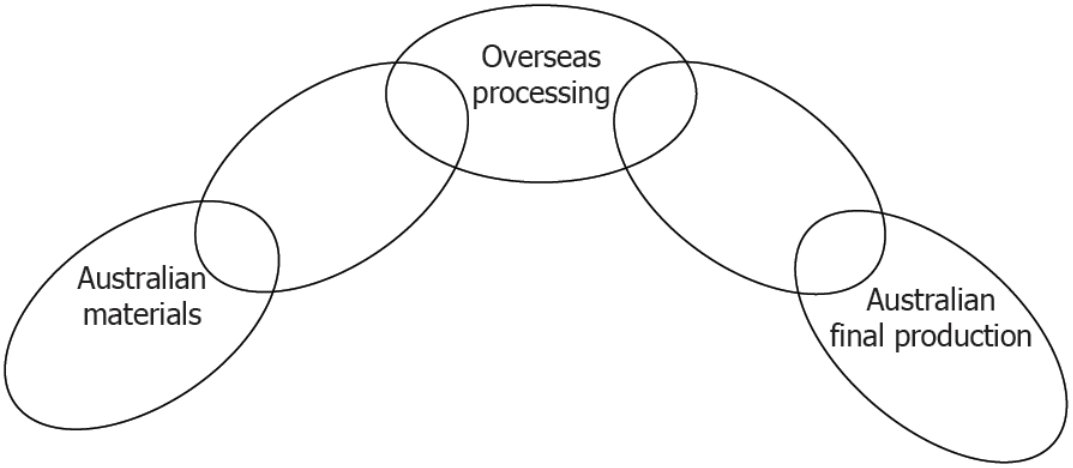
40 DITR, 2007, p. 3. Another term for making use of a global supply chain is 'off-shoring', but this has a more pejorative connotation. It is generally used about relatively unskilled activities being transferred away from the domestic economy (but the expression 'on-shoring' is not often used when activities are moving to the domestic economy). It is often associated with another disparaging term 'hollowing out', referring to a reduction in the scope of manufacturing operations within an economy. The Industry Statement 2007 also noted that 'feedback from industry through submissions and consultations indicated that access to global supply chains was necessary to capitalise on emerging opportunities and to access current knowledge and technologies'; p. 18.

41 Department of Foreign Affairs and Trade, *Submission no. 38*, p. 17.

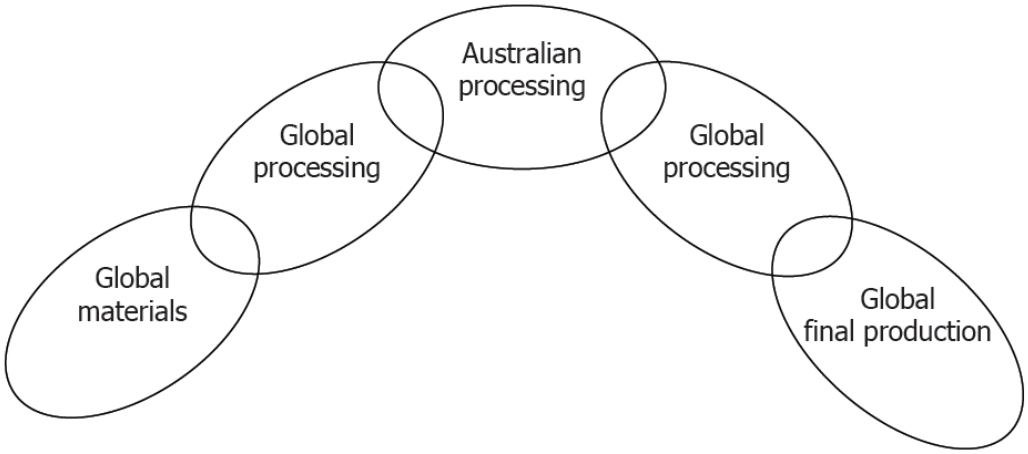
42 Ms C Hawkins, Cinnabar Designs, *Transcript*, 8 February 2007, p. 3.

Figure 4.1 Australian supply chain



- As part of one multinational company's global operations (Figure 4.2). For example, a global manufacturer might have one component of its global products made in its Australian subsidiary. An example is NEC, whose Australian operations are one of five R&D centres in NEC's global network, and produce the digital subscriber line (DSL) product for sale around the world.[43] Australian manufacturers are more likely to participate if we have a skilled, well-educated workforce and efficient work practices.

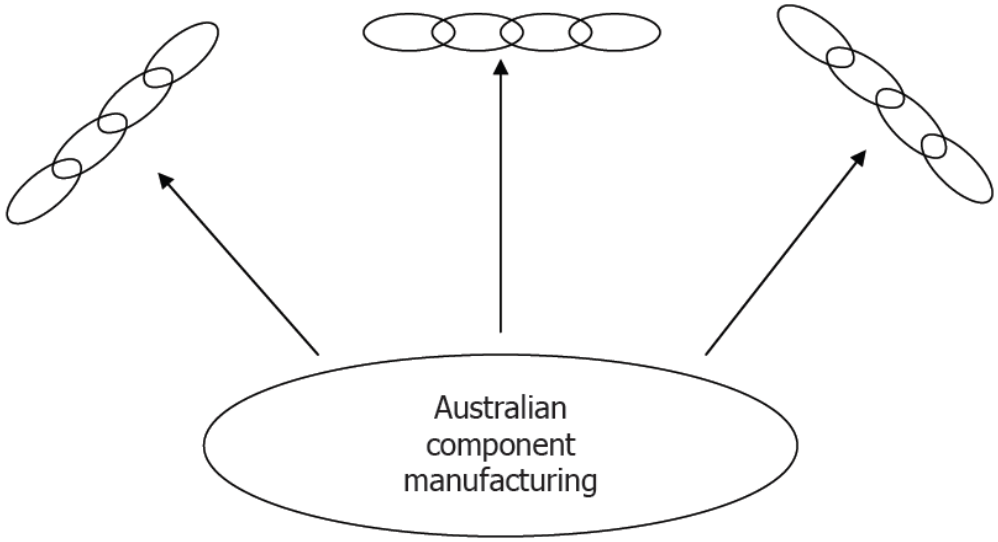
Figure 4.2 Link in global supply chain



43 Mr B McManus, NEC, *Transcript*, 15 March 2007, p. 19.

- As a supplier of a component to the supply chains of a number of international supply chains (Figure 4.3).

Figure 4.3 Supplier to global supply chains



4.60 The committee heard of a Newcastle problem-solving company for engineering and manufacturing, CCI Pope, which solved a problem for the Rolls Royce jet engine manufacture and has now embedded itself in a huge global chain.[44] This third aspect is the focus of the rest of this section.

4.61 A number of submissions, from both industry and trade unions, referred to the need for Australian companies to integrate into global supply chains. The Australian Industry Group (Ai Group) and AMWU respectively wrote:

> The fate of many firms will depend on securing a place in international supply chains. Trade is increasingly concentrated around a relatively small number of international supply chains.[45]

> A major outcome from this process must be… Australian firms becoming part of the new supply chains … in this region.[46]

4.62 The Treasury was comfortable about Australian manufacturing moving from autonomous manufacturing to a role within a global supply chain:

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44 Ms S Grierson MP, *Transcript*, 2 March 2007, p. 16. An example of an Australian company which has long adopted this approach is Borg-Warner (now Dana) which in 1963 started manufacturing two generic rear axle assemblies which would suit a wide range of Australian made cars, and went on to export them around the world.

45 Australian Industry Group (Ai Group), *Submission no. 31*, p. 12.

46 AMWU, *Submission no. 34*, p. 61.

> In global manufacturing there is a move towards greater specialisation. So maybe, instead of Australia trying to produce a whole range of cars which are sold in Australia, the automotive industry could concentrate on producing one model which is sold around the world. It might not even be a whole car; it might be that we concentrate on producing transmissions or something … It might be that Australia's input is to be the design centre.[47]

4.63 Ford Australia gave an example of just this process, describing its:

> Enhanced role as an engineering and design 'centre of excellence' for the Asia Pacific and Africa region …. Ford Motor Company recently awarded this significantly expanded team the lead role for the design and engineering of a new global light commercial vehicle to be sold in more than 80 markets worldwide.[48]

4.64 The motor vehicle industry offers scope for many Australian firms to enter global supply chains. Austrade estimates that there are approximately 200 Australian companies that supply components to the four Australian vehicle producers for their export models.[49]

4.65 While many witnesses stressed the importance of involvement in global supply chains, Australian firms have so far not been extensively involved in them. The Industry Capability Network (ICN) estimates that of the world's largest 500 companies:

> Less than 20 … use Australia as a significant product development, technical or production centre for a global business operation.[50]

4.66 Professor Dodgson outlined the supply chain innovation challenge:

> There are now many mechanisms that these firms use to advertise and to promote the access of those firms into their supply chains and they can do that. But the challenge is to continue to innovate, to continue to be ahead of the other potential supply chains, which could be in Brazil, South Africa or wherever. That is where the links and the improvements in managerial capability—the more strategic approach—would help. [51]

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47 Mr J Hawkins, the Treasury, *Transcript*, 1 December 2006.

48 Ford Australia, *Submission no. 4*, p. 2.

49 Austrade, *Submission no. 18*, p. 4.

50 ICN, *Submission no. 6*, p. 5. Similarly, the Industry Statement 2007 notes that an international business survey ranks Australia only 99th of 125 economies for its presence in global supply chains; *Global integration: Changing markets, new opportunities Background paper no 4*, p. 8.

51 Prof M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 16.

4.67 The AMWU was very sceptical about the model of Australian manufacturers supplying to global chains:

> This supply chain argument about simply offshoring it is doomed to failure. In our view, you cannot keep the cream of manufacturing, you cannot do the R&D and the prototyping here and hope that you can keep it here.[52]
>
> We need critical mass to maintain supply chains, build clusters, innovate successfully, win export markets and enjoy a balanced economy.[53]
>
> It is extremely hard to export a single automotive component in the absence of a supply chain here. It is much easier to get into the Toyota supply chain if you are already in the domestic supply chain of Toyota here and you have the aggressive backing of Toyota.[54]

4.68 The AMWU also highlighted its concern that many companies running global supply chains are not Australian-owned:

> The decisions about where the investment goes and where the economies of scale are being taken by companies in Detroit, Tokyo and elsewhere … When the boards sit down in Tokyo and Detroit, they will make decisions based on the government support and investment climate in the country.[55]

4.69 A number of agencies (see Appendix H) help involve Australian entities in global supply chains through various programmes, including Austrade, the ICN and Invest Australia.

4.70 Austrade supports exporters in general, including those exporting components to global supply chains. The committee heard mixed views on the effectiveness of Austrade's operations. Ai Group could not fault them,[56] while the AMWU called for a review of the agency because it did

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52 Mr D Cameron, AMWU, *Transcript*, 29 August 2006, p. 72. Similar concerns were expressed in a study by Cambridge University's Institute for Manufacturing, which warned 'the common assumption that the intellectual high ground of design and development can be retained locally, in the absence of a local production capability, may not be valid'. Professor M Gregory et al, University of Cambridge Institute of Manufacturing, 'Making the Most of Production,' *Exhibit no. 20*, p. 9.

53 AMWU, *Submission no. 34*, p. iii.

54 Mr P Conroy, AMWU, *Transcript*, 29 August 2006, p. 81.

55 Mr D Cameron, AMWU, *Transcript*, 29 August 2006, p. 81.

56 Dr P Burn, Ai Group, *Transcript*, 29 August 2006, p. 8.

> not think Austrade was concentrating enough on helping Australian firms become involved in big, international procurement programmes.[57]

4.71 Austrade does not see its role as organising major project teams. They act as an export facilitator and an international project 'spotter', which they can do with relative ease given their international market presence.[58]

4.72 In contrast, the Global Opportunities programme announced in the Industry Statement 2007 will apparently pro-actively form consortia of Australian businesses for large international projects. This programme will 'target more than 30 large international projects each year, with a combined value of at least $16 billion'.[59] Project teams will be drawn from DITR, Austrade and the ICN to identify the most promising projects. The Industry Statement 2007 states:

> Consortia of Australian businesses will be formed to pursue these opportunities, giving SMEs the chance to forge new links with Australian and international businesses.[60]

4.73 The ICN, a non-government organisation, has a more specific focus on business partnerships for accessing global supply chains.[61] ICN may be approached by international companies working on major projects, or be informed of them by Austrade. The ICN diagnoses the technical needs of the project and then scan their 'capability register'[62] seeking those that meet project requirements. Although the ICN informs manufacturers of bidding opportunities, neither it nor Austrade are involved in assembling a bid for a project.

4.74 The ICN also administers the Supplier Access to Major Projects (SAMP) grants programme, which provides funds for specialist consultants to work with project developers in identifying supply opportunities for capable and competitive Australian companies. Funding is provided for major projects of national or regional economic significance and has recently been expanded to participation in major projects overseas.[63]

4.75 ICN's submission (the only specific evidence received on SAMP) stated:

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57 Mr Conroy, AMWU, *Transcript*, 29 August 2006, p. 79.

58 Austrade have forged Australian links into international projects including the rebuilding of New Orleans post Hurricane Katrina.

59 DITR, *Global integration: Changing markets, new opportunities*, 2007, p. 25.

60 DITR, *Global integration: Changing markets, new opportunities*, 2007, p. 25.

61 ICN, *Submission no. 6*, p. 2.

62 The ICN holds a nation-wide database of Australian industry capability, volunteered by firms.

63 SAMP Global.

> ICNL estimates that under SAMP, Australian companies have won contracts worth around $1.6 billion for work that might otherwise have gone to overseas competitors.[64]

4.76 The Global Opportunities programme will include the existing SAMP Global programme, and supplement it with a new co-operative programme providing $254 million over ten years. It appears the new programme will use more resources than the ICN's capability network database, including conducting regional fora seeking capability and interest in joining in joint bids for large overseas projects.

4.77 Invest Australia encourages foreign companies to invest in Australia. The benefits of foreign investment are likely to be maximised when foreign investment takes the form of direct investment in 'greenfield' sites.[65] This is most likely to involve technology transfer and training for Australian workers and offers the most prospect of the Australian operation being part of a global supply chain.[66] It appears that Invest Australia now has a more targeted approach to foreign direct investment attraction with the bulk of promotion activities occurring in the high and medium high technology exports.[67]

Conclusions

4.78 The committee notes that Australian manufacturers are adopting varying strategies, depending on the nature of the goods they produce, to adjust to a global marketplace where proximity to raw materials is of less importance. Some Australian manufacturers are naturally protected by transport costs and others are staying competitive by slashing costs, raising productivity, achieving economies of scale by entering export markets, increasing quality and/or offering superior service. Mass low-value manufacturing is moving offshore or being replaced by more innovative 'niche' manufacturing.

4.79 The committee supports 'benchmarking' and the use of diagnostic audits and various management tools to improve business weaknesses identified

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64 ICN, *Submission no. 6*, p. 7.

65 Refers to a new manufacturing installation; not a purchase of share or of an existing facility.

66 This argument was put, for example, by the AMWU, who argued that Invest Australia should have a sharper focus on greenfield investment; *Submission no. 34*, p. 12. Such a focus was an important element in the Irish success; Professor R Green, private capacity, *Transcript*, 14 November 2006, p. 19.

67 Mr B Jones, Invest Australia, *Transcript (Services inquiry)*, 1 December 2006, p. 34.

through it. Firms analysing their deficiencies is a positive step towards productivity and efficiency gains. The committee therefore endorses the diagnostic analysis that the AIPCs are proposing to offer and hopes that the SMEs will be exposed to well-founded manufacturing-based methodologies suitable for their business type.

4.80 Australian manufacturers have adopted a greater focus on exporting. The main government support for exporting is the Export Market Development Grants scheme. The committee heard proposals to increase the cost of this scheme by raising the eligible turnover cap of $30 million. However, the committee supports the recent decision of the Government to lower this cap to ensure that the main beneficiaries of the scheme are the smaller firms less able to bear the costs of marketing themselves.

4.81 A problem with the EMDG scheme is that even applicants with strong applications are not sure how much they will be reimbursed when they are deciding on promotion spending, which limits the incentive the scheme provides to undertake additional marketing. The suggestion to allow a smoothing arrangement whereby unspent scheme monies could be carried over into future years would reduce this uncertainty. Increasing the budgeted amount for the scheme would reduce the uncertainty further, by increasing the probability that eligible applicants would receive their reimbursement even in years with high demand.

4.82 Participating in global supply chains is increasingly important as a means for manufacturing to remain viable and a number of government programmes are designed to facilitate this. However, complementary policies must be adopted to link newly arrived foreign multi-nationals to domestic producers, to gain true economic benefit from this strategy.

4.83 After the following chapter on 'new' manufacturers, there are further recommendations applying to all manufacturers covering engagement with researchers, innovation and government assistance packages.

Recommendation 5

4.84 **The committee regards benchmarking as a vital activity of the nascent Australian Industry Productivity Centres and recommends that the Government ensure the Centres are adequately resourced to provide this service to a wide range of companies across Australia.**

Recommendation 6

4.85 **The committee recommends that the Government increase the amount budgeted for the Export Market Development Grants programme each year and, in line with a recent Austrade review, allow the carry forward of any unspent budgeted funding to be used in future programme years of high applicant demand.**

5

Developing and funding emerging manufacturing

5.1 The future of Australian manufacturing lies with innovative firms. While some firms will introduce new products or processes into longstanding industries, many will be developing products on the frontiers of science.

5.2 The first half of this chapter discusses the emergence of three of these areas; nanotechnology, biotechnology and 'green' technology. A characteristic shared by companies involved with all these technologies is that they often struggle to attract funding in their early stages and the second half discusses the role of venture capital in meeting these needs.

Nanotechnology

5.3 Nanotechnology is a developing area of science with wide applications. Dr Peter Binks , chief executive officer, Nanotechnology Victoria summarised:[1]

> It is essentially engineering. It is manipulating materials and processes but not at the macro level that we are used to with large physical objects. It is right down at the molecular level. There are some very different things that happen at the molecular level. There are fundamental changes in the properties of materials

1 The prefix 'nano' denotes a factor of 10^{-9}, or one-billionth. Nanotechnology operates at a scale in the order of a nanometre.

> because quantum effects start to overlap with what we see as classical effects.[2]

5.4 An example demonstrated to the committee by Dr Binks was a nanostructured coating just a couple of molecules thick that changes the properties of surfaces. For example, it could mean:

> A surgeon's gown can never hold blood … bandages do not become sources of infection going forward … [or] corrosion can be eliminated from certain kinds of structures or at least deferred for a period of time.[3]

5.5 While nanotechnology may not yet cure cancer, it may aid in its early detection. Dr Binks revealed:

> You cannot detect cancer in the human body until there are more than a million cancerous cells in it. Otherwise, you cannot see it. We are trying to push that down, to about 10,000 cells and below, by having nanoparticles that can seek out cancerous cells and then fluoresce or be seen very differently under certain kinds of imaging.[4]

5.6 Nanotechnology is a focus of researchers globally and is seen as having great potential. Many universities are increasing the resources devoted to it. In Taiwan, even primary school students are learning about it.[5]

5.7 Manufacturing at the molecular level has huge implications. Some things previously only done in a laboratory environment may now be done in a manufacturing environment. The technology can potentially lead to developing new products in a wide range of manufacturing industries, such as scientific and mining equipment, micro-electronics, specialist materials, pharmaceuticals and biotechnology.

Government support for nanotechnology

5.8 The Victorian Government was an early supporter of nanotechnology. They set up Nanotechnology Victoria (NanoVic) five years ago to facilitate

2 Dr P Binks, Nanotechnology Victoria (NanoVic), *Transcript*, 15 March 2007, p. 1.

3 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, p. 1.

4 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, pp. 7-8.

5 Mr P Laver, Australian Academy of Technological Sciences and Engineering (AATSE), *Transcript*, 28 August 2006, p. 43.

its commercialisation. NanoVic is jointly funded by the Victorian Government and three Victorian universities.[6]

5.9 The Australian government has supported nanotechnology through its funding of the CSIRO. The committee generally heard positive views about the CSIRO's research in this area. For example, a leading textile producer, Mr Brett Manwaring , said:

> The CSIRO is actually one of the leading experts in nanotechnology, particularly with textile products.[7]

5.10 The universities, and other research institutes, also contribute to this research. Dr Binks, informed the committee that:

> We spend about $100 million a year across all activities on nanoscience and nanotechnology. More than half of that is spent on the research of nanotechnology. It is spent by almost all of our major universities, some of our CRCs, CSIRO, the Department of Primary Industries, ANSTO, DSTO and places like that. A smaller amount is spent by about 70 or so companies that are working in this field. They range from equipment manufacturers through to materials producers and biotechnology companies that focus on what materials can do within biological systems.[8]

5.11 In terms of government assistance, the CEO of Starpharma Ltd commented that they had received 'a lot of support from the Australian Government through R&D Start programmes, Commercial Ready and P3 [Pharmaceutical Partnerships Programme]'. However, they had 'far more support from the US government through the NIH [National Institutes of Health] programmes'.[9]

5.12 The Industry Statement 2007 singled out nanotechnology as having 'enormous potential'. It will be a focus for the CSIRO's new 'niche manufacturing' national research flagship at a cost of $36.2 million over four years with accelerated allocations in the last two years. In addition, the Government will provide $21.5 million for a 'National Nanotechnology Strategy'. Based on the overall spending figures quoted by Dr Binks, this is an evolutionary focus rather than a revolutionary focus.

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6 Other states have also been supportive. The Queensland Government appropriately gave the world's smallest cheque, only 1.1 mm by 1.8 mm, to an institute working at the molecular level; *Australian Financial Review*, 4 May 2007.

7 Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, p. 16.

8 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, p. 2.

9 Dr J Raff, Starpharma Ltd, *Transcript*, 15 March 2007, p. 9.

Impediments to commercialising nanotechnology

5.13 Some concerns were expressed about the commercialisation of nanotechnology in Australia. Mr Manwaring, thought CSIRO were too close to foreign companies:

> The only problem is that most of the companies they [CSIRO] are dealing with are overseas.[10]

5.14 Some companies thought that the research work lacked a commercial focus. Dr John Raff, deputy chairman, Starpharma Ltd commented:

> There is far too much emphasis on research push in Australia with very little understanding of the processes involved in development, manufacturing, marketing and product positioning.[11]

5.15 There was also some disappointment that larger companies are not actively involved. Dr Binks of NanoVic commented:

> Companies like BlueScope Steel, Amcor, BHP Billiton and Rio Tinto are all looking at nanotechnology activities, not necessarily investing right now but keeping a watching brief…. the biggest challenge that we face between the nanotechnology field and the Australian manufacturing industry is the translation of the outcomes into the manufacturing environment.[12]

5.16 While nanotechnology offers scope for improved products, producers may not be aware of the potential:

> Gear manufacturers will want harder and harder surfaces so that they wear less. They will want better lubricants and corrosion resistance. They are often looking for lighter, tougher materials. Nanotechnology can help provide all of that… [but] there is a real challenge finding the information to get that product improvement. [13]

5.17 The CEO of NanoVic agreed with a suggestion that universities get additional funding to employ industry liaison officers to investigate commercialisation, but warned universities should not feel reliant on

10 Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, p. 16.

11 Dr J Raff, Starpharma Ltd, *Transcript*, 15 March 2007, p. 10.

12 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, p. 2.

13 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, p. 4.

commercialisation to fund their research. This was leading to them driving too hard a bargain and protracting negotiations. [14]

5.18 A challenge for some companies bringing new products to market was competition for space on supermarket shelves. Dr Raff commented:

> Supermarkets [are] sourcing home brands from overseas. All the second-tier brands are being removed from the Australian market. That is making the introduction of innovative products very difficult. The amount of money required to effectively market a product in Australia … as a top-tier brand is prohibitive. [15]

5.19 Nanotechnology also leads to specific occupational health and safety issues associated with the risks of handling, packaging and containing very small particles, which were raised by NanoVic. A nanoparticle has:

> A much higher surface area compared to its volume, and that makes it in essence more reactive than a bulk material would be. We have already seen this in a number of other materials—for example, the sand blasting issues around silicosis. The same kinds of issues can occur with very small particles. It means that you need to have different handling equipment, different assessments of what exposure there is and essentially modifications to the regulatory environment. The process of developing those is under way. [16]

5.20 The Australian Government has identified the importance of health, safety and environmental aspects of nanotechnology research as a key area to be considered by CSIRO in the new Niche Manufacturing Flagship.

Australian Synchrotron and Lucas Heights neutron reactor

5.21 Research into innovative technologies such as nanotechnology often requires use of equipment too expensive for any single firm to construct.

5.22 An example of a large expensive research tool is a synchrotron, which is essentially a high-intensity light source; a 'super torch'. It produces light across a wide range of frequencies; infrared light, visible light, ultraviolet light and x-rays. It can be used for analysing materials in sub-microscopic detail and for the manufacture of small, precise materials. It has many applications, as outlined by Mr Max Roger from the Australian Synchrontron:

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14 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, p. 4.

15 Dr J Raff, Starpharma, *Transcript*, 15 March 2007, p. 10.

16 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, p. 3.

> It can be used for anything. Really, the only limiting factor is our imagination and capabilities in those areas…. There is a company in Sydney called Fermiscan which is looking at commercialising a test for breast cancer based on the analysis of human hair. They are using the Chicago synchrotron.[17]

5.23 One of the better known products developed using a synchrotron is the Relenza anti-flu drug. Lesser known examples include self-cleaning tiles and glass which are environmentally friendly[18] and 'metallic glass', a form of unbreakable glass based on a metal foundation. Synchrontron technology has also been used by IBM in the US and Japan to improve flat-screen technology to produce higher quality, larger and cheaper screens.[19]

5.24 The new Australian Synchrotron in Melbourne offers opportunities for many Australian researchers and businesses that previously required an overseas trip to (queue to) use a synchrotron in another country.[20] The initiative was taken by the Victorian Government, who met the bulk of the $220 million construction cost. There were also contributions from other state governments, universities and the commonwealth government. Similar facilities around the world are also mainly funded by governments. Ironically for something examining microscopic objects, the synchrotron is the size of a football field.

5.25 An additional benefit from a facility with applications across a range of fields is that it brings together researchers from different locations, specialisations and perspectives.[21] This will hopefully lead to future collaborations between industry and universities.

5.26 The Australian Synchrotron will cost around $20 million a year to run and the long-term funding is not yet determined. Typically the overseas experience has been that commercial charges only cover 5-10 per cent of the operational cost, as it is mostly used for basic research.

5.27 A complementary facility is the new Lucas Heights Open Pool Australian Light-water reactor (OPAL). CSIRO commented that:

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17 Mr M Roger, Australian Synchrotron, *Transcript*, 15 March 2007, pp. 45 and 49.

18 It was developed by an Australian researcher using synchrotron-based nanotechnology; Professor Robert Lamb, University of New South Wales.

19 Australian Synchrotron, 'Synchrotron science in manufacturing', *Exhibit no. 33*.

20 Further information can be found at <www. synchrotron.vic.gov.au.>.

21 A diverse range of businesses access the Advanced Photon source in Chicago, ranging from the Dow Chemical Company to DaimlerChrysler AG.

> We have at the moment an ongoing collaboration between the Division of Minerals and ANSTO [Australian Nuclear Science and Technology Organisation] in relation to finding ways of capturing the benefits of synergies that occur between the new synchrotron in Melbourne and the old and the new reactors at Lucas Heights.[22]

5.28 The Government increased funding for ongoing costs to operate the OPAL reactor by $22 million over four years in the 2007–08 Budget. The Australian Synchrotron received a one-off payment of $50 million to contribute to the operating expenses of the first five years of operation, subject to matched funding from the Victorian Government.

Biotechnology

5.29 Biotechnology is an area where Australian scientists are well ahead of some of their overseas peers. For example, we have particular immunology expertise. However, the Australian Academy of Technological Sciences and Engineering expressed concern that this may change given the greater efforts some other economies put into teaching.[23]

5.30 The Department of Industry, Tourism and Resources (DITR) summarised for the committee some of the specific Australian government programmes to support biotechnology.

> The Government's $150 million Pharmaceuticals Partnerships Program will support an additional $500 million (over 2004–05 to 2009–10) of high quality R&D in Australia by originator, generic and biotechnology companies. By supporting the portfolio of R&D undertaken by a company and its related bodies corporate, the program supports company growth and adds to critical mass which can help anchor manufacturing activity in Australia. From the Program the Government will specifically provide $10 million to establish a Small Scale Mammalian Cell Production Facility to bridge the infrastructure gap in the national biotechnology manufacturing chain.[24]

5.31 An example of a successful biotechnology innovation in Australia is the Australian Proteome Analysis Facility (APAF). Proteomics, the study of

22 Dr R Hill, CSIRO, *Transcript*, 22 March 2007, p. 10.

23 Mr P Laver, AATSE, *Transcript,* 28 August 2006, p. 43.

24 Department of Industry, Tourism and Resources (DITR), *Submission no. 31*, p. 35.

proteins, is in a sense a successor to the study of the human genome. Science Industry Australia (SIA) commented:

> APAF was established in 1995 under the Australian Government's Major National Research Facility Scheme …. The expression of particular proteins can be used as 'biomarkers' of health, disease and assist in finding protein quality traits in agricultural crops. APAF's four partner organisations - Macquarie University, University of New South Wales, University of Sydney and TGR Biosciences Pty Ltd (Adelaide) [provided] … funding in the order of $45 million.[25]

5.32 APAF is a leading global facility:

> APAF … continues to co-develop many of the laboratory 'tools' in use in proteomics research worldwide …. APAF engages a plethora of Australian and international science industry partners (around 350 in 2004) as a provider of proteomic R&D expertise, discovery partner, technology developer/licensor, technology educator, and market appraisal source. APAF has generated significant export dollars through royalties from products licensed to multinationals and overseas contracts.[26]

Green technologies

5.33 The recognition of the economic and social damage being caused by climate change has focused attention on the need for the costs of carbon emissions to be borne by the emitters (rather than being subsidised by future generations). As the current underpricing of non-renewable energy sources is removed, there will be market incentives for households and firms to seek to reduce energy usage and obtain it from more environmentally sensitive sources. This opens up many areas for innovative Australian companies to develop products and processes which will become in strong demand around the world.

5.34 Some Australian companies realise this potential. For example, the Australian Electrical and Electronic Manufacturers' Association stated:

25 Science Industry Australia (SIA), *Submission no. 7*, p. 10.

26 SIA, *Submission no. 7*, p. 10.

> There is another emerging 'growth engine' for manufacturing and that is 'minimal manufacturing', a trend to minimise the industry's environmental footprint.[27]

5.35 It has also been recognised by governments. For example, the Victorian Government submitted that:

> In Victoria, manufacturing is the main user of electricity and gas, which significantly contributes to the emission of greenhouse gases. Manufacturing companies are now incorporating cleaner production methods, adopting alternative energy sources, and developing new environmentally friendly technologies. As well as meeting local standards and regulations, it also provides opportunities for the design of innovative products and services.[28]

5.36 Nanotechnology experts viewed nanotechnology as an area that could help with addressing climate change.

> A lot of it is the real simple stuff. It is things like having energy efficient glass. Being able to stop the energy leakage from buildings is very important. … having lighter materials that are stronger or that do not collect other gunk along the way. We also work with wind turbines. Being able to get better blades that are lighter and more efficient involves nanostructured materials. [29]

Venture capital

What is venture capital?

5.37 Venture capital is the very early stage external equity funding that businesses, particularly in innovative industries, may need to start up. (By contrast, 'private equity' is a much broader concept, also covering funding of well-established unlisted operations.)

5.38 New innovative firms, sometimes called 'gazelles', require some form of equity because until they finish commercialising their product and start making profits they are not in a position to repay debt (and often have little in the way of hard assets to offer as collateral). It is probably only a minority of new firms that are funded by formal venture capital. Most

27 Australian Electrical and Electronic Manufacturers' Association, *Submission no. 19*, p. 1.

28 Victorian Government, *Submission no. 40*, p. 12.

29 Dr P Binks, NanoVic, *Transcript*, 15 March 2007, p. 5.

entrepreneurs initially rely on their own savings, or money provided by family and friends (also known as 'love capital'), employees ('servant capital') or individual private investors ('angel capital') or by borrowing from a bank using property as collateral. One innovator, Dr John Raff from Starpharma Ltd, suggested:

> Ninety per cent of all financing of smaller innovation companies comes from private placement financing. It does not come from the organised venture capital industry.[30]

5.39 Typically, the professionally managed venture capital fund is a 'patient' investor, committing funds for up to 5-10 years. It then sells up once the company is established and can borrow and/or list on a stock exchange.

5.40 Venture capital funding is, by its very nature, a risky investment. If the eventual product is successful the investor may earn extremely high returns, but if it is unsuccessful, as many (perhaps the majority) are likely to be, the venture capitalist may lose their entire investment. Venture capitalists tend to be more closely involved in the company's operations than a typical shareholder, sometimes acting as a mentor to the company's management or holding a seat on the board. Sometimes the provision of further capital is promised subject to meeting performance benchmarks. Venture capital fund managers typically specialise in certain industries, such as biotechnology or information technology.[31]

5.41 Some now large and well-known companies, such as Apple, Google, Intel, Microsoft and Starbucks, started life with support from venture capital. It was suggested that 'without that kind of investment, these enterprises might never have got off the ground'.[32] Australian companies to have benefited from venture capital include Cochlear (makers of the bionic ear) and ResMed (medical technology).

5.42 The ABS conducts an annual survey of venture capital.[33] At June 2006, investors, almost half of which are domestic pension funds, had $10.9 billion (just over double the amount in June 2001) committed to 229 venture capital funds. However, only $6.8 billion had been drawn down,

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30 Dr J Raff, Starpharma Ltd, *Transcript*, 15 March 2007, p. 18.

31 Further information about the operations of venture capital firms, particularly the legal aspects, are given in S Barkoczy et al, 'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, Exhibit *no. 35*.

32 Associate Professor S Barkoczy, *Transcript*, 15 March 2007, p. 35.

33 Cat. no. 5678.0. The survey is financially supported by the DITR. It is called *Venture Capital and Later Stage Private Equity*, as the data being reported has a broader scope. The survey covers both venture capital funds which directly invest in companies, and those which pool funds to invest in these vehicles (the latter are known as 'funds of funds').

and invested in 902 companies. The selection of these companies was an intensive process. The 157 venture capital managers reviewed over 6000 potential new investments during 2005-06 before selecting around 200 for investment. As well as providing funding, the managers spent a total of 186 000 hours advising and assisting the companies, or about three and a half days a month per company. Most funds only hold minority stakes in companies and most investments in individual companies are less than $10 million.

5.43 These data would seem to indicate that if there is any problem in the venture capital market, it is not a lack of money coming in but either the poor quality of many of the companies seeking funding or excessive conservatism of the venture capital fund managers.

5.44 However, the ABS survey is capturing some funds that are more like private equity funds than venture capital and they only provide a limited amount of data. There has not been a lot of research done on the Australian venture capital market. Associate Professor Stephen Barkoczy, associate professor of law, Monash University—appearing before the committee in a private capacity, said:

> There is no hard data. There is only anecdotal evidence.[34]

Is venture capital undersupplied?

5.45 It does appear that the amount of Australian venture capital, particularly for manufacturing, is not 'high' by international standards. Two international surveys of businesses suggest that Australia's venture capital market is less developed than in countries such as Ireland and Finland, renowned for their healthy manufacturing sectors, but comparable to the average advanced economy; see Appendix F.

5.46 Some evidence is more critical. The Victorian Government commented:

> As a nation, across all industries, we are below leading practice abroad on the measure of venture capital/GDP. In Australia, manufacturing accounts for a small proportion of venture capital investments across all industries.[35]

5.47 But venture capital may just be smaller relative to GDP because we have a smaller high-tech manufacturing sector relative to GDP. It does not prove that venture capital provision itself is *too low*, or that there is a market failure justifying government intervention.

34 Associate Professor S Barkoczy, private capacity, *Transcript*, 15 March 2007, p. 35.

35 Victorian Government, *Submission no. 40*, p. 13.

5.48 An academic study cautioned that:

> Evidence supporting the contention that market failures exist is usually derived from isolated case studies and is principally anecdotal in nature ... what is lacking is a carefully grounded, authoritative and broad-based empirical study examining this issue in Australia. [36]

5.49 An ABS survey in 2004 and 2005 found that only five per cent of innovating businesses reported 'excessive economic risk perceived by financiers' as a barrier to innovation, although a further 16 per cent referred to the cost or availability of finance as a barrier.[37]

5.50 Venture capital provision may be low because of information problems. New innovative companies may not be aware of the relevant venture capital funds. There could be a role for government in helping fill these information gaps. The Australian Government recently announced the establishment of Australian Industry Productivity Centres (AIPCs). These could operate as 'one-stop-shops' for manufacturers seeking advice and could have a desk officer with information on venture capital funds and the areas in which they specialise. Links to this information could also be placed on the AIPC website; a 'one-click-shop'.[38]

5.51 The Australian Government commissioned a 'Venture Capital Industry Review' in 2005.[39] However, their report and the submissions they received have not been made public.

5.52 Nonetheless, a common view seems to be that venture capital is underprovided. For example, the Australian Council of Trade Unions tied venture capital provision to innovation:

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36 S Barkoczy et al, 'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, *Exhibit no. 35,* pp. 23–4. Interestingly, this does not stop them concluding that 'Australian government support of such [venture capital] investment is appropriate' (p. 24).

37 ABS, *Innovation in Australian Business 2005*, Cat. no. 8158.0, p. 25. The largest barriers reported were lack of skilled staff and potential markets being dominated by established firms.

38 The UK's Management Advisory Service has a link to a website<www.bvca.co.uk> where entrepreneurs can find potential venture capital investors by entering their location, amount of funding required and industry type. The MAS website also has advice on preparing an application for venture capital.

39 Minister for Industry, Tourism and Resources media release, 10 May 2005. The expert group conducting the inquiry comprised Brian Watson (Executive Chairman of Georgica Associates, an independent private equity investment management firm, and a board member of the Future Fund); David Miles (deputy chair of the Committee for Melbourne and chair of the Australian Government's Industry Research and Development Board) and Gary Potts (formerly with the Treasury, now a commissioner at the Productivity Commission and a trustee director of a major superannuation fund).

> A more concerted focus by institutional investors on investing in venture capital can help accelerate the emergence of new technology intensive firms.[40]

5.53 The Victorian Government suggested that in the absence of tax concessions manufacturers will not get sufficient access to venture capital due to sectoral image problems:

> The venture capital industry is likely to grow significantly, largely because the Federal Government has introduced tax incentives, but there are still barriers for manufacturers in accessing venture capital, including a perception that manufacturing is a low skill, low technology, low return industry.[41]

5.54 Similarly, Ms Christine Hawkins, a director from the textile industry thought venture capitalists were prejudiced against innovation in the more traditional parts of manufacturing:

> You cannot go out and find venture capitalists to support your business, especially in fashion and textiles. It is not the sexy end of the market for the Macquarie Banks and the venture capitalists.[42]

5.55 Mr Nixon Apple, industry and investment policy advisor, ACTU, who had served as a fund trustee, suggested to the committee that Australian investors are unduly cautious:

> I have spent the last 10 years banging my head against the wall as an industry fund trustee about how to get more investment in venture capital. It is very hard …. Nobody really wants to back the guys who are starting up because they do not have a track record.[43]

5.56 Dr John Pulsford, from SIA, also felt the Australian funding market is 'not as aggressive and risk-taking' and attributed it in part to the small number of very wealthy individuals.[44]

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40 Australian Council of Trade Unions (ACTU), *Submission no. 27*, pp. 26-7. They expressed concern that 'Australia only has a handful of managers in venture capital who are established with a track record of any significance'; 'Strategic Directions to Boost Australian Manufacturing—a compendium to support a report by the National Manufacturing Forum,' *Exhibit no. 24*, p. 262.

41 Victorian Government, *Submission no. 40*, p. 12.

42 Ms C Hawkins, Cinnabar Designs, *Transcript*, 8 February 2007, p. 12.

43 Mr N Apple, ACTU, *Transcript*, 22 November 2006, p. 20.

44 Dr J Pulsford, SIA, *Transcript*, 2 March 2007, p. 9. Similar comments were made by Associate Professor S Barkoczy, private capacity, *Transcript*, 15 March 2007, p. 35; and Mr T Strasser, *Submission no. 13*, p. 2.

Government support for venture capital

5.57 At least implicitly, the Australian Government apparently thinks the market under provides venture capital, as it has a number of programmes to encourage it. DITR says the schemes aim 'to promote … the development of a self-sustaining venture capital market.'[45] Taken at face value, this statement suggests the schemes should only be temporary. But no benchmark is given to indicate when they will no longer be needed.

5.58 There are a number of venture capital schemes. Some involve direct government funding and others involve tax concessions.

5.59 The Innovation Investment Fund (IIF) programme involves the provision of venture capital to early stage, small high-tech companies. A pool of capital provided mostly by the government (but a significant minority by the private sector) is divided between a number of licensed private sector funds managers (some of whom specialise in particular sectors) who take the investment decisions. Returns are shared by the government and private sector investors, but favouring the private sector investors. The programme is budgeted to cost $55 million in 2007–08.

5.60 The Pre-Seed Fund (PSF) programme is similar but focused on companies controlled by a university or CSIRO or using intellectual property developed by them.

5.61 The IIF and PSF are similar to schemes in many other countries whereby the government directly invests in venture capital programmes. A recent comparative study concluded that many countries:

> Have established grant programs, low interest loan programs and loan repayment guarantee and insurance programs.[46]

5.62 As well as providing funding, government grants may act as a 'seal of approval' making it easier for recipients to attract private sector funding.

5.63 A plethora of other grant programmes provide support for new companies in other ways. For example, the Small Business Entrepreneurship programme provides grants to assist setting up small business incubators and the Commercialising Emerging Technologies (COMET) programme helps companies less than five years old commercialise new processes and products. Much of the support for research and development also goes to new companies.

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45 DITR, *Submission no. 31*, p. 32.

46 S Barkoczy et al, 'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, *Exhibit no. 35*, p. 187.

5.64 The other Australian schemes provide tax concessions to investors in venture capital funds. Normally a venture capital fund would be subject to capital gains tax when it exits from its investment in a company.[47] The schemes provide relief from this tax.

5.65 The Venture Capital Limited Partnership (VCLP) framework is aimed at foreign investors (initially only from selected countries).[48] It interposes incorporated limited partnerships (rather than a corporate structure) between the foreign investors and start-up companies.[49] The limited partnerships have general partners (the venture capital managers) and limited partners (the investors). The scheme allows tax benefits to flow through this structure. The VCLP programme allows for investment in companies up to $250 million.[50]

5.66 The latest scheme is the Early Stage Venture Capital Limited Partnership (ESVCLP), announced in May 2006, which is gradually replacing the PDF programme.[51] The ESVCLP is similar to VCLP but focused on the small end of the market. This limited partnership entity allows for investment in companies valued up to $50 million. The ESVCLP must divest itself of any holdings once the total assets of the investee company exceed $250 million. The fund managers have discretion about what companies in which to invest, other than excluding retailing and land development.[52]

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47 An alternative legal view is that a venture capital fund is not holding an equity stake to receive a dividend flow and therefore is 'trading' in the equity positions and so returns should be taxed as 'income' rather than 'capital gains'. See: S Barkoczy et al, 'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, Exhibit *no. 35* p. 42.

48 The ABS survey shows that only around five per cent of investors in venture capital are non-residents so there is substantial scope to increase their involvement. However, VCLP seems to be attracting more domestic than foreign interest; S Barkoczy et al, 'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, Exhibit *no. 3,* p. 79.

49 The Venture Capital Limited Partnership (VCLP) supersedes the dormant Foreign Superannuation Fund (FSF) programme. There had been 21 venture capital entities registered under the FSF in 2001 but over time all their registrations have been revoked.

50 The PDF scheme was limited to $50 million.

51 The Pooled Development Funds (PDF) programme involves private sector investment companies which raise capital from investors. Their investments in eligible Australian companies receive concessional tax treatment. In May 2006 the Government announced that the existing PDF programme would be closed to new registrations after 31 December 2006. DITR, *Submission no. 31*, p. 32. According to the ABS survey, about half the venture capital vehicles were participating in the scheme. The PDF scheme had itself replaced the Management and Investment Companies (MIC) programme.

52 VCLP and ESVCLP are examples of what are termed in the literature 'back-end incentives' (as opposed to measures, such as the former MIC programme, giving investors a tax deduction for placing funds in a venture capital fund, which are termed 'front-end incentives'). The 'front end incentives' may be more prone to abuse through tax shelter schemes; S Barkoczy et al,

5.67 ESVCLP provides flow through tax treatment and a complete tax exemption for income, both revenue and capital, received by its domestic and foreign partners in early stage investments. However, losses can not be offset against other taxable income. Advocates laud this feature as meaning the scheme only rewards success, and therefore those projects likely to generate future tax revenue. Critics argue it means investors get a tax benefit when they do not need help, and are penalised for supporting unsuccessful ventures. The scheme may therefore do little to encourage risk-taking. A recent study suggests:

> One reform that could be considered is to allow investors … to benefit from either full or partial deductions and/or capital losses on the disposal of unsuccessful investments. The obvious concern with implementing such a reform is its cost …. [and] there is simply no reliable data as to what extent the denial of [more generous tax treatment] of losses is an important concern to potential investors.[53]

5.68 Countries such as the United States and Canada have schemes that provide tax concessions for both gains and losses.

5.69 The Australian schemes are also quite complex which may deter, or at least delay, investors. A recent report comments 'it will take some time for the VCLP program to be widely understood'.[54]

5.70 Even an expert in the field concedes the number of schemes creates unnecessary confusion:

> You should call these things by the right name and perhaps merge the programs into one program so that you do not have a million different programs operating, because people just do not understand different titles. ESVCLP does not roll off the tongue.[55]

Venture capital and superannuation funds

5.71 Australians are investing heavily in superannuation. There do not appear to be any regulatory hurdles to superannuation funds investing in venture capital funds. As superannuation funds have long-term liabilities and very

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'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, Exhibit *no. 35*, p. 33.

53 S Barkoczy et al, 'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, *Exhibit no. 35,* pp. 189-90.

54 S Barkoczy et al, 'Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits,' 2006, *Exhibit no. 35,* p. 78.

55 Associate Prof. S Barkoczy, *Transcript*, 15 March 2007, p. 41.

large portfolios, they would seem a good source of funding for venture capital funds. But while they provide about half of the venture capital funds, this is only a tiny proportion of superannuation fund assets.

5.72 The reason for the limited involvement of superannuation funds in venture capital is not clear. It may just be that the returns offered by venture capital are inadequate, or it may be that superannuation fund managers are being unduly 'conservative' in their investment practices.

Conclusions

5.73 Nanotechnology offers great scope for both improving traditional manufacturing processes and developing new manufacturing industries.

5.74 The Australian Synchrotron is an important facility for nanotechnology (and has broader uses). It will bring national benefits. It is noted that around the world, synchrotrons are substantially funded by governments, partly due to their high cost and use in basic research. It is important that the synchrotron be placed on a sound financial footing.

Recommendation 7

5.75 **The committee recommends that the Australian Government commits to annual direct funding of the Australian Synchrotron given its importance to manufacturing innovation through cutting-edge research.**

5.76 There may be other facilities like the synchrotron, too large for any individual company to fund but of great value to researchers and manufacturers. CSIRO should inform the government of any such projects which could be considered for funding support.

5.77 Biotechnology and green technologies are other important areas with potential for developing innovative manufacturing industries. They should continue to be supported by government.

5.78 The committee notes claims that innovative manufacturing is being held back by an underdeveloped venture capital market in Australia, meaning that viable projects are not being funded. However, on the information

currently publicly available, it is hard to assess this. More information is therefore required.

5.79 In addition, it notes claims that superannuation funds are unduly conservative towards investing in venture capital funds. However, the committee does not believe that superannuation funds should be directed where to invest.

Recommendation 8

5.80 **The committee recommends that the Australian Bureau of Statistics, in conjunction with the Australian Taxation Office and the Department of Industry, Tourism and Resources, improve the available data on venture capital, including by distinguishing better between venture capital and other forms of private equity, and compiling performance data.**

Recommendation 9

5.81 **The committee recommends that an inter-departmental working party, headed by the Department of the Prime Minister and Cabinet, report publicly on the issue of whether there are market failures hindering the development of the venture capital industry. The report of, and submissions received by, the Venture Capital Industry Review, should be made available to this working party and be allowed to be cited in their report.**

5.82 If, in the light of further study, it is concluded that the venture capital market is unduly limited in Australia, it would be worth examining the available tax concessions. These appear to 'reward' successful investors and 'punish' the unsuccessful, which may be reinforcing rather than offsetting any tendency towards investors being unduly risk averse.

Recommendation 10

5.83 **The committee recommends that the Department of Industry, Tourism and Resources and the Treasury prepare a paper outlining the implications, including cost, of allowing participants in the Venture Capital Limited Partnership and Early Stage Venture Capital Limited Partnership schemes to deduct losses in these schemes against other income.**

5.84 Regardless of whether substantial changes are deemed necessary to the venture capital tax concessions, the existing schemes are unduly complicated and lack criteria for judging their success.

Recommendation 11

5.85 **The committee recommends that the venture capital tax concession schemes—such as the Venture Capital Limited Partnership scheme and the Early Stage Venture Capital Limited Partnership scheme—be merged and simplified, and clear objectives set.**

5.86 Another possible impediment to new companies accessing venture capital is a lack of knowledge about how and where to obtain it. The nascent Australian Industry Productivity Centres could play a role here.

Recommendation 12

5.87 **The committee recommends that the Australian Industry Productivity Centres ensure they have adequate information about venture capital funds to assist new manufacturers in accessing this source of funding.**

6

Manufacturing careers and training

Introduction

6.1 There is good and bad news with regards to careers, training and employment in the Australian manufacturing sector. While there is plenty of opportunity for Australians to develop diverse careers in this developing sector, there is little desire on the part of young people, in particular, to do so. This is largely due to the wide range of other employment opportunities available in the current economic conditions and poor community attitudes towards the industry.

Employment options and opportunities in the manufacturing sector

6.2 There are a growing number of opportunities for employment in the manufacturing sector—as lines are blurring between some industries within the manufacturing and services sectors and the science/innovation field. This considerably broadens the scope of employment in the industry.

6.3 Manufacturing today employs a wide range of capabilities and qualifications. Not only are technical and research skills required but increasingly, sophisticated logistics and marketing skills as well.

6.4 The industry employs the semi-skilled, trade and university qualified and is seeing a steady rise in university qualified technicians and scientists at the development end.

The skills shortage

6.5 Careers and employment in the manufacturing sector operate within the wider context of an Australian skills shortage, in which demand for skilled labour outstrips supply.[1]

6.6 Of all the factors affecting production, the March 2007 quarter issue of the *Survey of Australian Manufacturing* reported 'labour shortages were the largest drag on production.'[2]

6.7 The Victorian Government submission claims 'one in two manufacturing companies experience difficulties in obtaining skilled labour' and it cites electricians, engineers, mechanics, welders, plant managers and sheet metal workers as being highly sought after.[3] The Treasury Autumn 2007 *Economic Roundup* confirms this view in results from business liaison:

> Skill shortages are particularly viewed as a problem ... by companies with workers such as engineers and electricians whose skills are readily transferable to the mining sector.[4]

6.8 The Department of Education, Science and Training (DEST) note in their submission that the national priorities of the *Commonwealth–State/Territory Agreement for Skilling Australia's Workforce* include addressing skills shortages 'in traditional trades and in emerging industries.'[5] The submission also highlights the particular skills shortages experienced in regional areas and how the Targeting Skills Needs in Regions programme is focussing on addressing this problem in 'regions of strategic economic importance.'[6]

6.9 The skills shortage is compounded by new technologies that demand increased and diversified skill sets from manufacturing workers. Furthermore, the greatest barrier to innovation being undertaken in Australian innovating businesses is a lack of skilled staff.[7] This impediment affects the manufacturing sector disproportionately; it being the most innovative of sectors.

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1 The skills shortage has been recognised by the Australian Government in a range of initiatives since the late 1990s—including the national skills shortage strategy established in 1999.

2 Australian Industry Group and PricewaterhouseCoopers, *Survey of Australian Manufacturing*: *March Quarter 2007*, Sydney, p. 4.

3 Victorian Government, *Submission no. 40*, p. 12.

4 The Treasury, *Economic Roundup: Autumn 2007,* Canberra, 14 June 2007, p. 72.

5 Department of Education, Science and Training (DEST), *Submission no. 49*, p. 3.

6 DEST, *Submission no. 49*, p. 13.

7 Australian Bureau of Statistics, *Innovation in Australian Business*, cat. no. 8158.0, ABS, Canberra, 2007, p. 25.

6.10 The February 2006 COAG communiqué on *A New National Approach to Apprenticeships, Training and Skills Recognition* identified the 'growing need for higher level skills' as an area requiring further reform in Australia.[8] Similarly, the Australian Industry Group (Ai Group) has reported that a higher level, broader range and more frequently updated set of skills is required by the manufacturing sector.[9]

An image problem for manufacturing

6.11 At a time when new and existing skills are in high demand, manufacturing careers are not. While the industry has moved on from the 'dark satanic mills' of centuries ago, the community still sees manufacturing as a 'dirty' or diminishing industry. This makes recruitment of new workforce participants and workers from other fields/sectors who are prepared to retrain, a challenge. This backdrop may also deter those already in manufacturing from up-skilling. The poor perception of the sector is exacerbated by reports of declining employment trends which do not consider the dynamism of the sector nor the emerging work opportunities.[10] The Victorian Government noted:

> The perception of manufacturing remains outdated and unfortunately unattractive. The resultant effects of the poor image include difficulties in recruiting fresh talent, in obtaining finance for growth and in carrying weight in national policy development.[11]

6.12 There is anecdotal evidence that parents and teachers discourage young people from jobs in manufacturing because they think the industry is moving offshore, in demise and holds little career prospects—as Mr Brett Manwaring, chief financial officer of regional Victorian textiles company, Bruck Textiles, noted:

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8 Council of Australian Governments, Communiqué, 10 February 2006, as viewed 15 May 2007, <http://www.coag.org.au/meetings/100206/index.htm>.

9 Australian Industry Group, *World Class Skills for World Class Industries*, May 2006.

10 Department of Workforce and Employment Relations, *Australian Jobs 2007*, DEWR, Canberra, June 2007, p. 15, viewed 27 June 2007, <http://www.workplace.gov.au/NR/rdonlyres/00DD2708-97DA-47AF-8A7A-15F12196C447/0/AustralianJobs2007Workplace.pdf>. The report cited a projected overall decline in manufacturing employment of 33 600 jobs over the next five years. This projection, based on trends of the last 20 years, was subsequently reported in Adrian Rollins, 'Manufacturing work shrinks', *The Australian Financial Review*, 19 June 2007, p. 6.

11 Victorian Government, *Submission No. 40*, p. 13.

> Fifteen years ago, if you were in Wangaratta you were told, 'If you do well at school you'll get a job at Bruck.' It has changed to: 'If you don't do well at school, you'll get a job at Bruck.'[12]

6.13 There is a role for both government and industry to promote to the broader community the genuine opportunities and career pathways available in the manufacturing industry. Mr Paul Laver, vice president of the Australian Academy of Technological Sciences and Engineering (AATSE) told the committee:

> I think they [parents and teachers] have to start telling them [students] that you put up with hell while you do your four years as an apprentice, but within a couple of years of that, if you wanted to live outside a capital city, you could probably be up in the $80,000 to $100,000 range quite easily.[13]

6.14 The UK Government has championed manufacturing through its Manufacturing Strategy (2002 & 2004) focusing on industry's metamorphosis from antiquated factories and repetitive shop floors to sustainability, clean production lines and cutting edge scientific research—this is a good working model for Australian governments to follow.[14]

6.15 Similarly, the Victorian Government's 2003 Manufacturing Policy, *Agenda for New Manufacturers*, challenges manufacturers (among other things) to:

- 'highlight manufacturing's links to industrial design, biotechnology, information technology and the services sector.
- contribute to the marketing and public information efforts of industry bodies; and
- encourage graduates to apply for rewarding manufacturing careers and make them feel welcome when they are successful.'[15]

6.16 At an anecdotal level, young people respond positively to information about the sector. Mr Manwaring continued:

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12 Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, p. 14.

13 Mr P Laver, Australian Academy of Technological Sciences and Engineering (AATSE), *Transcript*, 28 August 2006, p. 48.

14 Department of Tourism and Industry, *Review of the Government's Manufacturing Strategy – Competing in the Global Economy, the Manufacturing Strategy Two Years On*, as viewed 22 May 2007, <http://www.dti.gov.uk/files/file18188.pdf>.

15 Victorian Government, *Agenda for New Manufacturing 2003*, p. 11, as viewed 22 May 2007, <http://www.business.vic.gov.au/busvicwr/_assets/main/lib60015/agendanewmanufacturing03.pdf>.

> When we actually go to them [students] and show them the opportunities that are there, they are just blown away.[16]

Occupational Health and Safety

6.17 While Chapter 3 discusses the regulatory burden that occupational health and safety (OH&S) places on manufacturers, poor perceptions of OH&S in manufacturing also have a detrimental effect on its image as a viable career option. The National OH&S Strategy 2002–2012 identified manufacturing as one of the four priority target industries as a result of its high OH&S incidence rates and workers' compensation claims.[17]

6.18 In 2004–05, 28 770 manufacturing workers made compensation claims, accounting for 20 per cent of all workers' compensation claims where the employee was off work for one week or more. While the incidence rate of claims in the manufacturing industry has fallen from 40 claims per 1000 employees (1996–97) to 31 claims per 1000 employees (2003–04), it is almost twice as high as the overall rate for Australia, at 17 claims per 1000 employees and is the second highest of all industries.[18]

6.19 Additional concerns have been raised about the unknown health implications of working with new technologies, such as nanotechnology.[19]

6.20 The 2006 National Industry Skills Report notes that some industries (not specifically manufacturing) need to proactively counter public perceptions about safety records in order to attract workers.[20] Harmonised national OH&S standards would assist with this.

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16 Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, p. 14.

17 Australian Safety and Compensation Commission, *National OH&S Strategy 2002–2012*, as viewed 25 May 2007, < http://www.ascc.gov.au/NR/rdonlyres/E8D707CF-9E69-4C61-A063-F04519170EF7/0/NationalOHSStrategy200212.pdf>.

18 Australian Safety and Compensation Commission, *Information Sheet: Manufacturing*, p. 1, as viewed 25 May 2007, < http://www.ascc.gov.au/NR/rdonlyres/8AE325C4-0C73-4317-A332-E3268ED22C2B/0/ASCCinfo_Manufacturing.pdf>.

19 Australian Safety and Compensation Commission, *A Review of the Potential OH&S Implications of Nanotechnology*, pp. 11-12, as viewed 25 May 2007, <http://www.ascc.gov.au/NR/rdonlyres/AC17BA49-8BA1-43B8-BC08-219DE53781E6/0/ASCCReviewOHSImplicationsNanotechnology2006.pdf>.

20 DEST, *National Industry Skills Report*, May 2006, p. 8.

Science and manufacturing

6.21 The National Manufacturing Summit noted in December 2005 that research, development and innovation skills 'are critical for the future growth and development of Australia's manufacturing sector.'[21]

6.22 Attracting and retaining people with science skills was similarly identified by Science Industry Australia (SIA) as a key challenge for the innovation industry, which is heavily reliant on human capital to create and maintain its competitive global advantage.

6.23 While Australia cannot feasibly keep up with the 600 000 engineers that China reports it graduates each year, or the 'PhD factories' of India, there is yet to be a concerted and serious response to up-skilling the pool of Australia's scientific expertise.[22]

6.24 A May 2007 report by the Australian Centre for Education Research found that there is a 'crisis' in science education in Australia. Australian students are registering low and decreasing levels of interest in science, in part, because it is not presented as relevant to their lives. Students also have little understanding of what a career in science could hold for them:

> The dominant mode of school and tertiary science has somehow got out of kilter with the needs and interests of contemporary society and contemporary youth.[23]

6.25 AATSE noted that substandard science teaching at school has a flow on effect for future Australian students and teachers, as well as industry:

> Science literacy in primary schools is abysmal and as a consequence kids are not being excited by science. We are getting into a situation where it is becoming a self-perpetuating wheel, because the fewer the kids that are getting interested in science the fewer the good science teachers that we are going to have to teach the next generation. [24]

6.26 The inquiry heard evidence that Australia's edge in fields such as biotechnology is under threat from economies that are investing more heavily in science teaching. Taiwan was cited as an example:

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21 National Manufacturing Summit, Skills for Our Manufacturing Future, Background Paper, *Exhibit no. 24,* December 2005, p. 11.

22 M Blackman, *the Age*, 'Education Failures Hold China Back,' 28 February 2007.

23 Prof. R Tytler, Australian Education Review 51, *Re-imagining Science Education: Engaging students in science for Australia's future*, 15 May 2007, p. 67.

24 Mr P Laver, AATSE, *Transcript*, 28 August 2006, p. 43.

> The [Taiwanese] National Science Council actually sponsors a program on nanotechnology for kids from kindergarten to year 12, so kids in primary school are learning about nanotechnology. We [Australia] cannot get teachers who can teach kids about electricity or gravity, but here are the Taiwanese teaching primary school kids about nanotechnology.[25]

6.27 Senior high school and university enrolments in science courses have dropped. From 1978 to 2002, Year 12 biology enrolments fell from 55 per cent to just over 20 per cent, chemistry enrolments from 30 per cent to 15 per cent, and physics enrolments from 27 per cent to 12 per cent. The number of university students enrolled in physical and materials sciences fell by over 31 per cent between 1989 and 2002.[26]

6.28 SIA observed that science graduates are well-schooled in theory, but have not had adequate practical training:

> Our issue is generally not one of knowledge, because when our people come out of a science degree they have the knowledge, they just don't have the skill.[27]

6.29 A further issue with some graduates and skilled migrants in the science/technology area is their poor English and verbal communication skills, which can serve to make them 'unemployable.'[28]

6.30 There are government initiatives addressing issues around curricula and communications skills. The committee notes that DEST received $13 million over two years in the 2007–08 Budget to work with states and territories to develop core curricula standards in subjects that include maths, physics, chemistry and biology for Years 11 and 12 and maths and science for Year 10. This follows the recent commitment made by governments at the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) to develop nationally-consistent curricula for English, maths and science. Furthermore, the Government announced $67 million over four years to continue the Workplace English Language and Literacy Programme in the 2007–08 Budget, to fund organisations to train workers in English language, literacy and numeracy.

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25 Mr P Laver, AATSE, *Transcript*, 28 August 2006, p. 43.

26 Prof. R Tytler, Australian Education Review 51, *Re-imagining Science Education: Engaging students in science for Australia's future*, 15 May 2007, p. 13.

27 Dr J Gonis, Science Industry Association (SIA), *Transcript*, 2 March 2007, p. 14.

28 SIA, *Submission no. 7*, p. 8.

Conclusions

6.31 The committee concludes that the manufacturing sector is evolving into a complex industry that is not simply concerned with 'making things' but also innovation, research and high-technology. This provides a multitude of employment opportunities for workers of all ages and stages.

6.32 These opportunities are balanced with the 'double-edged sword' of a shortage of manufacturing skills at a time when new technologies demand new and improved skill levels, which are more regularly updated.

6.33 The committee concludes that skills shortages are being experienced in some areas of manufacturing where skill-sets are transferable to the mining sector. In addition, difficulties in attracting new employees to fill skills shortages in manufacturing are exacerbated by the sector's poor public image—working in manufacturing is not seen as a viable career by many prospective employees. The community perceive it as an unsafe, dirty and diminishing industry that holds little career prospects. Whilst the committee recognises that some industries of this ilk remain, there may be insufficient community awareness of the many manufacturers offering attractive and increasingly interesting working environments.

6.34 Targeted, government-initiated communications campaigns are required to address these misconceptions, promoting the opportunities available in the manufacturing sector—for employees with diverse skill levels—and countering claims that the sector is moving offshore and that working environments are unpleasant.

6.35 Good quality science education is critical for the future growth and development of Australia's innovation and manufacturing sectors. It is of great concern, therefore, that science education is experiencing a decline in Australia—in terms of secondary and tertiary student uptake, quality of teaching and relevance of curricula.

6.36 The committee notes the importance of practical and interesting (not just 'core') primary and secondary curricula that engage students, equip them with up-to-date science and mathematics skills, and encourage the pursuit of science and innovation related careers. However, such curricula must be backed by adequate resources and appropriate teacher training.

6.37 The committee heard concerns that the university environment is not vocationally oriented. The committee concluded that the workplace is the best environment in which to learn vocational skills using the knowledge acquired at university. The value of a theoretical and broad-based learning platform at the university level should not be underestimated. It enables graduates to innovatively apply broad knowledge in a practical

environment, rather than merely accepting conventional wisdom. Australia needs science and technology graduates who 'think outside the square'.

Recommendation 13

6.38 **The committee recommends that the manufacturing industry, with the support of the Australian Government, develop a coordinated communications strategy for promoting the career opportunities in manufacturing, especially in innovative, knowledge based manufacture.**

Recommendation 14

6.39 **The committee recommends that the Ministerial Council on Education, Employment, Training and Youth Affairs consider the necessary resources provision and teacher training needs to introduce updated primary and secondary school science curricula with a focus on practical and up-to-date information about emerging technologies.**

Keeping skilled labour

An exodus from manufacturing to resources?

6.40 A strong manufacturing industry in terms of human capital is comprised of a tertiary educated workforce in combination with technicians, trainees and apprentices.

6.41 The committee heard anecdotal evidence that valuable skilled labour is being lost to the mining industry where more attractive salaries are being offered. Comparable skill sets in these industries mean that cross-poaching can occur in some areas. The Department of Industry, Tourism and Resources (DITR) noted in their submission that skills shortages in the mining sector for mechanical fitters, electrical tradespeople and

boilermakers could be filled by transfers from manufacturing.[29] However, DITR also note that this shift constitutes only a very small proportion of total manufacturing employment.

6.42 There is little evidence that this movement is occurring in the high-tech manufacturing areas, however, at the lower skill levels there has been some movement and the committee's concurrent inquiry into Australia's services export sector heard similar information with respect to the services industry.

6.43 There may be opportunities to attract drought-affected farmers and rural workers to manufacturing in regional areas, as they frequently possess a variety of applicable skills, as TAFE NSW noted:

> One of the things we are looking at is the ability to engage people who are coming off the farms … We are looking at ways in which we can recognise their existing skills and perhaps help them into a qualification which will make them employable ... As you will be well aware, people who work in rural environments are often multiskilled and multitalented.[30]

An exodus to other sectors?

6.44 Of greater concern is the phenomenon of workers 'going off their tools' and being attracted by higher salaries and better conditions in other industries or sectors, such as engineering, geology or merchant banking.

6.45 This is also evidenced in the loss of teaching expertise, particularly in the Vocational Education and Training (VET) system. Despite some professional loading, the salaries for trained technicians and professionals are far greater in industry than in the education system, making it difficult to gain and retain high quality teaching staff. Dr Julie Wells, director of policy and planning at RMIT University, discussed the issue:

> The fact that skills shortages mean people can command quite high salaries in the trades also poses particular problems for training providers, because the salaries that we pay our staff are often not comparable with what they can earn in the industry sector, despite the fact that we will offer industry loadings. It is a double-edged sword, I think, for skills acquisition.[31]

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29 Department of Industry, Tourism and Resources, *Submission no. 31*, p. 25.

30 Mr K Fillingham, TAFE NSW, *Transcript*, 14 November 2006, p. 12.

31 Dr J Wells, RMIT University, *Transcript*, 28 August 2006, p. 25.

Demographic pressures

6.46 The manufacturing industry is set to lose an increasing and disproportionate number of retiring workers over the next decade. The industry has a top-heavy structure in terms of age: 15 to 24 year-olds make up 14 per cent of the manufacturing workforce, while 55 to 64 year-olds make up 51 per cent. [32]

6.47 When older workers retire as part of the 'baby boomer bubble', labour as well as skills will be lost from the industry if they are not refreshed by younger workers. Mr Manwaring noted some employees had worked in his textiles company for 40 years.[33] This was also noted by Dr Wells:

> Our population is ageing and we are having to focus on engaging young people who have perhaps fallen out of the education system and also on the need for workers at the other end to stay in the workforce and reskill and upskill, but we are surrounded by countries where the demographics are reversed.[34]

6.48 The impact of the bubble bursting could be softened by maintaining older workers, through part time or flexible hours and harnessing their expertise in teaching and mentoring roles.[35]

6.49 Compensating for the changing demography of the manufacturing workforce should also involve targeting more mature workers (not simply those straight out of high-school), with good salaries and accelerated training.

6.50 Mr Nixon Apple, industry and investment policy advisor with the Australian Council of Train Unions, had a more positive perspective on the ageing population—as one creating opportunity for younger manufacturers to reposition Australian firms in the global market:

> One of the great things about the ageing of the population is that you are going to have a huge turnover in the people who currently own and run small manufacturing businesses in Australia. This generational change offers a huge opportunity.[36]

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32 This 'top-heaviness' is slightly more pronounced than in the total workforce where 15 to 24 year-olds make up 18 per cent and 55 to 64 year-olds make up 47 per cent of the total workforce: National Manufacturing Summit, Background Paper: Skills for our manufacturing future, *Exhibit no. 24*, December 2005, p. 5.

33 Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, p. 13.

34 Dr J Wells, RMIT University, *Transcript*, 28 August 2006, p. 23.

35 National Manufacturing Summit, Background Paper: Skills for our manufacturing future, December 2005, *Exhibit no. 24*, p. 10.

36 Mr N Apple, Australian Council of Trade Unions, *Transcript 22 November 2006*, p. 15.

Skilled migration

6.51 A thorough investigation into increased skilled migration was outside the parameters of the inquiry, and indeed there was little substantive discussion of the issue in evidence presented to the committee. However, it is one possible means of addressing skills shortages in Australian manufacturing.[37]

6.52 Skilled migration is an official component of Australia's migration policy, with both Commonwealth and state programmes in place to attract skilled migrants.

6.53 At the Commonwealth level, the skills stream is designed for migrants with 'skills or outstanding abilities that will contribute to the Australian economy'. According to the Department of Immigration and Citizenship:

- In 2005-06 the skill stream represented approximately 68 per cent of the Migration Programme, up from 65 per cent in 2004–05;
- In 2005-06, the outcome in the State Specific and Regional Migration initiatives was increased by 47 per cent on 2004–05 to 27 490; and
- The skill stream planning level for 2006–07 is the same as 2005–06.[38]

Conclusions

6.54 The committee believes that strategies to improve careers and skills in the manufacturing industry should address existing workers as well as prospective ones—university educated personnel are indeed a vital component of the industry, but so too are technicians, trainees and apprentices.

6.55 It is of concern that the manufacturing sector is losing employees in several key cohorts. While the committee heard evidence that manufacturing workers are being lost to the mining industry, this trend is currently only affecting a small proportion of total manufacturing employment. Of greater concern are the skills that are being lost as the baby boomers, and the generation prior to them, retire. In particular, vocational training skills are being lost in this way and also to the higher salaries offered in industry.

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37 The Joint Standing Committee on Migration published a report *Review of Skilled Migration* in 2004.

38 Department of Immigration and Citizenship, *Overview of Skilled Migration to Australia*, as viewed 22 May 2007, <http://www.immi.gov.au/media/fact-sheets/24overview_skilled.htm>.

6.56 The committee concludes that creative and adaptive approaches need to be taken to maintain workers and attract new sectors of the workforce to manufacturing. Older workers in particular, should not be cast aside as they reach retirement age. Rather, they should be encouraged to keep a foot in the industry's door, through measures such as flexible working hours and harnessing their skills in teaching or mentoring roles.

6.57 Mature workers and ex-farm workers were also identified by the committee as groups that may have compatible skill sets for manufacturing and who could be attracted to the manufacturing industry with good salaries and re-training opportunities.

6.58 The committee notes that skilled migration is a significant and growing component of Australia's migration programme. It is also one means of addressing skills shortages in manufacturing, in the short-term, both with respect to undersupplied and lapsed skill areas.

The skills gap

6.59 Just as there is a skills shortage within the manufacturing industry, so too is there a 'skills gap'. Existing workers do not necessarily have the right skills to perform the tasks required of them as a result of changing technological demands.[39]

6.60 Many employees in the manufacturing industry have been trained to perform a particular skill or narrow set of competencies. Tailored training is now possible through many state and territory TAFEs and is a good mechanism to fill skill shortages at short notice.

6.61 However, this emphasis on job-specific skills means that training and skill-sets are not easily transferable across the industry and exacerbate the notion that manufacturing is a 'dead end' career.

6.62 There are also many people employed in the manufacturing sector who have sophisticated skills, despite lacking a formal qualification. Again this limits their mobility in the manufacturing sector. Mr Kimble Fillingham, general manager, TAFE business, TAFE NSW noted:

> Many of the people in the manufacturing sector are highly skilled, although they do not have a piece of paper.[40]

39 Australian Chamber of Commerce and Industry (ACCI), *Submission no. 33*, p. 32.

40 Mr K Fillingham, TAFE NSW, *Transcript*, 14 November 2006, p. 12.

6.63 One answer to this issue is the development of new paraprofessional qualifications such as associate diplomas which 'reduce training time and enable professional recognition for technicians.'[41]

6.64 Another answer is 'recognition of prior learning'—an existing government strategy for minimising superfluous training of already-skilled but un-qualified workers, attracting funding and Commonwealth-State partnerships under the February 2006 COAG reform agenda.[42]

6.65 Similarly, the *Skilling the Existing Workforce* project is an Australian Government initiative aimed at skilling the adult population without post-school qualifications. Led by Ai Group, the project is aimed at blending formal and informal learning and tailoring training to the specific adult audience and is currently at the consultation stage, due for completion in 2008.[43]

Vocational Education and Training – skilling new and older workers

6.66 The vocational education and training (VET) sector provides for non-university, post-school learning in technical skills and trades. The Australian Government is solely responsible for funding the higher education sector and has a leadership/funding role for schools and vocational education and training, largely via partnerships between Commonwealth and state governments.

6.67 According to DEST's *Annual National Report of the Australian Vocational and Technical Education System 2005*, there is a national network of over 4 000 public and private national registered training providers. Over 1.6 million Australians—from a variety of career stages—participate in VET each year.[44]

6.68 The *2004-08 Commonwealth State Agreement for Skilling Australia's Workforce* established government funding and accountability arrangements for the system, which is based upon industry-defined competency standards, assessment guidelines, qualifications and support materials. Addressing skill shortages, especially in traditional trades and emerging industries

41 RMIT University, *Submission no. 5*, p. 5.

42 DEST, *Submission no. 49*, p. 5.

43 DEST, *Submission no. 49*, p. 6.

44 DEST, *Annual National Report of the Australian Vocational and Technical Education System*, 2005, p. 12.

and increasing participation and up-skilling of mature workers are among the priorities of the training system.[45]

6.69 As outlined in the DEST Submission, there are a wide range of government training and funding initiatives underway that address (either as a whole or in part) the skills shortage in Australia and career opportunities for those in the manufacturing industry at the school, TAFE and industry level. These include Australian Technical Colleges, Industry Skills Councils, group training schemes, *Backing Australia's Ability*, the *National Skills Shortages Strategy* and February 2006 COAG Agenda.

6.70 Under the *Realising their Potential* package, the 2007–08 Budget recently provided $343 million to DEST over four years for tax-exempt wage top-ups of $1000 per annum for first and second year apprentices in skills shortage trades and $206 million over four years to provide first and second year apprentices with $500 vouchers to reimburse course fees. The Government also announced that it would extend FEE-HELP to full-fee paying students in diploma and advanced diploma courses that are accredited as VET qualifications and provide $59 million over four years to Registered Training Organisations to partner with industry and local employers to implement fast-track, competency-based apprenticeships.

Developments in the VET system

6.71 Employees in the manufacturing sector are trained in a variety of ways, including: on-the-job; on-the-job and via formal in-house training; and a mix of on-the-job, formal in-house-training and general trade training at state or territory TAFE institutions.

6.72 Most Australian Apprenticeships are four years duration and in the traditional realm cover areas such as electrical, automotive, engineering and manufacturing. Completion of an apprenticeship or traineeship provides the employee with a trade qualification which is recognised throughout Australia.

6.73 There are currently approximately 400 000 apprentices in training in Australia.[46] According to the National Centre for Vocational Education Research, in the year ending 30 September 2006, commencements of apprenticeships and traineeships increased by one per cent on the

45 DEST, *Annual National Report of the Australian Vocational and Technical Education System*, 2005, pp. 12-13.

46 DEST, *Australian Apprentices*, <http://www.australianapprentices. gov.au>, viewed 25 May 2007.

previous year; completions increased by three per cent; and withdrawals increased by three per cent.[47]

6.74 Group training schemes were initially introduced for the building and construction trades where volatility in the industry makes it more difficult for an apprentice to be maintained by one employer for the life of their apprenticeship. This approach was later rolled out into other trade environments including manufacturing trades.

6.75 There are in excess of 150 group training organisations operating throughout Australia. Apprentices and trainees are employed by a group training organisation which receives government funding and payments from host employers.[48] The group training provider ensures an apprentice undertakes a trade course and is placed in a host environment conducive to learning the trade. In many cases the apprentice will be placed with one host employer for the length of their apprenticeship. Should a host be unable to support the apprentice's work, or where they have a narrow industry field, the group employer provides the opportunity for the apprentice to complete their full apprenticeship with other host employers. Such arrangements are most called for in small-scale manufacturing environments.

6.76 The importance of collaboration between TAFE and group training providers was noted by a committee member at an inquiry hearing:

> I know the value of industry focused local solutions and local collaborations of TAFE and group training companies, supported by industry...[49]

6.77 State and territory TAFEs are the traditional link between manufacturers and employee training schemes. However, the relationship between TAFEs and employees is now in a state of flux—some apprenticeship training may now be delivered entirely in the work place, with involvement from TAFE, and tailored to meet the needs of employers.

6.78 During site visits, the committee heard of the difficulties some apprentices have in accessing appropriate training at a nearby TAFE—needing to

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47 National Centre for Vocational Education Research, *Apprentices and trainees – September quarter 2006, Summary*, viewed 22 May 2007, <http://www.ncver.edu.au/statistics/aats/quarter/sept2006/highlights.html>.

48 Matched government funding under the Joint Group Training programme is only available to group training organisations that meet the *National Standards for Group Training Organisations*. The scheme totals approximately $20 million per year.

49 Ms S Grierson MP, *Transcript*, 29 August 2006, p. 5.

travel long distances (from regional to metropolitan areas), due in part to a lack of teaching resources in specific subject areas.[50]

6.79 The traditional apprenticeship is also facing the challenge of Generation Y career needs/wants. That is, to keep pace with changing technology and to be more flexible in terms of commitment to a particular job or workplace. In light of this, the four year apprenticeship period is too long, locking the worker into a lower pay scale for a set period, and can also act as a deterrent for mature (existing) workers to become trade skilled. The Australian Chamber of Commerce and Industry noted:

> They [Generation Y] do not necessarily expect to remain in the one occupation or with the one employer for extended periods of time.[51]

6.80 A further challenge for education providers is the high level of sophistication needed in terms of training equipment—often beyond the funding constraints of TAFEs.

6.81 TAFE NSW has devised a practical solution to this equipment/training issue, wherein a number of TAFE institutes have formed working relationships with industry to provide in-house training in manufacturing workplaces. One example of this was the partnership formed with precision manufacturing company Broens Pty Ltd. TAFE teachers utilise Broens' advanced, costly machinery to tailor workplace-specific training for its trade course. These arrangements mean trainers are kept up-to-date with the latest equipment and ensure that elementary trade skills, as well as job-specific skills are maintained.[52]

6.82 TAFE NSW is successfully working with industry in this way across a number of regional institutions. It is a model that could be further developed in TAFE institutions nationally.

The role of industry

6.83 A common criticism from industry is that vocational training systems are out of date, too slow and not tailored to the skills required in the workplace. As a corollary of this, there is a reported reluctance in some industry sectors to take on apprentices or lower-skilled workers, because industry may not realise the benefits quickly enough, or at all—if

50 For example, toolmaking is now only offered at one TAFE NSW campus.

51 ACCI, *Submission no. 33*, p. 34.

52 Mr K Fillingham, TAFE NSW, *Transcript*, 14 November 2006, pp. 4-5.

employees change jobs. This has obvious implications for the skill levels of an industry in need of skilled employees.

6.84 A recent article in the *Australian* detailed the perils of training and upskilling employees with the example of SJ Cheesman, a small-scale engineering parts manufacturer in Port Pirie, South Australia. The company employed six former abattoir workers and trained them in health, safety, metal grinding and oxygen torches. After six months, four workers left. Managing director, Mr Richter noted:

> Other bastards have come along and poached them.[53]

6.85 Evidence presented to the inquiry suggested that information about apprenticeships and the VET system can be so complex as to discourage potential employers making use of these resources.[54]

6.86 There was also a reported reluctance in industry to train existing employees. Given the shortage of workers, downtime for training was not seen as practicable, as Mr Manwaring argued:

> Investment in training is just as important as investment in machinery or new products. If you look at tax regimes, a 125 per cent tax deduction for R&D is all well and good but if you are not investing in people, R&D is not going to do anything.[55]

6.87 Flexibility in terms of course schedules, and components of courses (i.e. cherry-picking) was seen as the key to attracting employers.

6.88 Several witnesses to the inquiry noted that overcoming the skills shortage would require active participation and commitment from industry, educators and individuals in 'three-way partnerships'—where industry actively informs the subject matter of VET, to ensure the relevance of the training.[56] Mr Fillingham from TAFE NSW noted:

> I think we need some way to encourage the manufacturing industry in particular and industry in general to want to take on people and to engage in training of their existing workforce as well as their new entrants.[57]

6.89 Despite criticisms of the current apprenticeship and trainee system survey research suggests that existing arrangements are working for many employers. A 2005 National Centre for Vocational Education Research

53 A Trounson, 'Manufacturers become Miners', *the Australian*, 27 January 2007, p. 34.

54 ACCI, *Submission no. 33*, p. 34.

55 Mr B Manwaring, Bruck Textiles, Pty Ltd, *Transcript*, 8 February 2007, p. 13.

56 Mr K Fillingham, TAFE NSW, *Transcript*, 14 November 2006, p. 13.

57 Mr K Fillingham, TAFE NSW, *Transcript*, 14 November 2006, p. 13.

report on employers' (not exclusively in the manufacturing sector) use of the VET system found that 57 per cent of surveyed employers' had had some engagement with the system in the previous twelve months. Of those:

- 79 per cent of employers with apprentices or trainees were satisfied; and
- 80 per cent of employers using other nationally recognised training were satisfied.[58]

Schools and VET

6.90 Beyond public relations campaigns about the value of a manufacturing career, practical options and incentives are available to interest and train school students in a vocation whilst they are still at school. RMIT described the 'taster' programmes they conducted for Year 10 school students, to bring them on campus and demonstrate training they may want to undertake.[59]

6.91 The Australian Government's *Adopt a School Programme* encourages local businesses to form mentor-type partnerships with schools in their area, providing advice on VET and apprenticeships. On a site visit, the committee encountered the scheme operating successfully with Inbye Mining Company in the Hunter Region of NSW.

6.92 TAFE NSW is brokering partnerships between industries and communities to facilitate creative training opportunities, such as a recent successful 'T3' programme in Sydney where Year 12 students spent half a day a week at TAFE, one day at a Toyota dealership and the rest on their school studies. Forty nine of the 52 students enrolled completed the programme and their Higher School Certificate.[60]

6.93 According to the DEST, over 90 per cent of Australian high schools have some form of vocational training available to students, via VET in schools courses or Australian School-based Apprenticeships.[61] These arrangements allow students to complete the highest level of secondary education whilst undertaking some vocational education. This may occur in specialist trade schools; in block release with TAFE or entirely at TAFE.

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58 National Centre for Vocational Education Research, *Employers' use and views of the VET system: Summary 2005*, as viewed 22 May 2007, <http://www.ncver.edu.au/statistics/surveys/seuv05/seuv05highlights.htm>.

59 Dr J Wells, RMIT University, *Transcript*, 28 August 2006, p. 21.

60 Mr K Fillingham, TAFE NSW, *Transcript*, 14 November 2006, pp. 8–9.

61 DEST, *Submission no. 49*, p. 8.

6.94 The federal government has recently formed 28 Australian Technical Colleges as specific colleges to provide school based VET education. These were designed to overcome skills shortages, particularly in regional areas and have recently received $84 million over five years for an additional three colleges in the 2007–08 Budget. With the first tranche of colleges only recently opened, it is premature to make an assessment of their impact at this stage.

Universities and manufacturing

6.95 As noted above, the change in manufacturing technology has lead to a high demand for technically skilled university qualified employees.

6.96 This requires a culture shift in perceptions about manufacturing as a career, such that university-educated technicians consider pursuing careers in professions that were once trade-dominated. According to the National Manufacturing Forum, in a perfect world:

> Young people [would] see manufacturing as an industry of many and varied career opportunities, good pay and the opportunity to work in the global economy.[62]

6.97 It is interesting to note that the manufacturing sector already has a relatively high intensity of engineers and scientists.[63]

6.98 A number of witnesses to the inquiry backed the Ai Group suggestion that science and engineering undergraduate degrees should be given HECS concessions (as is done for education and nursing degrees) to support students' entry into the manufacturing industry. Science Industry Australia noted:

> Designating science and engineering as national priority areas, exempt from HECS fee increases, in a similar way to nursing and education, would assist in encouraging students to take up science and engineering at university.[64]

6.99 However, its is not clear how effective this would be in switching students' preferences between degrees, given that HECS does not have to be paid until a certain level of income is reached. It is also questionable on equity grounds as, unlike nurses and teachers, science and engineering graduates are likely to go on to earn high salaries. There is also a risk to the overall

62 National Manufacturing Forum, Report, *Exhibit 22,* October 2006, p. 39, as viewed 16 May 2006, <http://www.business.nsw.gov.au/NR/rdonlyres/4E9FFF98-494A-44AD-BB8E-5D689ED6FD7C/0/NatManuf_forum_Final_report_200610.pdf>.

63 Productivity Commission, *Trends in Australian Manufacturing*, Canberra, August 2003, p. 79.

64 SIA, *Submission no. 7*, p. 8.

integrity of the HECS scheme if various fields of study are successively given concessions.

6.100 Away from the traditional degree-domains, dual-sector institutions, such as RMIT are providing industry skills 'through a mix of higher and vocational education'. The key to making such initiatives successful again is flexibility—accommodating working students in night time courses and facilitating accelerated courses, and industry relevance—working closely with industry to develop the training and skills required for the workplace.[65]

6.101 To be truly effective, educators, trainers and industry need to think in the long-term, beyond yearly enrolments, to pre-empt industry trends and thus student needs, rather than simply reacting to changes in the workplace as they occur.

6.102 In a similar way, any panic about a 'brain drain' of graduates needs to be viewed holistically. The focus should not be on discouraging graduates from working overseas, but attracting them back with their new skills and knowledge, as Dr Wells of RMIT University said:

> It is less a matter of a brain drain than a matter of a brain swirl that we are looking at with a globally mobile workforce. We should be less anxious about people moving offshore once they have completed a qualification to work and more concerned with how we draw them back and how we draw talent from offshore to work in Australia.[66]

6.103 Furthermore, as the House of Representatives Standing Committee on Science and Innovation noted in their June 2006 report *Pathways to Technological Innovation*, statistical data for years to 2003–04 suggest that 'losses of scientist and engineers through emigration have been offset through net gains through immigration'.[67]

Conclusions

6.104 The committee notes the need to up-skill existing employees to address the skills gap created by changing technologies and to enhance career pathways. This necessitates a focus on immobile workers, who do not have opportunity beyond the job they are currently doing. This includes those

65 RMIT University, *Submission no. 5*, p. 5; Dr J Wells, RMIT University, *Transcript*, 28 August 2006, p. 27.

66 Dr J Wells, RMIT University, *Transcript*, 28 August 2006, p. 27.

67 House of Representatives Standing Committee on Science and Innovation, *Pathways to Technical Innovation*, June 2006, p. 78.

who are highly skilled but unqualified and those who have very specific skill sets that are not easily transferable across industry.

6.105 The committee therefore endorses the development of paraprofessional qualifications and the recognition of prior learning strategy that reduce training time and give professional recognition to technicians.

6.106 VET training is evolving away from the traditional rigid four-year TAFE-based apprenticeship, to more flexible arrangements with schools, and industry employers. This is a much-needed evolution and the committee notes that apprentices and employees alike have expressed dissatisfaction with traditional models, which do not necessarily give apprentices the practical skills and training they require for the workplace.

6.107 The committee notes the importance of three-way training partnerships between individuals/schools, educators and industry. The success stories it heard in evidence involved TAFE brokering training partnerships with industry—to harness up-to-date equipment and to gain an understanding of skills that trainees require for the workplace. In addition, group training organisations should be mindful of exposing apprentices to technologically advanced equipment by ensuring a good spread of host employers are involved in the scheme. Training needs to be flexible—in terms of structure and schedule, to attract and maintain students of all ages.

6.108 The committee reinforces that industry commitment is a vital to the training of younger (and older workers). Training and development must be seen by industry as a priority even if it is a longer-term investment and temporary drain on resources.

6.109 The demand for university-qualified manufacturing workers created discussion about how best to encourage undergraduates into degrees that led to manufacturing careers. A number of witnesses to the inquiry supported the Ai Group suggestion that science, engineering and mathematics-based degrees be granted HECS concessions. However, the committee does not endorse the suggestion as it does not think that HECS is a disincentive (or suitable incentive) to one type of degree over another and could pose a risk to the integrity of the HECS system.

6.110 The committee encourages the moves by dual-sector institutions, such as RMIT, to provide a mix of university and vocational education. This is in keeping with calls for flexible, tailored approaches to educating prospective manufacturing workers.

6.111 Australia's 'brain drain' needs to be viewed in the long-term, with strategies developed to win expatriate graduates back to the Australian

workforce. It also needs to be viewed in the context of net gains through immigration.

6.112 The committee endorses the suite of existing government training and VET initiatives that are addressing manufacturing skills shortages and careers in a variety of contexts—such as the *National Skills Shortages Strategy*. However, with so many different programmes at the Commonwealth and state level, and ad-hoc arrangements between trainers and employees in place, it is difficult to ascertain an accurate overall picture. Further work in this area could focus on comprehensive audits of programmes, skill requirements and areas of genuine need.

Recommendation 15

6.113 **The committee recommends that post secondary vocational education providers continue to seek out opportunities to form training partnerships with companies that own costly state-of-the-art equipment—to give apprentices access to the latest technology and maintain the skills of TAFE trainers.**

7

Business engagement with researchers

7.1 Modern manufacturing must be driven by innovation, which often develops from pure research, mostly done by publicly funded research institutions. The main ones are the universities, which receive $5.8 billion from the Australian Government, and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) which receives $0.7 billion.[1]

CSIRO

7.2 CSIRO is Australia's national science agency.[2] Around $180 million of its $1 billion budget is directed towards activities related to manufacturing.[3] When it appeared before the committee, CSIRO had six research flagships geared towards issues of national importance.[4] The Australian Government's 2007 Industry Statement announced a new flagship is being established on Niche Manufacturing, particularly nanotechnology, at a cost of $36 million over four years from 2007-08.

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1 Budgeted amounts for 2007-08. A total of $0.2 billion is also allocated to fund the Australian Nuclear Science and Technology Organisation and the Australian Institute of Marine Science.

2 One of the world's largest research agencies, CSIRO has assisted the primary and manufacturing sectors since 1926. Its breakthroughs include atomic absorption spectroscopy, biological control of rabbits, gene shears, plastic banknotes and improved contact lenses.

3 Dr R Hill, CSIRO, *Transcript*, 22 March 2007, p. 1.

4 These flagship programmes (Energy Transformed, Food Futures, Light Metals, Preventative Health, Water for a Healthy Country and Wealth from Oceans) are described in CSIRO, *Submission no. 50*, pp. 15-18. New Climate Adaptation and Mining Down Under flagships were also announced in the 2007-08 Budget.

7.3 Most evidence accumulated by the committee was favourable towards the CSIRO's research capability, with the main area for improvement being liaison with companies for the commercialisation of the research.[5]

7.4 Research should be relevant as well as high quality. CSIRO told the committee that the majority of their research agenda is responding to industry requests or needs:

> It may not be industry coming to us directly, but our analysis of the market and opportunities and trying to anticipate where the end use will be or the impact. That drives what we do more than people sitting around in a back room with propellers on their heads thinking up great ideas that no-one can use. That may have been a legitimate criticism many years ago, but that has not been the case for many years in the CSIRO.[6]

7.5 Some of CSIRO's research is done directly for private companies and charged accordingly. Other projects are conducted jointly with them.

7.6 Of course, not all CSIRO research is, or should be, at the behest of business. An important part of CSIRO's work is undertaking research which has a longer time scale than that usually held by private companies and on 'areas that the general community and business have not yet identified as important'.[7] Furthermore, in some cases, CSIRO research conclusions may appear more credible if they are independently funded rather than funded by a company or industry.[8]

7.7 While a minority of witnesses were critical,[9] the committee heard of many examples of good cooperation between CSIRO, industry and other agencies. For example, Science Industry Australia (SIA) said:

> At times CSIRO assistance has been critical in helping SGE [a significant global supplier of chromatography components] learn new technologies. Sometimes this assistance has been in the form of specific development projects and just as importantly at other times has been through informal advice.[10]

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5 See, for example, Council of Textile and Fashion Industries of Australia Limited, *Submission no. 17*, p. 2. Praise also came from other textile manufacturers, such as the Australian Council of Wool Exporters and Processors, *Submission no. 22*, p. 8; the Geelong Manufacturing Council, S*ubmission no. 25*, p. 6; and Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, p. 16.

6 Dr R Hill, CSIRO, *Transcript*, 22 March 2007, p. 3.

7 CSIRO, *Submission no. 50*, p. 13.

8 CSIRO, *Submission no. 50*, p. 12.

9 Dr J Raff, Starpharma, stated 'There is far less collaboration going on now between organisations like CSIRO and the industry than there was', *Transcript*, 15 March 2007, p. 11.

10 Science Industry Australia (SIA), *Submission no. 7*, p. 16.

7.8 Although the majority of evidence suggested CSIRO had good relations with business, there is still more to do. An Australian Bureau of Statistics (ABS) survey showed that only three per cent of innovating businesses collaborate with a 'government agency' (presumably mostly CSIRO).[11]

7.9 SIA commented:

> Yesterday I went to the CSIRO and I found out about something I did not even know they were working on. It was actually going to be very valuable to me, and it was only through a conversation—a general one—that that came up. So that is an example.[12]

7.10 CSIRO itself referred to:

> Very strong feedback from industry that in many cases the last thing it needed was more technology. What they wanted was the ability to see how technology could impact upon their business … They want organisations like the CSIRO to open the doors more to their facilities and …[show] what they are doing and how they can help …. We obviously are not communicating well enough.[13]

7.11 The Industry Statement 2007 comments:

> Links between businesses and public research organisations can be weak … in many cases business and research cultures do not fit easily together.[14]

7.12 However, a number of groups commented that CSIRO was improving its communication. The National Manufacturing Forum (NMF) pointed out that:

> Steps are being taken by CSIRO to improve the way it engages with industry, particularly SMEs [small and medium enterprises], and leverage its extensive international networks to better advantage.[15]

7.13 CSIRO's desire to form close links with business was evidenced by;

- an internal audit of their operations in the past 18 months to ensure a more formalised approach to industry involvement.

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11 ABS, *Innovation in Australian Business 2005*, Cat. no. 8158.0, p. 28.

12 Dr H Fraval, SIA, *Transcript*, 2 March 2007, p. 6.

13 Dr R Hill, CSIRO, *Transcript*, 22 March 2007, p. 4.

14 *Industry Statement 2007*, p. 20.

15 NMF, 'Strategic actions to boost Australian manufacturing', *Exhibit, no. 22*, p. 25.

- 'roadshows' where industry is invited along for networking;[16]
- sector advisory committees which represent, in the case of manufacturing, typically CEOs from the manufacturing industry;
- six 'sector advisory councils', one of which is for manufacturing, chaired by an associate director from the Australian Industry Group.[17]
- meetings between the leaders of industry action agendas and CSIRO to explore how CSIRO can become even more heavily engaged;[18] and
- its 'Australian Growth Partnerships' proposal for contingent loans.[19]

7.14 The 2007 Industry Statement announced two initiatives to improve liaison. Firstly, one task of the new Australian Industry Productivity Centres will be connecting business with leading technology experts in CSIRO. Secondly, the Intermediary Access Programme will fund services to link up to 150 SMEs with possible technology partners including CSIRO.

7.15 CSIRO have 'spun off' 60 companies in the last ten years, such as Gene Shears[20], with a market capitalisation of around $1.3 billion in early 2007.[21] In some cases CSIRO staff work with the spin-off company, often on secondment, and sometimes through a services agreement with CSIRO.[22]

7.16 Some strong criticism of CSIRO's own commercialisation came from Dr John Raff, deputy chairman, Starpharma, who claimed CSIRO:

> Were given a mission to go out there and raise money and do their own commercialisation. As a result, they completely alienated, competed with and did all sorts of things to companies.[23]

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16 Mr G Redden, CSIRO, *Transcript*, 22 March 2007, p. 9 and CSIRO, *Submission no. 50*, pp. 3-4. Over three-quarters of attendees were more likely to collaborate with CSIRO after attending.

17 CSIRO, *Submission no. 50*, p. 5.

18 Mr G Redden, CSIRO, *Transcript*, 22 March 2007, p. 9.

19 The plan for HECS-like loans was submitted to the House of Representatives Standing Committee on Science and Innovation, who in their June 2006 report, *Pathways to Technological Innovation*, recommended the government give consideration to the proposal.

20 In 1986, CSIRO scientists Jim Haseloff and Wayne Gerlach found that they could create bits of genetic material, called 'hammerhead ribozymes' or 'gene shears' that could selectively cut out bits of unwanted or harmful DNA. These could be used to prevent DNA from a virus producing the protein causing symptoms of diseases. In 1989 Gene Shears Pty Ltd was formed by CSIRO to commercialise the technique. Among potential uses are fighting HIV/AIDS, minimising crop and livestock disease, therapy against genetically inherited diseases, and prevent scarring after angioplasty. Source: Questacon.

21 Dr R Hill, *Transcript,* 22 March 2007, p. 3; The spin-off companies are listed in CSIRO, *Submission no. 50*, pp. 7-9.

22 CSIRO, *Submission no. 50*, p. 19.

23 Dr J Raff, Starpharma, *Transcript*, 15 March 2007, p. 13.

7.17 CSIRO rejected this criticism, stating:

> It is not the role of CSIRO to crowd out business, just as it is not CSIRO's role to provide subsidies to business.[24]

7.18 CSIRO said their motives for undertaking research included commercial viability, intellectual challenge, public importance, match to their capabilities, contribution to Australian industry and accordance with their established priorities.[25]

7.19 CSIRO's own commercialisation is a minority of the commercialisation of CSIRO research. More often CSIRO will judge that its staff may not be the people with the best business and marketing skills and so commercialisation is mostly done by private companies, perhaps paying CSIRO a royalty or giving them a minority equity stake.

7.20 Furthermore, a lot of CSIRO research is adopted by companies without ever appearing to be formally 'commercialised'. CSIRO explained:

> In fact, the majority of our work is involved in what you might call incremental innovation. We do tactical or strategic collaborative work with industry [usually on a 'fee for service' basis] and the outcome is the transfer of that technology, which disappears, if you like, in some senses into the company.[26]

7.21 It was noted by one witness that 'the CSIRO has good linkages overseas'.[27] However, the committee also heard claims that the CSIRO's overseas linkages are *too* close. It was accused of engaging in activity with overseas manufacturers in preference to working with local manufacturers on the basis that the overseas work was more lucrative.[28]

7.22 CSIRO rejected these claims. While there are many cases where collaboration with overseas companies is in the national interest, CSIRO has an approach whereby:

> If we believe that doing business with an offshore company will disadvantage Australian companies, we will decline.[29]

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24 CSIRO, *Submission no. 50*, p. 14.

25 CSIRO, *Submission no. 50*, p. 20.

26 Dr R Hill, CSIRO, *Transcript*, 22 March 2007, p. 3.

27 Mr T Strasser, private capacity, *Transcript*, 29 August 2006, p. 38.

28 Mr B Manwaring, Bruck Textiles, *Transcript*, 8 February 2007, p. 16 and Mr L Black, Melba Industries, *Transcript*, 8 February 2007, p. 17.

29 CSIRO, *Submission no. 50*, p. 21.

Conclusions

7.23 The committee commends CSIRO's pure and applied research work which has made a substantial contribution to moving Australian manufacturing towards innovative high-skill manufacturing. In setting research priorities, CSIRO appear to take appropriate notice of the views of business.

7.24 While the committee commends CSIRO for the steps it has taken to improve its liaison with business, more needs to be done to ensure Australian firms are able to take full advantage of CSIRO's research.

Recommendation 16

7.25 **The committee recommends that CSIRO receive additional funding to employ more staff dedicated to liaising with individual (especially small and medium-sized) businesses, business organisations and the new Australian Industry Productivity Centres. The liaison officers should inform potential partners of relevant work within CSIRO and seek information on possible future CSIRO work that could lead to developing new products and processes useful to Australian manufacturers.**

Universities

7.26 Australian universities are a major venue for research. Without downplaying the importance of teaching, the opportunity for research is one of the main attractions of an academic career. While university research covers the whole gamut of intellectual endeavour, many areas have the potential to generate insights that can be harnessed for new manufactured products or improved procedures for manufacturing. And as a UK study pointed out:

> Unlike corporate or government-owned research facilities, university laboratories are constantly being refreshed by the arrival of clever new brains.[30]

7.27 The committee heard little criticism of the quality of pure research by Australian universities. The concern was about the work needed to bridge

30 Lambert Review of Business-University Collaboration, *Final Report*, December 2003.

what SIA termed the 'innovation gap' between the pure research done by academics and the product development done by commercial firms.[31] Similarly, the Australian Electrical and Electronic Manufacturers' Association (AEEMA) emphasised the importance of intermediate stages between research and commercialisation. These include 'product realisation', (identifying how the research could meet a business or consumer need) and 'prototyping' (constructing an example of the product that meets that need). They suggested Japanese electronic manufacturers focused on these stages while:

> Australia's greatest weakness in innovation continues to be product realisation.[32]

7.28 An ABS survey showed that only two per cent of innovating businesses collaborate with a university.[33] But the lack of linkages between business and academia is not just an Australian issue. The OECD have commented that:

> Formalising knowledge transfer between universities and industry is of growing importance even in countries where industry-science relations are strong. As a result, a third stream of funding is now being earmarked for knowledge transfer activities at universities.[34]

7.29 The traditional view of universities was that they were filled with unworldly tenured dons, besotted with esoteric pure research, who viewed industry with disinterest, if not disdain. This has obviously changed in recent decades. However views differ about where academics' incentives now do, and should, lie.

7.30 Mr Tony Strasser suggested there were inherent conflicts for academics in pursuing more applied work:

> Academic tenure is based on publishing and citations. Sometimes that works against the need for secrecy in some elements in order to commercialise intellectual property …. I have certainly heard of cases where some IP has been lost because it has been put in the public domain and picked up by the first one to market.[35]

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31 SIA, *Submission no. 7*, pp. 2-3.

32 Australian Electrical and Electronic Manufacturers' Association (AEEMA), *Submission no. 19*, p. 8.

33 ABS, *Innovation in Australian Business 2005*, Cat. no. 8158.0, p. 28.

34 *OECD Science, Technology and Industry Outlook 2006*, p. 51.

35 Mr T Strasser, private capacity, *Transcript*, 29 August 2006, p. 42. The Australian Academy of Technological Sciences and Engineering (AATSE) argued that 'the proposed Research Quality Framework Model favours Research Quality over Research Impact and this will have the effect

7.31 On the other hand, the committee received some evidence that Australian universities are becoming *too* focused on their own *applied* research (at least partly because of pressure to attract funding from outside government). SIA warns that universities:

> Engage in the commercialisation of their ideas with government support through start-up and spin-off companies. This can act as an impediment to the flow-through of ideas to industry.[36]

7.32 A common view expressed to the committee was that many academics lack business experience.[37] This is unlikely to change, and indeed it is right that academics focus their energies on the areas in which they have expertise. Of course, most universities have some academics in business schools with knowledge of project evaluation, marketing and other business skills, but they are busy teaching these skills rather than applying them to the work of their colleagues in the science and engineering faculties.

7.33 The gap between 'town and gown' is shown by the relatively low level of collaboration between universities and business. It was noted that:

> Only 8% of firms had cooperative arrangements for their innovation activities, and of these about one-third had these arrangements with universities.[38]

7.34 There are cases where universities and industry are trying to bridge the gap between them. The Australian Industry Group told the committee of a project it is conducting on improving the links.[39]

7.35 The Government is also trying to assist, by establishing the Business-Industry-Higher Education Collaboration Council in 2004 and the Collaboration and Structural Reform Fund in 2005. The Australian Industry Productivity Centres foreshadowed in the 2007 Industry Statement will help connect business with academic technology experts.

7.36 Better relations might be secured by exchanges of staff, and short-term secondments, between universities and businesses.[40] Another possible area

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of rewarding academics and institutions that pursue academic outcomes over engagement with industry', as they felt had happened in the UK; *Submission no. 15*, no. 5.

36 SIA, *Submission no. 7*, p. 4.

37 For example, Associate Professor S Barkoczy, private capacity, *Transcript*, 15 March 2007, p. 34. See also the discussion with representatives from SIA, *Transcript*, 2 March 2007, p. 5.

38 AATSE, *Submission no. 15*, p. 3.

39 Dr P Burn, Australian Industry Group, *Transcript*, 29 August 2006, p. 7.

40 AATSE, *Submission no. 15*, no. 4. They suggested that overseas universities seemed to engage in more of this interaction.

for fruitful cooperation between higher education institutions and business is the sharing of specialised equipment.[41]

Conclusions

7.37 While the primary focus of university research should remain independent basic research to push out the frontiers of knowledge, there is scope for better cooperation between universities and industry. In some cases this might lead to university researchers doing more applied work with more obvious commercial applications. In some cases they might learn from the experience of TAFEs in working with industry. However, universities should not be placed under funding pressure so that they feel a need to undertake commercial research to fund basic research and teaching.

Recommendation 17

7.38 **The committee urges universities to consider appointing more 'industry liaison officers' to facilitate contacts between universities and local industry (including via the new Australian Industry Productivity Centres). They could look for opportunities to share equipment and arrange short-term secondments in both directions.**

Commercial research centres

7.39 The Cooperative Research Centres (CRC) programme was introduced in 1990. It supports applications for partnership arrangements between researchers (mostly universities and CSIRO) and users (mostly private companies) that can commercialise the research. The programme also provides educational opportunities.

7.40 In 2006-07, 57 CRCs were operational, with CSIRO a partner in 49 of them.[42] On average the Australian government has contributed about a quarter of the funding for CRCs, at a cost in 2005-06 of around $200 million. As this is actually higher than the contribution by industry, the potential subsidy can be quite high. It is notable that in similar schemes

41 National Manufacturing Forum (NMF), *Exhibit no. 22*, October 2006; Dr J Wells, RMIT University, *Transcript*, 28 August 2006, p. 21.

42 Dr R Hill, CSIRO, *Transcript*, 22 March 2007, p. 4.

in the US and Scandinavia industry is required to contribute at least half of the cost.[43]

7.41 CRC proposals are currently selected by the CRC committee advised by an expert advisory panel against the following four broad selection criteria:

- outcomes will contribute substantially to Australia's industrial, commercial and economic growth;
- path to adoption will deliver identified outcomes;
- collaboration has the capability to achieve the intended results; and
- funding sought will generate a return and represents good value.

7.42 Each CRC is run by a CEO reporting to a board of directors with a majority representation by research users. Since 2004 CRCs are expected to be incorporated entities producing annual reports.

7.43 The CRC programme shifted in 2004 towards a greater emphasis on industrial and commercial objectives and away from social and environmental research. The Productivity Commission found strong support for a return to the original objectives, on the grounds this was more likely to lead to funding of worthwhile projects that would not otherwise be undertaken.

7.44 Those involved in the programme indicate a high level of satisfaction, although there have so far been few companies 'spun off' from the programme. There are concerns that they are not suitable for SMEs.[44]

7.45 An evaluation by the Allen Consulting Group in 2005 concluded that CRCs provide a good return:

> For every $1 spent by the Commonwealth Government on the CRC Programme, GDP is cumulatively $0.60 higher than it would have been had that $1 instead been allocated to general government expenditure.[45]

7.46 The NMF was sympathetic to the concept of CRCs but commented:

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43 Information in this and the following paragraph is from Productivity Commission, *Public Support for Science and Innovation*, 2007, pp 441-62. A full list of CRCs operating in 2005-06 is given in the last of these pages, Figure 1, xxviii and pp. 441-62.

44 QMI Solutions noted 'the CRC scheme is particularly prohibitive to SME participation. With long-term (7 year) commitments and big dollar investments CRCs are only attractive to large enterprise'. *Submission no. 10*, p. 1. This view was supported by Dr J Wells, RMIT University, *Transcript*, 28 August 2006, p. 3.

45 Allen Consulting, *The Economic Impact of Cooperative Research Centres in Australia*, 2005, p. vii.

> Despite some recognised successes, there are strong indicators that industry support of CRCs is patchy, and that the organisational and management arrangements used in many CRCs fail to maximise the potential of their collaboration. This may be due to a perceived imbalance in the funding for R&D on one hand and commercialisation on the other. [46]

Conclusions

7.47 The committee believes that the commercial research centres fulfil a useful role in facilitating collaborative research between companies and research institutions. It notes the concerns expressed about their focus shifting unduly to immediately commercial projects and regards these concerns as worthy of further consideration. It would also be worthwhile examining the scope for a greater involvement by smaller companies in CRCs.

Clusters

7.48 A cluster is a geographic concentration of interconnected companies, specialised suppliers, service providers, firms in related industries, training institutions and support organisations within a local area or region. One mark of a successful cluster is that its value as a whole is greater than the sum of its parts.

7.49 There are many long-established clusters that have developed and maintained their position because of the availability of some key resource or position.[47] Some clusters remain in the area where the item produced was first invented.[48] In the case of some other clusters, there appears no obvious reason for them to develop in a particular location but once established they act as a magnet for skilled people in that industry, and supporting industries, and so remain a prime location.[49] Sometimes one

46 NMF, 'Strategic actions to boost Australian manufacturing', *Exhibit, no. 22*, p. 28.

47 For example, Sweden developed expertise in speciality steel products due to its iron ore deposits and in timber products due to its forests.

48 For example, over five centuries after Gutenberg invented the printing press, around half the world's printing presses were still being manufactured in central Germany.

49 For example, Hollywood has such a concentration of actors, writers, directors, cinematographers, producers, costume and set designers, lighting specialists and so forth that it remains the leading centre for film production despite relatively high costs.

cluster can give rise to a (seemingly unrelated) cluster.[50] Recently clusters have developed based on new technologies, often around universities.[51]

7.50 The importance of such clusters was emphasised to the committee by Professor Mark Dodgson, director of the Technology and Innovation Management Centre, University of Queensland—appearing in a private capacity:

> Innovation does not happen in the confines of individual firms; it occurs through the interaction between firms and it is often assisted by labour mobility between those firms.[52]

7.51 The literature suggests clusters can take considerable time to develop but are then long-lasting.[53] In some cases, once clusters have emerged, governments have encouraged them by funding more educational facilities and supporting infrastructure. But some attempts by governments to *create* clusters have been less successful.[54]

7.52 A reading of the international literature suggests there are no Australian manufacturing clusters of global significance. But this need not always be the case. There are some clusters developing which may grow to world, or at least regional, importance. One of the most promising of which the committee heard is a cluster of scientific instrument manufacturers in Melbourne.[55] The committee also visited areas with emerging clusters associated with the maritime industry around Fremantle. Around

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50 For example, a golf equipment cluster in Carlsbad, southern California emerged because the nearby aerospace cluster created a pool of engineers and casting factories. Basel's success as a cluster for the pharmaceuticals industry partly reflects its former importance in the dye industry.

51 For example, Silicon Valley in California (headquarters to leading IT companies such as Apple, eBay, Google and Yahoo!) and Silicon Fen around Cambridge.

52 Prof M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 13. Greater emphasis on clusters was also recommended by Dr V Beck, Australian Academy of Technological Sciences and Engineering, *Transcript*, 28 August 2006, p. 47; Australian Manufacturing Workers' Union, *Submission no. 34*, p. 23; and Australian Electrical and Electronic Manufacturers' Association, *Submission no. 19*, p. 4. AEEMA noted that the action agenda for the electronics industry refers to 'industry collaboration through clusters to address the high level of industry fragmentation'. The OECD comment that 'innovation is often found in geographically based clusters of firms, universities and public research organisations which bring together producers and users, learners and teachers'; *OECD Science, Technology and Industry Outlook 2006*, p. 75.

53 M Porter, 'Clusters and the new economics of competition', *Harvard Business Review*, November 1998.

54 Michael Porter, the Harvard academic regarded as the leading writer on clusters, concludes 'government policy will be far more likely to succeed in reinforcing an existing or nascent cluster than in trying to promote an entirely new one, however tempting that might be for national prestige', *The Competitive Advantage of Nations*, Free Press, New York, 1990, p. 655.

55 SIA, *Submission no. 7*, p. 15.

Newcastle the committee heard of the HunterNET engineering cluster and a defence industry cluster and The Geelong Manufacturing Council described a carpet manufacturing cluster in their region.[56]

7.53 There would appear to be substantial scope for further development of clusters within Australia. For example, there are an increasing number of businesses located around north-west Sydney, but they appear to have relatively little interaction with the nearby Macquarie University.[57]

Conclusions

7.54 Geographic clusters of companies in related businesses are more likely to become internationally competitive than companies operating in isolation. It is unlikely a government alone could develop a cluster from scratch, but industry programmes could usefully build on existing clusters of expertise.

7.55 Clusters may help to facilitate participation in global supply chains. This has proven successful in countries such as Ireland (Galway's IT cluster) and the US (Silicon Valley and Route 128, both IT clusters). Invest Australia and the Australian Industry Productivity Centres could encourage potential foreign investors to link up with research organisations and join industry networks in the region (such as HunterNet) to facilitate the development of clusters. It is important that attracting foreign investment per se is not the ultimate goal but ensuring that it is integrated into the Australian manufacturing sector in a way which brings maximum benefit.

7.56 The CRCs discussed above could be the basis for clusters to develop as they already bring together industry and research institutions. Regional universities could specialise in research in areas in which local firms are involved. The Industry Capability Network could also play a role.

56 Mr D Peart, Geelong Manufacturing Council, *Transcript*, 28 August 2006, p. 51.

57 Professor R Green, private capacity, *Transcript*, 14 November, p. 17.

8

Innovation and research and development

Introduction

8.1 As Australian manufacturers move up the value chain to producing ever more sophisticated products, innovation becomes increasingly important. An important source of competitive advantage is having a new product not made elsewhere, or a better product than others produce.[1]

8.2 An important source of innovation is research and development (R&D) conducted within companies. It is far from the only source—much innovation involves commercialising research by universities or 'on the job' improvements to processes. This chapter focuses on the R&D part of innovation not because it is necessarily more important than other aspects, but because of its policy issues.

8.3 R&D is defined by the Australian Bureau of Statistics (ABS) as:

> Systematic investigation or experimentation involving innovation or technical risk, the outcome of which is new knowledge, with or without a specific practical application, or new or improved products, processes, materials, devices or services. R&D activity

1 About half of Australian manufacturers are 'innovative': they have introduced a new or substantially improved good, service or process over the past three years, but they are less likely than European firms to rank innovation among the most important drivers of competitiveness; 'Australian Innovation in Manufacturing: results from international survey,' M Dodgson and P Innes, *Exhibit no. 19*, pp. 6 and 17. Of Australian firms introducing new goods or services in 2004 and 2005, 74 per cent reported that the innovations were new to the business only, 20 per cent that they were new to the industry, 15 per cent that they were new to Australia and eight per cent that they were new to the world. For those firms introducing new organisational/managerial processes, 94 per cent reported these were only new to the firm. ABS, *Innovation in Australian Business 2005*, Cat. no. 8158.0, p. 33.

> extends to modifications to existing products/processes. R&D activity ceases and pre-production begins when work is no longer experimental.[2]

8.4 There have recently been some other relevant studies on the topic of innovation and R&D. The Productivity Commission released a major research report, *Public Support for Science and Innovation*, in March 2007, when the committee's hearings had almost concluded. While its analysis could not be tested at hearings, some references are made to it in this chapter. The Standing Committee on Science and Innovation has released two related reports, on *Riding the Innovation Wave: The Case for Increasing Business Investment in R&D* (June 2003) and *Pathways to Technological Innovation* (June 2006), and reference is also made to these where relevant.

8.5 These studies have provided useful information about innovation processes in manufacturing. However, the committee still heard calls for more research to be done in this area. Professor Mark Dodgson, director of the Technology and Innovation Management Centre, University of Queensland—appearing before the committee in a private capacity, noted:

> There is really a paucity of good research into this whole subject ... We have a lot of interested parties doing research that helps their case but we do not have any independent research. I would contrast that very sharply with the US, the UK and European countries, which do a lot of research.[3]

The importance of being innovative

8.6 Technology has long been regarded as an important aspect of economic performance. It is often regarded as a 'third factor' complementing labour and capital in producing output. Since the late 1980s increasing emphasis has been placed on the role of innovation and R&D in improving technology. This 'endogenous growth theory' has gained increasing importance in mainstream economics.[4]

8.7 Economic studies suggest that R&D can generate high returns. A review of the literature by a leading ANU academic, Steve Dowrick, led him to

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2 ABS, *Research and Experimental Development 2004–05*, cat. no. 8112.0, p. 25.

3 Prof M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 4.

4 One influential article was Paul Romer's 'Endogenous technological change', *Journal of Political Economy*, October 1990 and he describes the development of the approach in 'The origins of endogenous growth', *Journal of Economic Perspectives*, Winter 1994.

conclude that rates of return on R&D are over 50 per cent.[5] The Productivity Commission, while emphasising the uncertainties, suggest they could be around 30 to 100 per cent.[6] The OECD also concludes that R&D is an important driver of economic growth.[7] A study found a link between measures of innovation (or successful R&D) and productivity.[8]

8.8 Witnesses also stressed the role of innovation in having manufacturers that can compete in global markets. Professor Dodgson argued:

> You compete with China by doing things that they cannot, and that means being hyperinnovative—producing really exciting products that do new things, delight customers and combine services into products in new and exciting ways.[9]

International comparison of research and development

8.9 Given the apparent importance of R&D in economic performance, concerns are sometimes expressed that Australia, and Australian companies in particular, do less R&D than international competitors.[10]

8.10 Australian businesses spent $8.4 billion on R&D in 2004–05, of which manufacturing accounted for $3.3 billion. Adding in the $2.6 billion spent by government, $4.3 billion by universities and $0.5 billion by other non-profit institutions, Australia's total expenditure on R&D was $15.8

5 S Dowrick, 'A review of the evidence on science, R&D and productivity', paper prepared for the Department of Education, Science and Training (DEST), August 2003. Similar views are cited in *Riding the Innovation Wave*, p.65.

6 Productivity Commission (PC), *Public Support for Science and Innovation*, 2007, p. xx. This draws heavily on S Shanks and S Zheng. 'Econometric modelling of R&D and Australia's productivity', *Productivity Commission staff working paper*, April 2006.

7 OECD, *Sources of Economic Growth in OECD Countries*, 2003. Their tentative estimates of the magnitudes are that an increase in R&D of 0.1 per cent of GDP raises the level of GDP by a little over 1 per cent, or increases the annual growth rate by up to 0.2 percentage points.

8 W Gu and J Tang, 'Link between innovation and productivity in Canadian manufacturing industries', *Economics of Innovation and New Technology*, vol 13, no 7, October 2004. Surprisingly, the Industry Statement 2007 downplays the importance of R&D, commenting 'there is no discernible statistical relationship between R&D spending levels and nearly all measures of business success, including sales and earnings growth, gross and operating profitability, market capitalisation growth, and total shareholder returns'; Department of Industry, Tourism and Resources (DITR), *Global Integration: Changing Markets. New Opportunities, Background papers*, no. 4, p. 19.

9 Prof M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 4.

10 For example, the Standing Committee on Science and Innovation noted in *Riding the Innovation Wave* 'that Australia's level of business expenditure on R&D is relatively low … when compared to OECD countries'.

billion (of which about $3.8 billion was spent on manufacturing R&D). Almost 120 000 person-years were devoted to R&D activity.[11]

8.11 The $15.8 billion spent on R&D was the equivalent of 1.8 per cent of GDP, which placed Australia around the middle in a ranking of OECD economies. However, as the largest OECD economies (the United States, Japan and Germany) have above average R&D spending, Australia was below the OECD average R&D spending of 2.3 per cent of GDP.[12]

8.12 Australia does *not* have a 'target' for R&D. Nor do some high R&D economies such as Japan and the United States. However, a number of economies do have explicit targets, which aim to lift their R&D spending further above the 1.8 per cent in Australia (Table 8.1).

Table 8.1 R&D spending (% to GDP): actual and target

	Actual (2005)	Target
Australia	1.8	No target
Austria	2.4	3.0 by 2010
Canada	2.0	Top 5 in OECD
China	1.2	2.5 by 2020
Estonia	0.9	1.9 by 2010
Finland	3.5	4.0 by 2010
France	2.1	3.0 by 2010
Germany	2.5	3.0 by 2010
Greece	0.6	1.5 by 2010
Ireland	1.3	2.5 by 2013
Japan	3.2	No target
Netherlands	1.8	3.0 by 2010
New Zealand	1.1	OECD average for public R&D
Sweden	3.9	4.0
Taiwan	2.6	3.0 by 2006
United Kingdom	1.7	2.5 by 2014
United States	2.7	No target

Sources: Productivity Commission, Public Support for Science and Innovation, March 2007, p. 563; OECD, Main Science and Technology Indicators, December 2006; OECD Science, Technology and Industry Outlook 2006. Values for Australia, China, Japan, Netherlands, Taiwan, UK and US refer to 2004 and NZ to 2003.

11 ABS, *Research and Experimental Development 2004–05*, Cat. No. 8112.0.

12 Australia also lags behind most of the other higher-income OECD countries, but interestingly above Ireland (often regarded as the model for manufacturing). As Australia aspires to be a niche rather than mass manufacturer, it could be argued the relevant comparison is with the higher-income economies. If the comparison is restricted to *business* R&D, the $8.4 billion represents 0.9 per cent of GDP. Again Australia is ranked among the middle of the OECD economies but spends less than the OECD average of 1.5 per cent of GDP, according to Australian Bureau of Statistics, *Research and Experimental Development, Businesses, 2004–05*, Cat. No. 8104.0. In both cases Australia was also below the OECD average in 2000–01 and 2002–03.

8.13 These targets are sometimes used to argue that Australia should set such a target.[13] However, the targets are not always well-specified. Many European countries have adopted the EU's target of three per cent announced in its 'Lisbon strategy' in 2002. Sweden and Finland, which were already above this target, are aiming for four per cent, while others have set more modest targets. Canada aims to exceed the OECD average; it would obviously be impossible for the majority of OECD countries to do this. Overall, there does not appear to be rigorous reasoning behind the choice of target levels; most countries seem to just choose as a target a level a bit above where they are now. Nor does it seem that many countries are likely to achieve their targets.[14]

8.14 An important caveat about using international comparisons to argue that Australia does too little R&D is made by the Productivity Commission:

> Comparisons of input ratios are usually a conceptually unsound basis for assessing optimal investment in R&D. Nothing says that 'high' input ratios are necessarily better than 'low' ones, since it is possible to both under- or over-invest in R&D. For most other inputs — such as labour or capital — the usual interest is not in maximising inputs per output, but rather maximising its inverse (output per input or productivity).[15]

8.15 A 2005 study by Davis and Tunny, two Treasury economists, splits the OECD data into components of R&D and show that Australian businesses do similar amounts of 'basic research' to their international peers, less 'applied research' and much less 'experimental development'.[16] Australian non-businesses (government, academia etc) do a relatively large amount of applied research, so that total Australian spending on applied research is comparable to that in other OECD countries. Overall then, Australia appears to do a reasonable amount of 'R' but falls behind on 'D'.

8.16 This view that Australians are better at inventing than commercialising agrees with anecdotal evidence. Australians invented the atomic

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13 A target for *business* R&D of 1 per cent of GDP was recommended by the Standing Committee on Industry, Science and Resources, in their report *Getting a Better Return* (September 2001). As business R&D had risen to 0.95 per cent of GDP in 2004–05, the 'target' may have been reached.

14 PC, *Public Support for Science and Innovation*, 2007, pp. 567-8 suggests that only Sweden and Malta among the OECD economies are on track to meet their 2010 targets. The average R&D to GDP ratio actually *fell* slightly in the European Union between the announcement of the 'Lisbon' target in 2002 and 2005.

15 PC, *Public Support for Science and Innovation*, 2007, p. 43.

16 G Davis and G Tunny, 'International comparisons of research and development', *Economic Roundup*, Spring 2005, pp 63-82.

absorption spectrophotometer, the black box flight recorder and the orbital engine but all were commercialised overseas.

8.17 It also accords with views expressed by experts in new technologies. For example, Dr Peter Binks, chief executive officer, Nanotechnology Victoria commented:

> I am not convinced that we need more R&D performed …. The big gap is being able to support industries in evaluating new technologies … the best role, in particular, for the federal government is around creating the infrastructure to support the uptake of those technologies.[17]

8.18 However, this view is challenged by the Productivity Commission:

> There is evidence of widespread success in commercialisation across all sectors of the Australian economy, which belies a commonly expressed pessimistic view of Australia's capabilities.[18]

8.19 Another conclusion from the Davis and Tunny study is that 'the relationship between R&D and more direct measures of innovation does not appear to be strong or stable across countries'.[19]

8.20 In making international comparisons, it is important to note that total spending on R&D is also a function of a country's industrial structure. Given Australia's industrial structure – significant mining and rural sectors and less high-tech manufacturing – even if Australia had relatively high R&D within each individual industry, it would still have relatively low overall R&D relative to GDP.[20] Putting it another way, adjusting for its industrial structure Australia's R&D spending is not a significantly smaller share of GDP than the OECD average.

Conclusions

8.21 The committee encourages companies to be innovative, realising this is often a prerequisite for lifting productivity and succeeding in global markets. Innovation may result from improving or redesigning processes as well as from formal research and development. In a free market firms should undertake the innovation and research that they believe will improve their profitability.

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17 Dr P Binks, Nanotechnology Victoria (NanoVic), *Transcript*, 15 March 2007, pp. 2–3.

18 PC, *Public Support for Science and Innovation*, 2007, p. xxii.

19 G Davis and G Tunny, 2005, p 63.

20 G Davis and G Tunny, 2005 and PC, *Public Support for Science and Innovation*, 2007.

8.22 The commonly expressed concerns that Australia allocates a smaller proportion of its national income to research and development than do other OECD countries are overstated as they fail to take account of Australia's industrial structure.

Government support for research and development

8.23 The benefits from R&D discussed above do not of themselves justify any government intervention to encourage it. Given the benefits that accrue to companies from R&D, in a free market businesses will undertake it, in the areas they judge will be of most benefit. With hindsight, some of the expenditure will not be productive, while some will generate huge returns.[21] This is in the nature of research and is not undesirable.

8.24 Probably the main contribution government can make to encouraging the private sector to undertake R&D is to provide a sound economic background which gives the private sector the confidence to undertake projects with long-term returns.

8.25 The justification for government measures to encourage R&D is that it has some 'public good' characteristics. Some of the benefits from it may accrue (or 'spill over') to the rest of the economy rather than just to the firm undertaking it. Dr Peter Burn, associate director, public policy, from the Australian Industry Group, described these 'positive externalities':

> Expenditure on research and development generates external benefits. A company generates more for society than the benefits it accrues for itself, so from a social point of view there is an impediment to the optimal amount of private spending on research and development just by leaving the market to itself.[22]

8.26 The parts of R&D most likely to benefit the broader community rather than just the individual firm tend to be more at the R than the D end. The 'truly original idea' with wide ramifications is more likely to come from pure research than process improvements. These may be most likely to come from universities and research organisations.

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21 It is reminiscent of the saying attributed to the US retailer John Wanamaker: 'Half the money I spend on advertising is wasted; the trouble is I don't know which half'.

22 Dr P Burn, Ai Group, *Transcript*, 29 August 2006, p. 12. S Dowrick suggests that the total social rates of return to R&D are around ten percentage points higher than the private returns to the company undertaking it; 'A review of the evidence on science, R&D and productivity', paper prepared for the Department of Education, Science and Training (DEST), August 2003.

8.27 Among companies, technological breakthroughs may be most likely to originate from 'start-ups' than from established companies.[23] For example, in the field of nanotechnology, it was noted that work was being done in the field by universities, government research organisations and small companies whereas:

> Companies like BlueScope Steel, Amcor, BHP Billiton and Rio Tinto are all looking at nanotechnology activities, not necessarily investing right now but keeping a watching brief and developing relationships.[24]

8.28 Dr John Raff, deputy chairman and founder of Starpharma Ltd:

> Would like to see far more, I suppose, nurturing and love for the smaller structures, which are the innovators coming through, than for the larger, established organisations.[25]

Forms of government support for R&D

8.29 Governments support R&D in six broad ways. Firstly, they directly fund research work by universities and institutions such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australian Nuclear Science and Technology Organisation and Defence Science and Technology Organisation. These tend to concentrate on research and do less development work.

8.30 It is sometimes suggested that public investment 'crowds out' industry R&D, for example, by drawing scientists away from industry. However, the available empirical evidence seems to suggest that public R&D is more of a complement to private R&D than a competitor.[26]

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23 This seems the predominant view in Australia now. For example, Starpharma's Dr Raff asserted: 'worldwide, larger organisations are not the innovators'; *Transcript*, 15 March 2007, p. 15. PC state that 'smaller firms with a greater R&D focus are more likely to perform genuinely new and more widely-utilised research'; *Public Support for Science and Innovation*, pp. 34 and 386. This emphasis on smaller firms contrasts with the view attributed to the Austrian economist Joseph Schumpeter that large monopolies are the wellsprings of innovation. Some US data suggests that in the past large firms conducted more R&D relative to their sales than did small firms, but more recently the positions have reversed, possibly due to the growth of internet-related companies (of course there are many 'corner store' types of small business than do no R&D, although they may still innovate); P Samuelson and W Nordhaus, *Economics*, 2005, pp. 193–7. An interesting account of how research has moved from large monopoly companies to small firms and universities is given in *The Economist*, 3 March 2007.

24 Dr P Binks, Nanotechnology Victoria, *Transcript*, 15 March 2007, p. 2.

25 Dr J Raff, Starpharma Ltd, *Transcript*, 15 March 2006, p. 14.

26 The Dowrick 2003 survey concludes 'business R&D is complementary to public sector civilian R&D – raising investment in one sector stimulates the productivity of the other' — S Dowrick, 'A review of the evidence on science, R&D and productivity', paper prepared for DEST,

8.31 Secondly, governments encourage R&D by allowing companies monopoly rights for limited periods over innovations arising from their R&D. This is done through creating intellectual property rights through patents and copyrights. Some submissions said that getting patents was a slow process in Australia, particularly if there was a challenge to them.

8.32 Thirdly, governments encourage businesses R&D by providing grants.[27] Fourthly, they provide tax concessions. Grants and tax concessions are discussed in the following two sections.

8.33 Fifthly, governments may support R&D by encouraging foreign firms to conduct some R&D in the domestic market. Australia is unlikely to become a major global R&D centre if it just relies on local companies. The Department of Industry, Tourism and Resources has noted that Australia is home to only two of the top 1 000 global corporate R&D spenders.[28]

8.34 Attracting multinationals to conduct R&D in the domestic economy was an important element in the Irish 'success story' (discussed in Appendix F). Inward R&D by foreign firms is encouraged by Invest Australia. While an important consideration for multinational companies deciding where to locate R&D activities is the cost, the House of Representatives Science and Innovation Committee noted:

> A second consideration for major international corporations is the extent to which a country is 'innovation friendly'. This involves factors such as the availability of university, government and commercial research institutions, 'the availability of a world-class telecommunications infrastructure' and 'the capacity for IT enablement', the presence of 'leading-edge customers to stimulate demand [and] innovation', 'world-class skills availability with a focus on excellence in vocational training/teaching/research', 'culture training in entrepreneurship' and the availability of

August 2003. The PC 2007 report opines that 'there is strong evidence that displacement [of corporate R&D by funding for universities] is small' (p. 109).

27 An alternative, but uncommon, model for funding R&D is for governments to award prizes for breakthroughs in specific areas. For example, in 1714 the British government offered £10-20 000 for practical ways of measuring longitude at sea. The prize was won by John Harrison for his very accurate sea-going clocks. (See D Sobel, *Longitude*, Walker & Co, London, 1996.) In 1887 the New South Wales government announced a £25 000 prize (roughly equivalent to $10 million today) for a biological method to eradicate rabbits. Despite eminent scientists such as Louis Pasteur entering, no prize was awarded.

28 Cited by PC, *Public Support for Science and Innovation*, 2007, p. 586.

> companies 'that can function as partners when the R&D project requires the use of outside resources'.[29]

8.35 Finally, governments may persuade firms to undertake more R&D in other ways. At a public hearing in Melbourne, NEC told the committee that, in the past, they were induced to place some R&D activity in Australia by 'more or less a stick … [being told to] do the necessary conditions or you do not get government business'. They thought 'probably the days are over'[30] when this approach could be used, in part as it would now be inconsistent with commitments in trade agreements.

8.36 Another witness thought there were still governments who intervened to encourage R&D in these sorts of ways. Professor Dodgson stated:

> The presumption that the state does not intervene in manufacturing in other countries is seriously wrong. American manufacturing depends completely on American government policies; procurement is one example.[31]

8.37 Not all these forms of support involve government outlays and the costs of some are hard to measure. The Productivity Commission's estimate is that 'total funding of science and innovation by the Australian Government has actually fallen slightly as a share of GDP between 1981-82 and 2005-06'.[32]

Grants for research and development

8.38 The bulk of assistance grants are aimed at strengthening industry's innovative outlook and are administered by AusIndustry. These include:

- Innovation Investment Fund programme (a venture capital programme discussed in Chapter 5);
- Commercial Ready;
- Commercialising Emerging Technologies;
- Industry Cooperative Innovation Programme; and
- Intermediary Access (a new programme announced in May 2007).

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29 House of Representatives Science and Innovation Committee, *Riding the Innovation Wave: The Case for Increasing Business Investment in R&D*, 2003, pp. 57–8.

30 Mr B McManus, NEC, *Transcript*, 15 March 2007, pp. 27–8.

31 Professor M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 14.

32 PC, *Public Support for Science and Innovation*, 2007, p. 37.

Supplementing these are also some state government schemes, although these concentrate on agriculture rather than manufacturing.

Commercial Ready (CR)

8.39 CR is a merit-based suite of grant programmes for SMEs, supporting innovation and its commercialisation. It provides matching grants to support R&D, 'proof of concept'[33] work and early stage commercialisation. The scheme provides annual grants from $50 000 to $5 million.

8.40 CR began in 2004 as part of the *Backing Australia's Ability*[34] strategy with a $1 billion programme allocation. In the 2007-08 Budget it was extended until 2011 with a further $32 million programme commitment for applicants applying for funding up to $250 000. The grants are competitive, with one of the five criteria on which projects are assessed being the 'national benefit' of the project and another that it would not proceed 'satisfactorily' without the support. Successful applicants receive up to half the project cost, subject to a ceiling of $5 million.

8.41 It appears the CR programme helped Starpharma, a dendrimer nanotechnology company, to commercialise. Starpharma stated:

> We have had a lot of support from the Australian Government through R&D Start programs, Commercial Ready and P3.[35]

8.42 The Productivity Commission concluded that 'there is robust evidence indicating that the Commercial Ready programme supports too many projects that would have proceeded without public funding assistance' and recommended changes to the governance of the programme.[36] However, it noted that a number of organisations, such as the Australian Industry Group and the Department of Industry, Tourism and Resources (DITR), disputed this conclusion.

8.43 Science Industry Australia (SIA) wants CR extended to cover larger companies:

> This turnover criterion which confines eligibility … to SMEs with an annual turnover of less that $50m is unrealistic for science industry companies that operate in the global business environment and rely on world class innovation for their

33 'Proof of concept' work includes activities to establish a technology's commercial viability.

34 Australian Government, *Backing Australia's Ability – Building our Future through Science and Innovation,* 2004.

35 Dr J Raff, Starpharma Ltd, *Transcript*, 15 March 2007, p. 9.

36 PC, *Public Support for Science and Innovation*, 2007, Finding 10.9, p. 420.

> competitive advantages … the relatively few larger Australian science industry companies that compete in world markets and contribute to Australia's economic and social welfare are denied access to many Government innovation support measures.[37]

8.44 This agrees with the report of the Standing Committee on Science and Innovation, *Pathways to Technological Innovation*, June 2006, which recommended the government review the thresholds. This issue appears to have been ameliorated by an increased threshold to an annual turnover over $100 million, announced by the Minister for Industry, Tourism and Resources, Mr Ian Macfarlane, in August 2006.

8.45 A more effective use of grant funding may be possible if successful firms returned some of the profits resulting from R&D to the scheme. This could also discourage firms from applying for grants for projects they would still undertake without the grant.

8.46 One approach would be for the government to receive an equity stake in the project. This could work like the venture capital scheme in Israel whereby the government will 'fund the R&D side of it and then they can be bought out by the private sector'.[38]

8.47 Another, perhaps simpler, approach along similar lines would be to have some R&D grants take the form of income-contingent loans, modelled on the HECS scheme for university students.[39] These would be repaid if the R&D results in commercial success. This could have three advantages. Firstly, as earlier 'grants' are repaid, more funds would become available for new 'grants'. Secondly, it would be more likely to lead to 'additionality'; firms would not bother applying for loans for conservative projects with guaranteed returns they would undertake anyway, but would apply for more marginal, risky and innovative projects, which may be those more likely to generate spill-over benefits. Thirdly, it would build in automatic monitoring of whether the assistance scheme was succeeding in generating a reasonable number of commercial successes. The Productivity Commission note that 'repayable schemes have been widely used overseas, and in some countries they are major forms of R&D support'.[40]

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37 Science Industry Australia (SIA), *Submission no. 7*, p. 5.

38 Mr S Ciobo MP, *Transcript*, 22 November 2006, p. 18.

39 PC, *Public Support for Science and Innovation*, 2007, suggests looking at 'introducing loan repayment mechanisms, rather than straight grants' (p. xxviii). It was also advocated in C Emerson, *Vital Signs, Vibrant Society*, 2006, p. 130 and Centre for International Economics, 'A review of the R&D start program', cited in PC, 2007, p. 422.

40 PC, *Public Support for Science and Innovation*, 2007, p. 421.

Commercialising emerging technologies programme (COMET)

8.48 The COMET programme provides small innovative businesses with a package of assistance to enable them to commercialise their activities. The programme is delivered by paying for private sector business advisers who offer advice on linkages to other parties for collaboration and venture capital. The total financial assistance available under COMET is capped at $120 000 per customer.[41]

8.49 COMET started under the umbrella of *Backing Australia's Ability* in 2001, with $40 million in funds to 2004-05. In 2004 it was extended to June 2011 under *Backing Australia's Ability – Building Our Future Through Science and Innovation* and allocated an additional $100 million. The DITR website states:

> This means some 200 companies per annum can be supported with mentoring and commercialisation management advice; ... In the five years to July 2004, firms supported under COMET raised around $275 million in capital and over 500 strategic alliances, licenses and other agreements to enable their businesses to grow. [42]

8.50 There was a suggestion that successful CR and/or COMET grant applicants could be linked up with the CSIRO to see if applied research activities could be undertaken. CSIRO commented:

> There is no special relationship that CSIRO has in that process of obtaining grants with AusIndustry. I think it is fair to say, though, that CSIRO is looking at ways in which we can more effectively work with industry, especially SMEs, I might add, who often depend upon Commercial Ready and COMET grants and the like.[43]

Industry cooperative innovation programme (ICIP)

8.51 The ICIP aims to assist business collaboration on product or process innovation, particularly between manufacturers. This programme was

41 DITR, *COMET Customer Information Guide*, Version 2.1, July 2005, COMET Section, p. 3.

42 'Commercialising Emerging Technologies (COMET) Program', DITR, 16 March 2007 <http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=5483ACCB-97CA-1838-61B239AE0868E468> as viewed, 5 June 2007.

43 Mr G Redden, CSIRO, *Transcript*, 22 March 2007, p. 13.

announced in 2004 and has funding until 2011 with a commitment of around $25 million.[44]

8.52 Innovation projects may include project scoping through to implementing innovation in production. There must be a consortium of at least three entities and the applicant (at least one member of the consortium) must be a non-tax exempt company incorporated in Australia. The programme provides funding of up to $3 million.

8.53 The ICIP was praised by the Australian Electrical and Electronic Manufacturers Association as enabling collaborative research to be undertaken by advanced manufacturers, the results of which fed into their industry action agenda, but they had concerns that it did not assist companies wanting to collaborate overseas.[45] The programme has never actually excluded international entity collaboration but as this was not explicitly stated in the guidelines, there was a misconception that the programme funded domestic collaboration only. New programme guidelines were gazetted in March 2007 to clarify this issue.

8.54 SIA also referred to the need for collaborative international innovation:

> With the internationalisation of Australian industry, and industry's greater use of open innovation, government should provide additional support to encouraging international linkages between manufacturers and offshore R&D.[46]

Intermediary Access Programme (IAP)

8.55 The IAP was announced in the Industry Statement 2007. The five year $20 million IAP will fund 50 per cent, up to a $50 000 cap, of the cost of intermediary services to link up to 150 SMEs with possible technology partners using 'trusted third parties' to protect commercial-in-confidence information. This is in line with a recommendation of the National Manufacturing Forum (NMF) for the development of 'innovation intermediaries'. The new programme will use two providers; the InnovationXchange (a not-for-profit global knowledge network) and the Australian Institute for Commercialisation's Techfast.[47]

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44 'Industry Cooperative Innovation Programme', DITR, 2 April 2007, viewed 5 June 2007, <http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=6DB4057B-65BF-4956-B9DCEB2ED81BB5DD>.

45 Mr A Robinson, Australian Electrical and Electronic Manufacturers' Association, *Transcript*, 7 December 2006, p. 15.

46 SIA, *Submission No. 7*, p. 7.

47 'Strategic Directions to Boost Australian Manufacturing,' National Manufacturing Forum (NMF), *Exhibit no. 22*, pp. 27–8. Further information about the InnovationXchange network is

8.56 The South Australian Government submission supported the use of TechFast.[48] The NMF praised the work of the InnovationXchange:

> It is bringing companies together to share their IP in a way that does not prejudice the privacy of their intellectual property. A manufacturing advisory service could give information about the role of that body and again help that organisation's extension to other states which are not currently engaged.[49]

8.57 It is difficult at this stage to determine whether the IAP facilitates international collaborative activities, even though the intermediary organisations sponsored by the programme operate internationally.

8.58 The programme was officially announced on 1 May 2007, but ironically AusIndustry's 'fact sheet'[50] states it commenced on 31 December 2006. Irrespective, the committee did not receive any evidence about the programme in the course of the inquiry.

Industry-specific grant programmes

8.59 There are also a number of industry-specific grant programmes. Examples include the Pharmaceuticals Partnership Programme and parts of the Automotive Competitiveness and Investment Scheme (ACIS). Under the ACIS scheme, rather than a direct payment, car manufacturers can receive a rebate on the duties they pay on imported components. The rebate is equivalent to 45 per cent of eligible R&D (up to a maximum of five per cent of the previous year's sales). A looser definition of eligible R&D is used than for other schemes. Car manufacturers are allowed to include 're-engineering and modification of existing products and processes' and this forms the bulk of the R&D supported.[51] The R&D component of ACIS cost $128 million in 2004–05.[52]

8.60 This concerns the Productivity Commission, who warn that the effectiveness of government assistance for R&D is reduced as 'a few

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at <www.ixc.com.au> and Techfast at <www.ausicom.com>. InnovationXchange Australia Ltd (IXC) was developed in Victoria, Australia in 2003 and the model has already been licensed to the UK as IXC UK.

48 South Australian Government, *Submission no. 26*, p. 14.

49 Mr R Herbert, NMF, *Transcript*, 22 November 2006, p. 4.

50 AusIndustry, Intermediary Access Programme fact sheet, viewed 13 May 2007, <http://www.ausindustry.gov.au/library/IAPfactsheetdot20070307121930.pdf>.

51 PC, *Public Support for Science and Innovation*, 2007, p. 438.

52 PC, *Public Support for Science and Innovation*, 2007, p. 382.

relatively declining sectors – such as the auto industry – have benefited disproportionately through special sectorally-specific R&D programs'.[53]

Conclusions

8.61 The committee accepts that fundamental research which benefits the broader economy, rather than just the company undertaking it, may be undersupplied in the free market so there is a case for government support. This can be provided through a competitive grants scheme along the lines of Commercial Ready. The scheme should focus on R&D with wide benefits that would not be undertaken otherwise. It need not be limited to smaller enterprises, although they may often better fit these criteria. Consideration should be given to making contingent loans as well as grants, as this will replenish the available funds and so allow more encouragement for R&D. The scheme should be simple for firms to access, with straightforward compliance requirements.

8.62 The committee identified scope in bringing together applied research activities with small innovative manufacturers by linking the successful grant applicants of either COMET or Commercial Ready to a relevant CSIRO research area or flagship. The process could be administratively simple but provide much capacity for interaction between industry and research institutions early in product or process development cycle.

8.63 One of the biggest advantages of the ICIP programme is its international collaborative approach which, based on evidence received, has until recently been viewed by industry as domestically oriented. However, although providing funding for international efforts, the programme may not fully achieve its aims because Australian companies have little way of linking with international consortia without government facilitation.

8.64 The newly announced Intermediary Access Programme may enable better facilitative links for manufacturers entering an ICIP arrangement; but at this stage it is unclear whether the IAP provides funding for international facilitative links. At this stage the two programmes appear divorced.

53 PC, *Public Support for Science and Innovation*, 2007, p. xxi.

Recommendation 18

8.65 **The committee recommends that successful Commercialising Emerging Technologies (COMET) and Commercial Ready grant applicants are linked up with the CSIRO to foster better industry applied research at the small to medium manufacturing level.**

Research and development tax concession

8.66 There are three elements of the current R&D Tax Concession:

- Companies can deduct up to 125 per cent of qualifying expenditure incurred on R&D activities when lodging their corporate tax return.
- Companies can deduct 175 per cent of that part of R&D exceeding its average level over the past three years under the 'Incremental (Premium) Tax Concession'. It was announced on 1 May 2007 that this concession would be extended to foreign-owned companies.
- Under the 'R&D Tax Offset' programme, small firms can obtain the full benefit of their tax concession claim, regardless of whether they are in profit or not; i.e. if they are not liable for tax, they will receive a payment.[54] This is restricted to firms with R&D between $20 000 and $1 million and with group turnover below $5 million.

8.67 The R&D tax concession was originally set at 150 per cent when it was introduced in 1985 but cut to 125 per cent in 1996. Along with the reduction to the company tax rate, this has reduced its value from 23 per cent (i.e. 0.50 of 46 per cent) of R&D spending to 7.5 per cent (i.e. 0.25 of 30 per cent) now.

8.68 Unlike grants, tax concessions apply to *all* R&D, regardless of its quality. Views differ about whether this is a good or bad thing. Those most sceptical about the ability of governments or their advisers to 'pick winners', or judge which R&D is 'high quality', laud supporting that R&D which companies themselves see as most beneficial. They characterise the tax concession as 'market driven'.

54 For example, a firm spending $100 000 on R&D eligible for the 125 per cent deduction will be given a tax benefit of: Tax rate × (1+concession rate) × R&D = 0.3 × 1.25 × $100 000 = $37 500.

8.69 Alternatively, others view such tax concessions as 'blunt measures with no quality control'[55] and argue that firms are most likely to choose R&D that is of specific benefit to themselves rather than to the broader economy. They also warn that some of any apparent increase in R&D following the introduction of tax concessions may reflect accountants (mis)classifying more expenditure as R&D, rather than a true increase in research activity. They advocate requiring firms to compete for more targeted funding of R&D likely to have wider benefits.

8.70 Views differ about whether these tax concessions have in practice actually lead to more R&D (known as 'additionality') or just provided a windfall gain for companies based on R&D they would have undertaken without the concession. For example, NEC told the committee that:

> Our business plans—which we submit to the board—do not include any allowance for the R&D tax concession. We do not include it because we are not confident that the Government will retain it at any particular time. It has been varied significantly over the time that we have been involved in R&D and exports. We would want a commitment covering 10 years during which its conditions would not be decreased or touched if we were to include it in our board financial documents. At the moment, it is an after-the-act collection by the accountants and it goes into general revenue. Essentially, it does not affect the R&D activity.[56]

8.71 Similarly, SIA pointed out that:

> Larger companies in the Australian science industry argue that the compliance costs of obtaining R&D support under the Tax Concession Scheme exceed the financial benefits it provides. With the recent reductions in company tax, any benefits have been eroded further. As a consequence, Australia's R&D support measures have little impact on the competitiveness of the larger Australian-based science companies.[57]

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55 Professor M Dodgson, private capacity, *Transcript*, 19 October 2006, p. 14.

56 Mr B McManus, NEC, *Transcript*, 15 March 2007, p. 26. Some similar points were made to the Productivity Commission's inquiry. One submission to them said 'I am yet to meet a technology manager who claims that there is a connection between the availability of the concession and the amount of R&D undertaken in his or her organisation!'; PC *Public Support for Science and Innovation*, 2007, p. 391.

57 SIA, *Submission no. 7*, p. 5. Similarly, PC cite a submission to them which claimed that the 'concession does not warrant the significant compliance work associated with registering projects and maintaining records of relevant expenditure'; PC, *Public Support for Science and Innovation*, 2007, p. 375.

8.72 During site visits, the committee heard from some companies that tax concessions do not drive decisions and that grants are more effective. Other companies may hold similar views but not wish to say so, reasoning that the concession may be just removed rather than improved or replaced, and so they will face higher tax bills.

8.73 The Productivity Commission concludes in its 2007 report:

> The extent to which the basic R&D tax concession stimulates additional R&D is low, particularly for large firms.[58]

8.74 The Productivity Commission's quantitative cost-benefit study of the 125 per cent tax concession is inconclusive; with a range from a net social benefit of around $230 million to a net social loss of a similar magnitude.[59]

8.75 Other inquiries have heard similar views. Former Australian Chief Scientist, Dr Robin Batterham, said 'my own opinion … is that, in the large company areas, the taxation concession is somewhat marginal in terms of any additionality of R&D'. Similarly, Productivity Commission Chairman, Mr Gary Banks, stated:

> By and large the evidence seemed to be that most firms regarded the tax concession as something which gives them a little bit more of cash flow but did not really fundamentally affect their R&D decision-making. That was at 150 per cent.[60]

8.76 The 1997 Mortimer Report[61] recommended that the tax concession be cut to 100 per cent. It argued this was still a concession, as R&D was a form of capital expenditure which would otherwise not be able to be fully deducted in the year the expenditure was incurred (but like the purchase of a machine or building would be depreciated over the years).

8.77 It is possible that the current tax concession (or even the previous 150 per cent concession) is too small to have an effect but a much larger concession would have a significant impact. Of course, a much larger concession would imply a much larger cost to revenue, so this would represent a considerable gamble.

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58 PC, *Public Support for Science and Innovation*, 2007, Finding 10.2, p. 392. They also cite on p. 388 earlier studies that about 90 per cent of the R&D earning the concession would have occurred without the scheme.

59 PC, *Public Support for Science and Innovation*, 2007, p. 390.

60 *Riding the Innovation Wave,* p. 93. Tellingly, the witness supporting the concession was an accountant, who might be regarded as having a vested interest in a more complex tax system.

61 *Going for Growth: Business Programs for Investment, Innovation and Export*, June 1997, a review of business programmes undertaken for the Government by Mr D Mortimer, then chair and CEO of TNT, and a secretariat from the DITR.

8.78 It has been observed that R&D expenditure tends to rise and fall with industry profitability.[62] For example, in Australia recently, the mining industry has been very profitable and has strongly expanded its R&D.[63] One interpretation of this is that when profits are high, firms think 'might as well stick it in R&D', implying that 'a lot of the R&D tax concession is going into industries that would have done R&D anyway'.[64]

8.79 Compared to its OECD peers, Australia provides relatively generous tax concessions for R&D (but relatively little direct support).[65] A number of countries have R&D tax allowances, with the United Kingdom having a similar scheme with a rate of 150 per cent.[66] But other countries having a tax concession is no more an argument for such a concession here than noting other countries have tariffs or subsidies is an argument for having them here. Furthermore, some of these countries are questioning the usefulness of the concessions. Ireland discontinued its R&D tax allowance in 2001. Furthermore, international comparisons do not suggest that businesses in countries with more generous concessions do more R&D.[67]

8.80 Expenditure on training workers also has potential spillover benefits, most obviously if the workers leave for another company after the training. Some capital expenditure on new equipment embodying technological advances may be a way in which new R&D contributes to greater productivity. Similar arguments could be made for spending to reduce carbon emissions, improve workplace safety or provide more generous parenting leave. It is not obvious that the spillover benefits from R&D are so much higher than those from other meritorious forms of company

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62 PC refers to numerous international studies finding that R&D spending is 'excessively' responsive to retained earnings. PC, 2007, p. 84. However their own econometric exercise did not find this result in Australia.

63 Between 2002–03 and 2004–05, the mining sector increased R&D spending by 35 per cent, compared to a 20 per cent rise by manufacturing. ABS Cat No. 8104.0.

64 Dr C Emerson, *Transcript*, 29 August 2006, p. 86. The Standing Committee on Science and Innovation report a witness from a company saying something similar; 'R&D is something off the side that we spend some money on if times are good.'; *Riding the Innovation Wave,* p. 51.

65 G Davis and G Tunny, 'International comparisons of research and development', *Economic Roundup*, Spring 2005, pp. 63–82, pp. 72-3. The OECD also refers to Australia's 'generous tax incentive programmes' and notes that Finland, Germany, Iceland, New Zealand, Sweden and Switzerland do not offer any tax concessions for R&D, while Australia is the only OECD economy to offer direct financial support for foreign direct investment in R&D; *OECD Science, Technology and Industry Outlook 2006*, pp. 24, 69, 142 and 242.

66 A recent study found that only about half the companies claiming the UK tax concession said that it affected their spending on R&D, according to a document obtained under the Freedom of Information Act; 'Half of research tax credits are wasted', *The Observer*, 14 January 2007.

67 G Davis and G Tunny, 2005, p. 73.

expenditure that R&D deserves to be singled out for favourable tax consideration.

8.81 Furthermore, Australia's dividend imputation scheme will often offset the tax concession for R&D from the Australian shareholders' viewpoint as the:

> Imputation system … credits individual shareholders with the amount of company tax paid. When no company tax is paid because of the tax concession given at the company level, shareholders receive unfranked dividends and pay the tax themselves. There is a 'clawing back' of the tax concession, so that overall … investors looking at a company doing R&D have no incentive to provide capital to that company in addition to the incentive that it would have if it were not undertaking the R&D.[68]

8.82 The incremental tax concession may generate more 'additionality' than the basic concession, but it may also have perverse incentives in encouraging firms to make their R&D spending more variable.[69] It does not reward consistently high R&D and firms cannot increase R&D indefinitely.

8.83 On the other hand, there are many, such as SIA, who argue the tax concessions do have an important influence:

> Industry and commentators have argued that since the Government lowered the R&D tax concession from 150 per cent to 125 per cent in 1996, business expenditure on R&D as a percentage of Australia's gross domestic product has declined.[70]

8.84 Such opinions lead the ACCI to call for the concession to be increased:

> Business has supported the R&D tax concession as an effective policy instrument addressing a market failure…. Business supports the restoration of the concession to 150 per cent.[71]

8.85 A similar view was put by the Australian Manufacturing Workers' Union:

> The axing of the 150 per cent R&D tax concession in 1996 was a major factor in manufacturing R&D, going from 10 per cent per annum real growth in the decade to the mid 1990s, to negative growth over the 1995-96 to 2001-02 period …. Restoring the 150

68 Dr P Burn, Ai Group, *Transcript*, 29 August 2006, p. 12.

69 PC, *Public Support for Science and Innovation*, 2007, p. 405.

70 SIA, *Submission no. 7*, p. 5.

71 Australian Chamber of Commerce and Industry, *Submission no. 33*, p. 22-23.

> per cent R&D tax concession and leaving it unchanged for at least a decade warrants serious consideration.[72]

8.86 DITR interviewed 116 firms in 2005 and concluded:

> The study found that the R&D tax concession increases the size of investment in individual R&D projects, brings forward R&D expenditure on projects to enable faster completion with higher commercial results, and encourages investment in projects that otherwise would not be undertaken.[73]

8.87 Even if the concession is effective, there are some companies which do not benefit. It is of limited use to newly established companies in innovative areas as they will not be making profits in their early years of operation and so not paying tax. This is a particular problem if, as argued above, it is these small nimble companies whose R&D has the most external benefit. The 'tax offset' component tries to address this problem by allowing the benefit to be cashed out, but this only applies to companies with R&D below $1 million, so does not apply to many new firms.[74]

8.88 Another type of company that does not fully benefit from the scheme is one which holds its intellectual property overseas. In the Industry Statement 2007, it was announced that businesses which hold their intellectual property overseas would now be eligible for the 175 per cent premium concession, but they are still ineligible for the standard 125 per cent concession.[75] The Statement argues that:

> Making Australia a more attractive place for world class innovation will boost investment, expand our skills base and help anchor the local arms of leading multinationals in Australia.[76]

8.89 The House of Representatives Standing Committee on Science and Innovation, in its June 2006 report, *Pathways to Technological Innovation*, also examined the R&D tax concessions. Several submissions 'questioned whether this was sufficient for businesses to actually increase their

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72 Australian Manufacturing Workers' Union, *Submission no. 34*, p. 15 and p. 65. They also presented the results of opinion polling showing strong public support for a tax concession for companies undertaking R&D. The Australian Council of Trade Unions also supported 'a higher level of R&D incentive through the tax system'; *Submission no. 27*, p. 26.

73 DITR, 'Submission to the Productivity Commission study into science and innovation', September 2006.

74 PC report comments 'there appear to be firms not increasing their R&D beyond the $1 million dollar mark to ensure they retain access to the Offset'. Productivity Commission, *Public Support for Science and Innovation*, 2007, p. 397.

75 DITR, *Global Integration: Changing Markets: New Opportunities,* p. 9.

76 DITR, *Global Integration: Changing Markets: New Opportunities,* p. 9.

expenditure on R&D activities'.[77] They also noted concerns about compliance costs. However, the Committee also received submissions from companies benefiting from the tax concession and did not recommend significant changes to its operation for domestic companies.

8.90 All tax concessions complicate the tax system to some extent.[78] Provisions to avoid their abuse may increase compliance costs.[79] Generally, free market economists prefer tax systems with broad bases and low rates. Tax concessions, even for worthy goals, make this harder to achieve. The government reduced the R&D tax concession from 150 to 125 per cent as a move towards a more uniform and less distortionary tax system.

Conclusion

8.91 There are doubts about the extent to which the existing R&D tax concessions are effectively inducing additional R&D, especially given the reduction in the company tax rate. The concessions may not be the optimal form of incentive. Replacing the concessions with increased grants would allow for a more targeted approach, although grants may have disadvantages, such as administrative costs and risks of favouritism.

8.92 The committee recognises that there may be benefits to Australia from conducting R&D here, even if the intellectual property rights are held offshore. R&D and design activities, rather than production, will increasingly form the basis for Australia's involvement in global manufacturing. The committee commends the recent decision to allow companies holding intellectual property offshore access to the 175 per cent premium concession and believes the same argument is applicable to the standard 125 per cent scheme.

77 Standing Committee on Science and Innovation, *Pathways to Innovation*, p. 168.

78 PC report cites PriceWaterhouse Coopers as commenting that 'the incremental 175% tax concession is already an extremely complex piece of legislation'; Productivity Commission, *Public Support for Science and Innovation*, 2007, p. 408.

79 Examples of abuse involving non-R&D activity being misrepresented as R&D to obtain the tax concession are given in Productivity Commission, *Public Support for Science and Innovation*, 2007, p. 378.

Recommendation 19

8.93 **The committee recommends that the design of the R&D tax concession scheme be examined in the light of the recent report by the Productivity Commission and the evidence assembled in this inquiry. The examination should include the eligibility rules, in particular the extent to which foreign-owned companies conducting R&D in Australia are able to benefit from the concession.**

If such an examination leads to the R&D tax concession being reduced then the funds saved should be used for increased grants where a convincing case can be made for them.

9

Government assistance to manufacturing

9.1 The most important role of government in assisting a sector is to disseminate information, facilitate industry links and provide advice within an overarching direction based on sound policy research.

9.2 The overriding view expressed in the inquiry's evidence was that government manufacturing policy needs to strike the right balance between allowing the market to operate freely yet assisting where market failure is recognised. Furthermore, there is a need to balance the pros and cons of the form of assistance offered, as noted by Professor Mark Dodgson, director of the Technology and Innovation Management Centre, University of Queensland—appearing before the committee in a private capacity, in reference to research and development tax concessions:

> You have the big, clumsy, relatively inexpensive to administer schemes like R&D [tax concession] supports or you have the more targeted grant type schemes, which are very expensive to administer. No-one has got the balance right. No-one knows what the balance is.[1]

9.3 Indirect support is not always effective. It may just be a gift to companies for doing something they were doing anyway, rather than encouraging an activity with benefits to the broader community.[2]

9.4 Australian government grants aim to fulfil one or more of the goals of the three pillars of current industry policy, namely, global integration; Australian innovation; and to a lesser extent, investment. The bulk of

1 Prof M Dodgson, private capacity, *Transcript*, 19 October 2006. p. 16.

2 Productivity Commission, *Public Support for Science & Innovation,* 9 March 2007.

grants to the manufacturing sector are geared towards providing innovation assistance.[3] The Export Market Development Grants scheme (EMDG) administered by the Australian Trade Commission (Austrade), and the Supplier Access to Major Projects programme administered by the Industry Capability Network, are designed to assist industry penetrate global markets or enhance import competitiveness.

9.5 The committee heard considerable evidence on the merits and deficiencies of specific support programmes (discussed throughout this report) as well as the overall effectiveness and accessibility of the suite of programmes. This chapter will concentrate on the latter.

9.6 Appendix D lists the Australian Government's suite of industry support programmes applicable to the manufacturing sector while Appendix H details the role of the Australian Government agencies that support the manufacturing sector.

Direct government support issues

9.7 The committee heard input during the inquiry about the problems associated with seeking, applying for and acquitting direct government assistance, and how, at a high level, support programmes to the sector could be improved.

Paperwork and compliance burdens

9.8 Applying for grants and meeting compliance requirements can be extremely time consuming and costly, particularly for small to medium manufacturers. However, when governments provide merit-based funding on a transparent and accountable basis, some degree of paperwork and evaluation is inevitable and necessary.

9.9 The Government's objective of providing equitable access to accountable and effective support programmes must be balanced with a reasonable level of resources utilised by manufacturers to meet programme requirements. Applying for support programmes should not unduly divert resources away from manufacturers' primary tasks.

9.10 The committee heard of application processes being inordinately demanding on manufacturers' resources. The Council of Textile and

3 Innovation Investment Fund; Commercial Ready; Commercialising Emerging Technologies; Industry Cooperative Innovation and Intermediary Access discussed in Chapter 8.

Fashion Industries of Australia Ltd noted huge paperwork and eligibility hurdles:

> This needs to also incorporate a removal of the bureaucracy accompanying government assistance programs such as 70 page contractual agreements for small business grants of no more than $50,000, quarterly reporting which takes more time to complete than the project and access to effective assistance for companies seeking to complete an application.[4]

9.11 The Standing Committee on Science and Innovation's *Pathways to Technological Innovation* report also highlights the difficulties and time associated with navigating the innovation programme maze. The report cites Mr Johansson from Gazelle Monitoring systems as saying:

> In May 2003, we applied for COMET [Commercialising Emerging Technologies program] funding. We were told we were too early [the development of the technology was not sufficiently advanced]...And it went on until September 2004 when we approached somebody who told us we were too advanced—this is six months after we were told we were too early: 'You are eligible for R&D Start but that finishes this week; you will be eligible for Commercial Ready, which starts in October.' ... In October, the email arrives. I apply for Com-ready. We were confirmed that we were too advanced for COMET, but we did not have enough software development for Com-ready...We basically thought this was just too hard, and we kept on going down the path of running our business without government funding.[5]

9.12 The Australian Electrical and Electronic Manufacturers' Association (AEEMA) discussed the considerable time spent in responding to programme evaluation exercises:

> One could say that the processes that have been put in place with the form filling and the KPIs [key performance indicators] that are created to check it, make the programs very inflexible and make it very difficult for people. So at the end of the period companies say, 'Thank goodness that is over; we can now do what we really need to do, rather than the box-ticking exercise that was set by the public servants.' ...a lot of the programs are based on that and a lot

4 Council of Textile and Fashion Industries of Australia Ltd, *Submission no. 17*, p. 20.

5 House of Representatives Standing Committee on Science and Innovation, *Pathways to technological innovation*, June 2006, pp. 52-53.

> of the companies do not have the resources to be able to administer that level of detail.[6]

9.13 Dr Hadrian Fraval of Science Industry Australia (SIA) remarked that small businesses may not have the wherewithal to apply for a grant or assistance programme. In particular, he noted that when the outlay to secure a grant is a very high proportion of the eventual assistance they may receive, they may not even bother to apply: 'The question is: is it worth the effort? ... If it's going to cost us $50,000 in order to get $70,000, is it really worth it?'[7]

9.14 This was echoed by the Australian Steel Institute:

> I have heard quotes that it costs you $100,000 to get $95,000. There is a balance between due diligence with government funds and getting it to the right people.[8]

9.15 The SIA submission referred to the Australian Industry Group's 2006 *Manufacturing Futures* report which gave many examples of the administrative burden in proving the grant's aim had been met. Much of this amounted to proving 'additionality'—that but for the grant, the work or expenditure would not have been undertaken.

9.16 SIA suggested reshaping innovation grant programmes into stepped processes so that programme steps aligned with business stages or goals. By providing smaller grants to align with business stages the success of the programme could be more easily demonstrated and future funding could depend on earlier success. This is an approach undertaken by US support agencies. SIA contend that if application and evaluation processes were streamlined with project stages, it would lead to productivity gains.[9]

Programme stability

9.17 Assistance programme changes are unsettling and require time to research and interpret. Sometimes a programme's inherent budgetary structure, like that of the EMDG, means that a grant outcome, irrespective of meeting eligibility criteria, is uncertain. Consequently, the Committee heard that many businesses do not even bother to apply for assistance given the effort and cost involved in continually updating understanding of the programme requirements.

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6 Mr A Robinson, Australian Electrical and Electronic Manufacturers Association (AEEMA), *Transcript*, 7 December 2006, p. 7.

7 Dr H Fraval, SIA, *Transcript*, 2 March 2007, p. 3.

8 Mr I Cairns, Australian Steel Institute, *Transcript*, 29 August 2006, p. 32.

9 SIA, *Submission No. 7*, p. 7.

9.18 During the past twelve months the major assistance programmes have undergone either eligible criteria changes (EMDG and Industry Cooperative Innovation Programme) or have received annexed programmes (Supplier Access to Major Projects Global). Others, like Commercial Ready, have been re-branded in the last few years.[10] In addition, the 2007 Industry Statement announced further changes including Commercial Ready Plus, a scheme that is identical to the existing Commercial Ready scheme but enables smaller grant applicants (up to $250 000) a more streamlined application process.

9.19 Many changes lead to reduced applicant confidence. At a hearing in Melbourne, Mr Nixon Apple, formerly an Austrade board member for 15 years, noted that the lack of programme continuity prevents businesses from planning ahead:

> We [the Austrade board] would have reviewed the EMDG scheme about once every two years. If you are the chief financial officer and your export manager comes and tells you, 'This is what I want to do and this is what I'll get back from the EMDG', you will just shake your head at him because the rules of the game will change in year three of his export plans. So continuity is a very important criterion.[11]

9.20 NEC agreed that lack of certainty in government incentives means they do not factor these programmes into their business plans. Instead, if they receive them they are an 'after-the-act'[12] bonus.

9.21 The Australian Manufacturing Workers' Union attributed continuity of government programmes as being key to the success of manufacturing sectors in other countries:

> A key reason for the success of Ireland and Singapore in capacity expansion by firms in knowledge intensive industries has been the long-term continuity of the incentives provided. The need for bipartisan support to keep the new arrangements in place for at least a decade is vital.[13]

9.22 On the flipside, a positive aspect of frequent programme changes is that industry's concerns can be met as they arise. This was reflected in evidence—early in the inquiry process the committee heard industry concerns about aspects of programmes which, by the end of the inquiry,

10 Formerly part of the 'R&D Start Programme'.

11 Mr N Apple, Australian Council of Trade Unions, *Transcript*, 22 November 2006, p. 15.

12 Mr B McManus, NEC, *Transcript*, 15 March 2007, pp. 26-27.

13 Australian Manufacturing Workers' Union, *Submission no. 27*, p. 26.

had been addressed. Examples include the increase in the eligible turnover cap in Commercial Ready and the changed guidelines for the Industry Cooperative Innovation Programme which clarified its international focus. The Commercial Ready change preceded a government response to the parliamentary report *Pathways to Technological Innovation,* which recommended this.

Providers, programmes and portals

9.23 A number of different government departments and agencies administer grants for the manufacturing industry. Those most relevant to manufacturing are administered by AusIndustry and Austrade and some through the Australian Customs Service.

9.24 The committee heard that when grants are administered by a variety of agencies it is not only confusing for manufacturers, but leads to information gaps and lack of policy unity:

> Programs and agencies such as Austrade, the Export Market Development Scheme, the Export Finance and Insurance Corporation, Tradex, Duty Drawback, and improvements to the depreciation scheme are noted as examples of the measures government has introduced to improve exporters' ability to compete in international markets. While these programs can be beneficial in isolated instances, most are non-integrated, ad-hoc and hampered by bureaucratic and administrative burdens for (generally) small companies that have neither the time nor the resources to complete the prolix application processes...[14]

9.25 The report of the House Standing Committee on Science and Innovation, *Pathways to Technological Innovation,* recorded 169 innovation programmes in existence across the Commonwealth, state and territory governments. There are in excess of 20 'parent' industry assistance programmes in the Industry Tourism and Resources portfolio alone and a number of these have supplementary or 'subsidiary' programmes. This may reflect the culture of the department given the number one priority of its *Strategic Plan 2006–09* is that of 'implementing new measures'.

14 AEEMA, *Supplementary Submission no. 44*, p. 3.

9.26 Further to the suite of programmes on offer, individual programmes have various goals and eligibility complexities, making it difficult for manufacturers to determine readily what is suitable for their business. This is particularly so for small to medium sized manufacturers (SMEs):

> SMEs have a more acute difficulty than larger and more sophisticated firms in dealing with government and understanding what programs are available. [15]

9.27 To address part of this issue the Australian Government, with support from the states and territories, has initiated a one stop business portal called the 'Business Entry Point'[16] (BEP), managed by Department of Industry Tourism and Resources (DITR). It is designed to bring together all government requirements and assistance programmes for business under one internet umbrella. It enables 'eGovernment' by providing secure on-line application process for many business activities, covering all three tiers of government. The site is clear and comprehensive and is an excellent example of joined-up government reducing the transaction costs of interacting with government.[17]

9.28 However, the BEP is not manufacturing specific. It focuses on the more administrative and regulatory aspects of starting, running and expanding a small to medium business in any sector.

9.29 As has been discussed earlier in the chapter, AusIndustry is programme-centric and their website reflects this. AusIndustry has an export focus in a further portal, the 'Export Hub', which is a joint initiative with Austrade. The hub includes Austrade's TradeStart and AusIndustry's export oriented programmes. Again, the Export Hub is not a self-contained site for manufacturers. Interestingly, the link to the BEP and Export Hub are not on the home pages of DITR, AusIndustry or Austrade websites.

9.30 In contrast, the UK has a specific manufacturing advisory portal[18] which serves a similar function to the BEP and Export Hub portals combined. The UK portal supports the Manufacturing Advisory Service (MAS) which, as was discussed in Chapter 3, is centrally run with regional phone and face-to-face contacts.

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15 Mr G Evans, Australian Chamber of Commerce and Industry, *Transcript*, 2 March 2007, p. 24.

16 <www.business.gov.au>

17 The site won the 2006 United Nations Public Service award for eGovernment.

18 The Manufacturing Advisory Service (MAS), <http://www.mas.dti.gov.uk/>, viewed 11 May 2007. The MAS is not only a web-based service but also has regional face-to-face agency points-of-contacts.

9.31 The MAS portal is easy to use and contains a sophisticated level of information about the manufacturing climate in the UK and how government can assist manufacturers with this in mind. It goes beyond providing links to assistance programmes and giving broad business-oriented information. Information covers issues such as process and systems improvements; materials technology; management and logistics skills; utilising emerging manufacturing applications and export strategy.

9.32 The US Government has a very similar portal to the UK MAS, the 'manufacturing portal'.[19] There is no Australian equivalent. The DITR website does not have a manufacturing webpage, nor does it contain a list of manufacturing relevant programmes or action agendas.

Conclusions

9.33 The committee concluded that the large number of government industry assistance programmes creates unnecessary confusion. Many grant programmes relevant to the manufacturing sector are of a similar nature and could be streamlined. Moreover, it is not easy to access manufacturing specific policy information to assist manufacturers to help themselves become more competitive and/or more globally oriented.

9.34 A number of inquiry participants reported that the resources required to complete application and programme evaluation processes were unreasonable. Programmes which demand proof of 'additionality' create the most work. The committee accepts that merit-based grants require a high degree of transparency and accountability—but should not unduly interfere in the operation of businesses. It concluded that grant programmes which require laborious ex-post evaluations should instead introduce a staged funding approach which would align with business milestones. This would negate the need for extensive retrospective analysis.

9.35 In response to concerns that programme stability is lacking, the committee noted that there is always inherent uncertainty in grant application outcomes. However, business confidence in support programmes is lost when eligibility criteria and processes are changed frequently.

19 US Department of Commerce, International Trade Administration, *Manufacturing Portal*, <www.manufacturing.gov>, viewed 22 May 2007.

9.36 Assistance programmes should be presented within an overarching manufacturing strategy as discussed in Chapter 3. This would make it easier for manufacturers to determine what industry programmes best fit their circumstance. This approach provides manufacturing sector relevance to general industry programmes; thus limiting the growth in programmes.

9.37 Despite the number of support programmes on offer, manufacturers may experience difficulty accessing appropriate information. Both the BEP and the Export Hub are valuable sector-generic sites, albeit poorly promoted. The committee recognised a need for a manufacturing webpage on the DITR site with a link to a stand-alone, user-friendly manufacturing portal.

9.38 The portal would support the manufacturing-based AIPC network, offering a comprehensive resource for manufacturers, beyond programme information. Clear home page links to Austrade, Invest Australia, ICN, BEP and the Export Hub should be on this site. The UK's MAS portal and the US's Manufacturing portal both have good features that could be used as models for site development.

Recommendation 20

9.39 **The committee recommends that the Department of Industry, Tourism and Resources review assistance programmes with a view to:**

- **rationalisation, simplification and programme stability;**
- **dovetailing programmes into a manufacturing sector strategic approach; and**
- **conducting grant programmes in consecutive stages where evaluation of outcomes is more readily apparent.**

Recommendation 21

9.40 **The committee recommends that a dedicated manufacturing advisory portal be developed as the internet face of the manufacturing-based Australian Industry Productivity Centres, linking to a manufacturing webpage on the Department of Industry, Tourism and Resources website. Features of this would include:**

- **streamlining of other information portals so there is a one-stop-shop for the manufacturing sector;**
- **prominent home page links to the industry agencies and the generic 'business entry point' and 'export hub';**
- **an on-line venture capital information service; and**
- **a focus on sector specific issues beyond assistance programme advice including information on production, process and entrepreneurial developments; forums and key global issues.**

The Hon Bruce Baird MP
Chair
12 July 2007

A

Appendix A – Submissions

No.	Provided by
1	Mr Bill Hartigan
2	Mr Ted Roach
3	Northern Territory Government
4	Ford Motor Company of Australia Limited
5	RMIT University
6	Industry Capability Network Limited
7	Science Industry Australia Inc.
8	Geelong and Region Trades and Labour Council
9	Australian Steel Institute
10	QMI Solutions Limited
11	Standards Australia
12	Australian Sugar Milling Council
13	Mr Tony Strasser
14	Australian Plantation Products and Paper Industry Council
15	Australian Academy of Technological Sciences and Engineering
16	The Australasian Institute of Mining & Metallurgy
17	Council of Textile and Fashion Industries of Australia Limited

18	Australian Trade Commission (Austrade)
19	Australian Electrical and Electronic Manufacturers' Association Limited
20	University of South Australia
21	The Treasury
22	Australian Council of Wool Exporters and Processors
23	Department of Transport and Regional Services
24	Blakemore Consulting International
25	Geelong Manufacturing Council
26	South Australian Government
27	Australian Council of Trade Unions
28	Chamber of Commerce and Industry, Western Australia
29	Inbye Mining Services Proprietary Limited
30	Federal Chamber of Automotive Industries
31	Department of Industry, Tourism and Resources
32	CONFIDENTIAL
33	Australian Chamber of Commerce and Industry
34	Australian Manufacturing Workers' Union
35	RMIT University (Supplementary to Submission 5)
36	Australian Industry Group
37	Tasmanian Government
38	Department of Foreign Affairs and Trade
39	BlueScope Steel Limited
40	Victorian Government
41	TAFE NSW
42	Australian Council of Trade Unions (Supplementary to Submission 27)
43	Australian Council of Wool Exporters and Processors (Supplementary to Submission 22)

44	Australian Electrical and Electronic Manufacturers' Association Ltd (Supplementary to Submission 19)
45	Australian Council of Trade Unions (Supplementary No. 2 to Submission 27)
46	Department of Industry, Tourism and Resources (Supplementary to Submission 31)
47	NEC Australia
48	Department of Education, Science and Training
49	Department of Education, Science and Training (Supplementary to Submission 49)
50	Commonwealth Scientific and Industrial Research Organisation (CSIRO)

B

Appendix B – Exhibits

No.	Description
1	*R&D Centres Driving Japanese Industry*, Manufacturers' Monthly, July 2006 (related to Submission no. 2).
2	S*aving Aussie Science from Third World Status,* Australian Science, p. 42 June 2006, (related to Submission no. 2).
3	*Private R&D Centres July 2006*, MuNet 225, Dr R H Brown, July 2006, (extract), (related to Submission no. 2).
4	*Repositioning Australian Manufacturing in the Global Economy,* address to the National Manufacturing Summit by Mr G Combet, ACTU Secretary, 12 December 2005.
5	*Auslink White Paper,* Department of Transport and Regional Services, June 2004 *(*related to Submission no. 23).
6	*Making the Future Great, Sustainable opportunities for Manufacturing in Geelong,* Geelong Manufacturing Council.
7	*Balancing the Risks: Building Australia's Economic Resilience*, Australian Industry Group, December 2005.
8	*Manufacturing Futures: Achieving Global Fitness,* Australian Industry Group, April 2006.
9	*Balancing the Risks: Ensuring our Prosperity Survives the Boom,* address to the National Press Club Canberra, Ms Heather Ridout, Chief Executive,Australian Industry Group, 19 April 2006.

10 *The State of Australian Manufacturing, Summary Report,* Australian Manufacturing Workers Union, prepared by the National Institute of Economic and Industry Research, July 2006.

11 *Future of Australian Manufacturing: The Implications of Free Trade Agreements for Industry Development and Australia's Manufacturing Regions,* Dr Peter Brain, National Institute of Economic and Industry Research and Mr Nixon Apple, Australian Manufacturing Workers Union , discussion paper prepared for AMWU's 2004 National Conference, July 2004.

12 *World Class Skills for World Class Industries, Employers' Perspectives on Skilling in Australia,* report to the Australian Industry Group, May 2006.

13 *Growing Global Niches: Positioning Victorian Elaborately Transformed Manufactures for Future Growth,* final report to the Department of Innovation, Industry and Regional Development, 10 February 2005.

14 *The Global Environment for Manufacturing,* workshop discussion paper, National Manufacturing Summit, Melbourne, December 2005.

15 *Innovation in Manufacturing,* workshop discussion paper, National Manufacturing Summit, Melbourne, 2005.

16 *Skills for our Manufacturing Future,* facilitated workshop background paper, National Manufacturing Summit, Melbourne, December 2005.

17 *Investment in Manufacturing,* workshop discussion paper, National Manufacturing Summit, Melbourne, December 2005.

18 *Strategic Assessment of Manufacturing,* Department of Innovation, Industry and Regional Development, December 2005.

19 *Australian Innovation in Manufacturing: Results from an International Survey,* Australian Business Foundation, Professor Mark Dodgson & Dr Peter Innes, University of Queensland Business School, July 2006.

20 *Making the Most of Production,* Professor Mike Gregory, Philip Hanson A.J. van Bochoven & Finbarr Livesey, University of Cambridge Institute of Manufacturing, July 2003.

21 *Defining High Value Manufacturing,* Finbarr Livesey, University of Cambridge Institute of Manufacturing, January 2006.

22 *Strategic Directions to Boost Australian Manufacturing: A Report by the National Manufacturing Forum to State and Territory Ministers Responsible for Manufacturing*, the National Manufacturing Forum, October 2006.

23 *Strategic Directions to Boost Australian Manufacturing: Summary of a Report by the National Manufacturing Forum to State and Territory Ministers Responsible for Manufacturing*, the National Manufacturing Forum, October 2006.

24 *Strategic Directions to Boost Australian Manufacturing: a Compendium to Support a Report by the National Manufacturing Forum to State and Territory Ministers Responsible for Manufacturing*, the National Manufacturing Forum, October 2006.

25 *Repositioning Australian Manufacturing in the Global Economy,* ACTU submission to the National Manufacturing Forum (draft), July 2006.

26 *New Pathways to Prosperity – A National Innovation Framework for Australia,* Business Council of Australia, November 2006.

27 *A Tale of Two Terms-of-Trade Booms,* David Gruen, The Treasury, address to Australian Industry Group's Economy 2006 Forum, 1 March 2006.

28 *The Australian Telematics Industry: a capability register,* Australian Electrical and Electronic Manufacturers' Association and Intelligent Transport Systems Australia, undated.

29 *Enabling a Smart Electronics Industry for Australia, the Electronics Industry Action Agenda,* Australian Electrical and Electronic Manufacturers' Association, Canberra, October 2006.

30 *Australia - Your Preferred NANO Industry Partner,* Australian Nano Business Forum, Melbourne, 2007.

31 *Developments in Venture Capital Structures and Incentive Schemes,* Associate Professor Stephen Barkoczy, Monash University and consultant, Blake Dawson Waldron, 2007.

32 *Australian Synchrotron, How it Works,* Department of Innovation, Industry and Regional Development, Melbourne 2007.

33 *Synchrotron Science in Manufacturing,* Department of Innovation, Industry and Regional Development, Melbourne 2007.

34 *Australian Synchrotron, the brightest new tool for industry innovation,* Department of Innovation, Industry and Regional Development, Melbourne 2007.

35 *Venture Capital Tax Expenditure Programs: An International Comparative Analysis of Legal Structures and Benefits*, S Barkoczy, D Sandler, J Glover, R Kowalski, Monash University, report prepared for the Department of Industry, Tourism and Resources, 2006.

C

Appendix C – Hearings and witnesses

Monday, 28 August 2006 – Melbourne

Australian Academy of Technological Sciences and Engineering

Dr Vaughan Beck, Technical Director

Mr Peter Laver, Vice President

Australian Council of Wool Exporters and Processors

Mr Peter Carey, Member

Mr Jamie Lillie, Executive Committee Member

Dr Peter Morgan, Executive Director

Mr Sal Vasile, Member

Australasian Institute of Mining and Metallurgy

Mr Don Larkin, Chief Executive Officer

Ms Monika Sarder, Senior Policy and Research Coordinator

Ford Motor Company of Australia Limited

Ms Elly Haug, Manager, Government Liaison

Mr Russell Scoular, Manager, Government Affairs

Geelong Manufacturing Council

Mr David Peart, Executive Officer

RMIT University

Dr Julie Wells, Director, Policy and Planning

Ms Katrina Woodland, Research Analyst, Policy and Planning

Tuesday, 29 August 2006 – Sydney

Private capacity

Mr Ted Roach

Mr Tony Strasser

Australian Industry Group

Dr Peter Burn, Associate Director, Public Policy

Australian Manufacturing Workers' Union

Mr Doug Cameron, National Secretary

Mr Patrick Conroy, National Projects Officer

Australian Steel Institute

Mr Ian Cairns, National Manager, Manufacturing and Distribution

Mr Walter Nicolussi, Member

Blakemore Consulting International

Dr John Blakemore, Chief Executive and Principal (Innovation)

Standards Australia

Mr Ian Graham, Consultant

Mr John Henry, Director, International and Standardisation Policy

Thursday, 12 October 2006 – Canberra

A3P—Australian Plantation Products and Paper Industry Council

Mr Neil Fisher, Chief Executive Officer

Mr Miles Prosser, Manager, Pulp and Paper

Thursday, 19 October 2006 – Canberra

Private capacity

Professor Mark Dodgson, Director of the Technology and Innovation Management Centre, University of Queensland

Thursday, 2 November 2006 – Canberra

Industry Capability Network Limited

Mr Derek Lark, Executive Director

Mr David McLachlan, Chairman

Tuesday, 14 November 2006 – Sydney

Private capacity

Professor Roy Green, Dean, Macquarie School of Management

Department of Education and Training, TAFE New South Wales

Mr Kimble Fillingham, General Manager, TAFE Business

Wednesday, 22 November 2006 – Melbourne

Australian Council of Trade Unions

Mr Nixon Apple, Adviser, Industry and Investment Policy

BlueScope Steel Limited

Mr David Jenkins, Manager

Mr Steve Mann, Executive Vice President

National Institute of Economic and Industry Research

Dr Peter Brain, Executive Director

Mr Michael Spencer, Senior Consultant

National Manufacturing Forum

Mr Robert Herbert, Executive Chairman

Mr Nigel Reeves, Project Manager

Friday, 1 December 2006 – Canberra

Department of Foreign Affairs and Trade

Mr Nicolas Brown, Assistant Secretary, Trade and Economic Analysis Branch

Ms Lorraine Fietz, Acting Assistant Secretary

Mr Graeme Meehan, Deputy Head, China Free Trade Agreement Task Force

Mr Brendan Pearson, Assistant Secretary, Services and Intellectual Property Branch

Mr Ric Wells, Head, China Free Trade Agreement

Austrade

Mr Lloyd Downey, National Manager, Education, Arts and Business Services

Mr Lino (Pasquale) Strangis, Manager, Industry Policy

Mr Hayden Williams, National Manager, Automotive and Advanced Manufacturing

Department of Industry, Tourism and Resources

Mr Jeff Beeston, Acting General Manager, Automotive, TCF and Engineering Branch

Dr Donald Brunker, General Manager, Industry Analysis

Mr Peter Clarke, Acting Head of Division, Manufacturing, Engineering and Construction Division

Mr Mike Lawson, General Manager, Aerospace, Defence and Industry Participation Branch

The Treasury

Mr Graeme Davis, Manager, Macro Dynamics Unit, Macroeconomic Policy Division

Mr John Hawkins, Manager, Business and Liaison Unit

Dr Steven Kennedy, General Manager, Domestic Economy Division

Ms Maryanne Mrakovcic, General Manager, Industry, Environment and Defence Division

Mr Troy Sloan, Manager, Industry Policy Unit

Thursday, 7 December 2006 – Canberra

Australian Electrical and Electronic Manufacturers' Association Limited

Ms Loretta Johnson, General Manager, Policy

Mr Angus Robinson, Chief Executive

Thursday, 8 February 2007 – Canberra

Australian Fashion Council

Mrs Zoe Edquist, General Manager

Bruck Textiles Proprietary Limited

Mr Brett Manwaring, Chief Operating Officer and Chief Financial Officer

Cinnabar Designs Proprietary Limited

Ms Christine Hawkins, Director

Council of Textile and Fashion Industries of Australia Limited

Mr Ashley Van Krieken, Executive Director

Melba Industries

Mr Lindsay Black, Operations Director

Stafford Group Proprietary Limited

Mr Peter Waddell, Chief Financial Officer

Friday, 2 March 2007 – Canberra

Department of Education, Science and Training

Dr Evan Arthur, Group Manager, Innovation and Research Systems Group

Australian Chamber of Commerce and Industry

Mr Gregory Evans, Director, Industry Policy and Innovation

Mr Peter Johnson, Policy Advisor

Science Industry Australia

Professor Mark Baker, Committee Member

Dr Hadrian Fraval, Member

Dr Jim Gonis, Executive Council Member

Dr John Pulsford, Manager, Research and Development

Thursday, 15 March 2007 – Melbourne

Australian Synchrotron

Dr Robert Hobbs, Science and Industry Adviser

Professor Robert Lamb, Science Director Designate

Mr Max Roger, Director

Private capacity

Associate Professor Stephen Barkoczy, University of Monash Law School

Nanotechnology Victoria Proprietary Limited

Dr Peter Binks, Chief Executive Officer

NEC Australia Proprietary Limited

Ms Effie Hansen, Market Analyst

Mr Brendan McManus, Senior Executive, Corporate Planning

Starpharma Ltd and Healthfarm Foods Proprietary Limited

Dr John Raff, Deputy Chairman and Chairman respectively

Thursday, 22 March 2007 – Canberra

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Dr Roderick Hill, Executive Director, Business Development

Mr Gregory Redden, Manager, Business Strategy

D

Appendix D – Government support for the manufacturing industry

Government programmes targeted to the manufacturing industry

Scheme	Administered by	Industries	Type of assistance	Aim of programme
Automotive Competitiveness and Investment Scheme (ACIS)	AusIndustry	Automotive	Tax concession (import duty credits)	Encourage investment and innovation as tariffs are lowered from 15% to 10%
Biotechnology Innovation Fund (BIF)	AusIndustry	Biotechnology	Grants	Increase the rate of commercialisation of biotechnology projects developed in Australia
Certain Inputs to Manufacture (CIM)	AusIndustry	Manufacturing	Tax concession (import duty credits)	Reduce input costs
Enhanced Project By-Law Scheme (EPBS)	AusIndustry	Mining, resource processing, food processing, food packaging, manufacturing, agriculture and gas supply	Tax concession (tariff duty concessions on inputs)	Encourage the use of Australian industry in global supply chains
Food Innovation Grants	DAFF	Food manufacturers	Grants	Improve innovation in the food industry

Scheme	Administered by	Industries	Type of assistance	Aim of programme
National Australian Technology Showcase (ATS)	AusIndustry and state/territory agencies	SMEs with innovative technologies	Indirect assistance (promotion and networking)	Increase exports and increase employment by promoting member technologies on the domestic and international markets
Pharmaceuticals Partnerships Programme (P3)	AusIndustry	Pharmaceuticals	Grants	Promotes high quality R&D, collaborations between multinational firms and local companies
Space Concession	AusIndustry	Space sector	Tax concession allowing duty-free imports for usage in space projects	Increase the competitiveness of Australia's space industry
Textile, Clothing and Footwear (TCF) Expanded Overseas Assembly Provisions (EOAP) Scheme	AusIndustry	TCF	Tax concessions (duty concessions to firms who assemble garments and footwear overseas from predominantly Australian inputs and then import for consumption in Australia)	Assist the ongoing development of Australian TCF industries and enable them to retain their value-adding and high-skilled activities
Textile, Clothing and Footwear Product Diversification Scheme (PDS)	AusIndustry	TCF	Tax concession (non-tradeable duty credit)	Give TCF manufacturers additional incentive to achieve growth in value-added production, to globalise sourcing arrangements and diversify product range.

Government economy-wide assistance relevant to the manufacturing industry

Scheme	Administered by	Industries	Type of assistance	Aim of programme
Building Entrepreneurship in Small Business (BESB)	AusIndustry	Small Business	Indirect (training and mentoring, field officers etc)	Encouraging entrepreneurship by supporting improvement to Australia's small business operating skills
Business Entry Point (business.gov.au)	DITR	All	Indirect (information)	To bring all government requirements and assistance programmes together in one place
Commercial Ready	AusIndustry	Small Businesses	Grant programme	Encourage innovation by supporting early stage R&D in SMEs
Commercialising Emerging Technologies (COMET)	AusIndustry	Businesses in all industries looking to commercialise innovations	Grants, early start	Encourage innovation
Early Stage Venture Capital Limited Partnership (ESVCLP)	AustIndustry and the Pooled Developments Fund Board	All	Tax benefits for investors.	Increase the supply of funding to the early-stage venture capital sector through the introduction of an investment vehicle with flow-through taxation treatment and no tax liability on the investment gains for investors.
Export Market Development Grants (EMDG)	Austrade	All SMEs	Grants (up to 50% of promotion expenses)	Encourage SMEs to develop export markets
Indigenous Capital Assistance Scheme (ICAS)	DEWR	All indigenous businesses	Access to financial support and subsidises interest rates and bank fees	Increases employment opportunities for Indigenous Australians by providing access to commercial finance and culturally appropriate support services
Indigenous Self Employment Programme (ISEP)	DEWR	All indigenous small businesses	Indirect (advice and support), training and loans.	Assist Indigenous Australians to establish their own small business

Scheme	Administered by	Industries	Type of assistance	Aim of programme
Indigenous Small Business Fund (ISBF)	DEWR	All indigenous small businesses	Grants (funding for the development and expansion of Indigenous businesses and enterprises)	Assist Indigenous people to learn about business, develop good business skills and expand their business
Industry Cooperative Innovation Programme (ICIP)	AusIndustry	Requires a consortium of at least three businesses, any industry	Grants	Fosters innovation projects that enhance the productivity, growth and international competitiveness of Australian industries. Focuses on meeting strategic industry needs.
Information Technology Online (ITOL) Programme	DCITA	All businesses, particularly SMEs	Grants	To accelerate the national adoption of collaborative e-business, especially by SMEs
Innovation Investment Fund (IIF)	AusIndustry	Venture capital fund managers	Grants	Develop venture capital funding industry
New Apprenticeships Scheme	DEST	All employers	Subsidies/grants	Encourage skills development
New Exporter Development Programme (NEDP)	Austrade	SMEs	Indirect assistance (advice and information)	Help SMEs develop the skills and knowledge required to seek out and be ready for export opportunities.
Pooled Development Funds (PDF) programme	AusIndustry	Small and medium-sized enterprises	Tax benefits for funds and shareholders. Indirect assistance to SMEs by providing incentives for investment	Grows SMEs by increasing the supply of equity capital
Pre-Seed Fund	AusIndustry	Universities and public sector research agencies	Grants and indirect assistance for commercialisation of research projects	Encourage commercialisation of research discoveries
R&D Start	AusIndustry	Businesses undertaking R&D	Grants to undertake R&D and commercialisation	Encourage R&D
R&D Tax Concession	AusIndustry/ ATO	Businesses undertaking R&D	Tax concession allowing companies to deduct up to 125% of relevant expenditure	Encourage R&D

Scheme	Administered by	Industries	Type of assistance	Aim of programme
Regulation Reduction Incentive Fund (RRIF)	AusIndustry	Local government (with benefit to small and home-based businesses)	Grants to local governments, indirect assistance to small business	Reduce regulatory compliance burdens for SMEs
Supplier Access to Major Projects (SAMP)	Industry Capability Network	All suppliers	Indirect (Identify opportunities, provide assistance)	Assist Australian businesses to become involved in major projects (both Australian and overseas).
Small Business Field Officers (SBFO) programme	AusIndustry	Small business	Indirect assistance (referral and general advisory services)	Foster the growth of small businesses
Venture Capital Limited Partnerships (VCLP) programme	AusIndustry	Offshore venture capital investors	Tax concession (capital gains tax)	Increase investment in Australian venture capital by encouraging non-residents to invest.

E

Appendix E – Manufacturing sector Action Agendas

Action Agenda	Status	Supported by	Development period	Iterations	Relevant industry
Advanced Manufacturing	Under implementation	DITR	2004–05	1	Advanced manufacturing
Aerospace	Under Implementation	DITR	2001–02	1	Aircraft and parts manufacturing
Automotive	Completed	DITR	1998–1999	1	Automotive Manufacturing
Building and construction	Completed	DITR	1997–98	1	Building and construction manufacturers
Biotechnology	Completed	DITR	1998–99	1	Biotechnology manufacturing
Cement Industry	Under implementation	DITR	2004–2006	1	Cement industry
Chemicals and Plastics	Completed	DITR	1999–2000	1	Chemicals and plastics manufacturing

Action Agenda	Status	Supported by	Development period	Iterations	Relevant industry
Digital Content	Under implementation	DCITA	2003–04	1	IT manufacturing
Downstream Petroleum Products	Completed	DITR	1997–98	1	Petroleum refining
Electronics Industry	Under implementation	DITR	2001–02	2	Electronics manufacturing
Environment Industry	Completed	DITR/DEW	2000–01	1	Environment products manufacturing
Forest and wood products	Completed	DAFF	1999–2000	1	Manufacturers of wood and timber products
Furnishing Industry	Completed	DITR	1999–2000	1	Furnishing manufacturing
Heavy engineering and infrastructure	Completed	DITR	1998–2000	1	Manufacturers of infrastructure
Light Metals Industries	Completed	DITR	2000–01	1	Light Metals Manufacturing
Marine Industry	Under Implementation	DITR	2003–04	1	Boat and marine parts manufacturing
Medical Devices	Under implementation	DITR	2004–05	1	Medical devices manufacturing
Mining Technology Services	Completed	DITR	2001–02	1	Machinery and equipment manufacturing
National Food Industry Strategy	Under implementation	DAFF	2001–02	1	Food Processing
Pharmaceuticals Industry	Completed	DITR	2001–02	1	Pharmaceuticals manufacturing

Action Agenda	Status	Supported by	Development period	Iterations	Relevant industry
Printing Industries	Completed	DITR	2001–04	1	Printing, publishing, graphic arts, paper packaging and paper products manufacturing
Renewable Energy Industries	Completed	DITR	2000–01	1	Renewable energy appliance manufacturing
Science Industry	Under implementation	DITR/DEST	2003–04	1	Scientific manufacturing
Spatial Information Industry	Completed	DITR	2000–01	1	Spatial Information manufacturing
Supermarket to Asia Action Plan	Completed	DAFF	1998–99	2	Food manufacturing
Textile, Clothing, Footwear and Leather	Completed	DITR	2000–01	1	TCF Manufacturing

F

Appendix F – Comparison of other countries' manufacturing policies

Introduction

F.1 A handful of advanced economies came up in discussion during the inquiry as being 'successful' manufacturers from whom lessons might be learned. Table F.1 compares the economies with Australia, on both objective and subjective criteria. The economies are roughly ordered by the frequency with which they were nominated as exemplars.

F.2 Manufacturing looms larger in all the comparison economies than in Australia, although this is partly because many of them have virtually no mineral deposits to mine and limited farmland to grow crops. The smaller economies included, especially those on the European periphery, benefited from the necessity of having a greater export focus.

F.3 Finland and Singapore stand out as apparently being stronger performers than Australia on education and research. Germany and Sweden are also stronger on research despite having schools regarded as weaker than in Australia. Finland and Ireland are highly regarded for their venture capital and all the comparison economies are regarded as being better than Australia at forming links between universities and business.

Table F.1 Comparison of selected economies: manufacturing and economic performance

	Australia	Ireland	Singapore	Finland	Taiwan	Germany	Sweden
Mfg employment							
% of total[1]	11	14	17	18	27	22	15
% change[2]	-4	11	0.9[3]	2	1.1	-11	-14
Mfg output							
% of GDP[1]	12	27	28	22	21	23	20
Recent growth rate[4]	1.6	5.1	5.2	1.9	n.a.	1.0	2.7
Mfg exports							
% of goods exports[1]	25	86	81	84	94	83	79
R&D							
Spending / GDP[5]	1.8	1.2	2.3	3.5	n.a.	2.5	4.0
Personnel numbers[6]	1.9	2.4	3.5	6.1	3.9	3.6	5.4
Basic research[7]	13th	24th	5th	10th	30th	8th	19th
Research quality[8]	16th	15th	10th	7th	21st	6th	8th
Corporate spend[9]	28th	15th	11th	6th	12th	4th	5th
Uni-business links[10]	25th	19th	8th	3rd	7th	5th	2nd
Education							
Science teaching[11]	24th	30th	1st	5th	6th	36th	32nd
Science teaching[12]	29th	16th	1st	2nd	10th	34th	37th
Overall teaching[13]	12th	6th	2nd	1st	9th	33rd	24th
Venture capital							
Venture capital[14]	15th	7th	14th	3rd	13th	27th	12th
Venture capital[15]	15th	7th	13th	4th	24th	16th	11th
Average income							
GNY per head[16]	30.6	34.7	29.8	31.2	n.a.	29.2	31.4

Sources: *OECD, Labour Force Statistics 1985–2005, 2006; Ministry of Manpower, Singapore, Statistics, Employment 1996–2005; Directorate-General of Budget, Accounting and Statistics Taiwan, Statistical Yearbook of The Republic of China 2005, 2006; World Bank, World Development Indicators 2007; Forfás Ireland, Forfás Annual Report 2006; IMD, World Competitiveness Yearbook 2006; World Economic Forum, Global Competitiveness Report 2006-07; Agency for Science, Technology and Research Singapore, National Survey of R&D in Singapore 2005, 2006; ABS, Research and Experimental Development 2004–05, cat. no. 8112.0; Taiwan Economic Statistics, March 2007.*

1 2005.
2 1995–2005.
3 1996–2005.
4 Annual average percentage change, 2000–2005.
5 Gross expenditure on R&D as per cent to GDP, 2004–05.
6 R&D personnel (full-time equivalent) in business per thousand people.
7 Ranking out of 61 economies for whether basic research enhances long-term economic development from IMD survey.
8 Ranking out of 125 economies, WEF survey: quality of scientific research institutions (universities and government).
9 Ranking out of 125 economies for company spending on R&D from WEF survey.
10 Ranking out of 125 economies for business collaboration with universities on R&D from WEF survey.
11 Ranking out of 61 economies for whether science is sufficiently emphasised in schools from IMD survey.
12 Ranking out of 125 economies for whether schools sufficiently emphasise mathematics and science from WEF survey.
13 Ranking out of 125 economies on how education system meets the needs of a competitive economy from WEF survey.
14 Ranking out of 61 economies for availability of venture capital from IMD survey.
15 Ranking out of 125 economies, WEF survey: can entrepreneurs with innovative but risky projects find venture capital.
16 Gross national income per person, 2007, purchasing power parity basis, thousands of US dollars equivalent.

Ireland

F.4 Ireland was often mentioned during the inquiry as the exemplar of successful manufacturing policy. Among the OECD economies it is one of a few where manufacturing employment has increased. High-tech manufactures are the highest proportion of manufacturing exports of any OECD economy. Overall economic growth was also very impressive, earning it the name of the 'Celtic Tiger'.

F.5 Ireland stands out as having a concerted and clear policy of developing its manufacturing sector. However, there were a number of aspects of Irish policy that contributed to this success and there is a range of opinion about the relative importance of them. There is therefore scope for advocates of differing views to cite Ireland as 'proof' of the efficacy of their preferred approach.

F.6 One reason the Irish economy was able to grow faster than the rest of western Europe was just that it 'came off a very low base'[17]; twenty years ago Ireland's GDP per capita was only around 60 per cent of the western European average (it caught up around 2000). The economic growth literature makes clear that is easier for economies to grow fast when they are 'catching up' than when they are near the frontier, and membership of the EU likely made catching up easier.

F.7 Related to this is that as a (formerly) relatively poor member of the European Union, Ireland received substantial subsidies from the EU. These peaked at around four per cent of GDP in the mid-1990s, but have now ceased—indeed Ireland is about to become a net contributor to the EU budget.[18]

F.8 Ireland also placed substantial emphasis on education. In addition it was able to draw on the Irish diaspora. As Ireland became a more vibrant and wealthier economy, some former Irish emigrants and their descendants brought their skills back to Ireland. The diaspora may also have played some part in attracting foreign investment to Ireland.

F.9 Initially Ireland had relatively low wages by western European standards. While this is no longer true, some of the multinational companies initially attracted by low wages are now embedded in the Irish economy.[19]

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17 Dr S Kennedy, Treasury, *Transcript*, 1 December 2006, p. 5.

18 Professor R Green, private capacity, *Transcript*, 14 November 2006, p. 23.

19 Australian Manufacturing Workers' Union, *Submission no. 34*, pp. iii–iv and 54.

F.10 Ireland's total R&D is not particularly high but it is focussed on high-tech manufactures.

F.11 The Irish Development Agency offers grants of up to 60 per cent of the cost of new investment and R&D following a cost-benefit analysis.

F.12 The Australian Council of Trade Unions (ACTU) cited the Irish Development Agency's description of its strategy:

> IDA Ireland set a new course aimed at contributing to the continued transformation of Ireland to a world-leading, knowledge-based economy at the forefront of technology and business innovation. We formulated a strategy comprising three key elements:
>
> • A focus on winning new investments where the activities were at the quality end of the business value chain.
>
> • The growth and development of our existing clients through the addition of new functions and activities in Ireland, which raised the value-add of the Irish operation and increased its strategic relevance to the parent.
>
> • Actively working to develop the business environment and infrastructure, both educational and physical throughout Ireland needed to support knowledge intensive businesses. Regional development is a special priority in this regard.[20]

F.13 The ACTU also stressed that Irish policies were more successful because they had bipartisan support which gave them continuity for over a decade, and so were more likely to affect business planning.[21]

F.14 Ireland encouraged the development of clusters, and was very welcoming to foreign companies. The Irish Government tendered for providers of Centres for Science, Engineering and Technology (CSETs), offering substantial funding. CSETs were charged with forming innovation partnerships with Irish companies. Regional universities were given the opportunity to link up with the CSETs for research. Most of the contract winners were large multi-national subsidiaries that, as a result of their participation, later became embedded in the local economy.

F.15 Professor Roy Green explained to the committee:

> The Science Foundation Ireland exercise was of a similar approach. It set up a number of competitively funded CSETs—centres for

20 Australian Council of Trade Unions (ACTU), *Submission no. 27*, p. 6, citing *IDA Annual Report* 2004, p. 3.

21 ACTU, *Submission no. 27*, p. 26.

> science, engineering and technology—which had to be part of innovation partnerships with companies. In many cases these were the subsidiaries of very large companies that had sited in Ireland and the resources were used to leverage the expertise of the university with the company on specific R&D projects, which were then pursued through the structure of the company as a whole. Now HP in Galway is a major part of HP's whole R&D strategy, but it did not happen spontaneously. There was a policy instrument.[22]

F.16 Ireland has an agency for attracting investment, the IDA, and a much larger organisation, Enterprise Ireland, encouraging innovation and linkages between companies and researchers through clusters.

F.17 Ireland also lowered its corporate tax from 40 per cent in 1993 to 12.5 per cent. This gave it a temporary advantage over its European competitors. However, the average corporate tax rate in the EU-15[23] fell from around 50 per cent in 1985 to 30 per cent in 2006.[24] A number of Eastern European countries, for example Poland and the Slovak Republic, now have corporate tax rates in the 16-19 per cent range.[25]

F.18 As noted above, it is hard to decide which of these factors has been the most important. The Australian Manufacturing Workers' Union downplayed the importance of taxes and emphasised the importance of industry policy:

> If the [Australian] Treasury thesis had been slavishly followed in other countries, Ireland would still be producing potato chips rather than computer chips.[26]

F.19 The independent commentators appearing before the committee agreed that Ireland's success could not just be attributed to low corporate taxation (or any other single factor):

> And the story around Ireland is not just about a bit of industry assistance or local tax rates. There are a number of things going on there.[27]

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22 Professor R Green, private capacity, *Transcript*, 14 November 2006, p. 18.

23 The EU-15 comprises the 15 countries in the EU before the 1 May 2004 expansion; Austria; Belgium; Denmark; Finland; France; Germany; Greece; Ireland; Italy; Luxemburg; Netherlands; Portugal; Spain; Sweden and United Kingdom.

24 R de Mooij and G Nicodeme, 'Corporate tax policy: entrepreneurship and incorporation in the EU', *European Economy Economic Papers*, European Commission, December 2006, p. 5.

25 OECD, Tax database, *Taxation of corporate and capital income (2006), Table 11.1,* viewed 6 May 2007, < http://www.oecd.org/dataoecd/26/56/33717459.xls>.

26 Australian Manufacturing Workers' Union (AMWU), *Submission no. 34*, p. iv.

Singapore

F.20 Singapore is the only one of 17 advanced economies examined by ACCI where manufacturing's share of GDP increased between 1978 and 2000.[28]

F.21 Singapore's Economic Development Board targeted bioscience, pharmaceuticals and high-tech manufacturing and product design as they realised that assembly jobs in electronics would move to China. Singapore has emphasised being part of global supply chains, and its location on key trade routes and efficient ports have helped achieve this.

F.22 The Board has three key criteria is deciding which firms to assist:

> Knowledge intensity including development of new technology and innovation; tradability which in Singapore's situation means a high export orientation; and value added per worker.[29]

F.23 A stable government and a very weak political opposition mean that firms can be confident that policies will be sustained.

F.24 Singapore is a low tax country. The corporate tax rate is 20 per cent, the top personal tax rate is 21 per cent and the VAT rate is five per cent.

Finland

F.25 Finland is renowned as a relatively small economy with innovative high-tech firms such as Nokia that are competitive around the world. Finland usually ranks very high in rankings of competitiveness.

F.26 Finland is the small state with which Ireland compares itself most. There is a lot of exchange at the civil service level between Finland and Ireland—and Singapore to some degree as well.[30]

F.27 Finland has one of the highest R&D to GDP ratios in the OECD.

F.28 The 'Centres of Expertise Programme' of Tekes in Finland was emphasised by the Australian Electrical and Electronic Manufacturers' Association (AEEMA). Tekes is the main public funding organisation for research and

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27 Mr G Davis, Treasury, *Transcript*, 1 December 2006, p. 5. Similar points were made by Dr P Brain, National Institute for Economic and Industrial Research, *Transcript*, 22 November 2006, p. 38 and Professor R Green, private capacity, *Transcript*, 14 November 2006, p. 15.

28 Australian Chamber of Commerce and Industry, *Submission no. 33*, p. 10. Their sample did not include Ireland.

29 ACTU, *Submission no. 27*, p. 10.

30 Professor R Green, private capacity, *Transcript*, 14 November 2006, p. 24.

development in Finland. The goal of Tekes' funding through loans and grants for the research projects of universities, research institutes and companies is unashamedly to build technological competence in regional clusters.[31]

Taiwan

F.29 AEEMA held up Taiwan as 'the shining blueprint of economic outcomes from science/innovation-based productivity'.[32] In particular, they referred to its 'strategic commitment to the telematics industry'.

F.30 AEEMA opined that:

> The Taiwanese spell out a continuum from idea to research to development to commercialisation to 'industrialisation'. They also seem to understand better than Australia the importance in external industry development of the inter-relationship and bundling of R&D collaboration, manufacture, strategic alliances, investment attraction and export facilitation.[33]

F.31 AEEMA described the Taiwanese approach as seeking to 'create a comparative advantage'. It employed a public sector research institute, ITRI, as the vehicle for technology leverage.

F.32 Taiwan's tax rates are below Australia's, but not dramatically. The corporate tax rate is 25 per cent, the top personal tax rate is 40 per cent and the VAT rate is five per cent.

F.33 Education (especially science) is accorded a priority in Taiwan. The committee heard that:

> We [Australians] cannot get teachers who can teach kids about electricity or gravity, but here are the Taiwanese teaching primary school kids about nanotechnology.[34]

31 Australian Electrical and Electronic Manufacturers' Association (AEEMA), *Submission no. 44*, p. 14.

32 AEEMA, *Submission no. 19*, p. 7.

33 AEEMA, *Submission no. 19*, pp. 7–8.

34 Mr P Laver, Australian Academy of Technological Sciences and Engineering, *Transcript*, 28 August 2006, p. 43.

G

Appendix G – Overview of the Industry Statement 2007

G.1 According to the Department of Industry, Tourism and Resources (DITR) website:

> Following extensive consultations across the country, the 10-year, $1.4 billion Statement was released by Prime Minister John Howard and Minister Macfarlane in Sydney on 1 May 2007.'[1]

G.2 The DITR website provides an overview of the key measures contained in the Industry Statement 2007. The text from this overview is shown below.

Global Integration: Changing Markets, New Opportunities[2]

A Decade of Economic Achievement

Industry policies will fail without sound economic management. Businesses need a stable environment to invest with confidence.

Until recently, Australia has been a victim of boom-bust cycles. Since 1996, the Howard Government has made the Australian economy far more robust. Australia

1 Department of Industry, Tourism and Resources, *Industry Statement*, Canberra, May 2006, viewed online 18 May 2007, <http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?method=clientdisplay&objectID=572C46BC-F5DC-42BA-7856D5B684345986&CFID=5261216&CFTOKEN=62959872>.

2 This information is taken directly from: Australian Government, *Global Integration: Changing Markets, New Opportunities,* Australian Government, May 2007, viewed 18 May 2007, <http://www.industry.gov.au/assets/documents/itrinternet/Global_Integration20070504170028.pdf>.

has sustained strong growth despite the 1997 Asian financial crisis, the dot.com crash and long periods of stagnation in many leading countries. The 2006 IMD World Competitiveness Yearbook rates Australia as the most resilient economy in the world.

Over the decade to 2006:

- Growth has averaged 3.5 per cent;
- Real GDP has grown 41 per cent from $660 billion to $933 billion;
- Real per capita GDP has grown by more than 25 per cent, to more than $45 000;
- Two million more Australians have jobs;
- The unemployment rate has been halved;
- Real wages have risen by almost 20 per cent;
- Despite strong growth, inflation has been contained, averaging 2.5 per cent a year;
- Interest rates remained low;
- Business profitability has never been higher;
- Business investment has never been higher at more than 15 per cent of GDP; and
- Australian exports have soared at an average annual rate of 7.5 per cent.

These achievements are not accidents. Government policy has created the right conditions for businesses to grow. Industry has responded, taking up the challenge. Australia cannot afford to slide back into complacency.

Markets don't stand still – nor can our industry policies

One of the most significant changes is the concentration of trade in global supply chains. Supply chains have been rationalised, shrinking the number of businesses involved and requiring suppliers to expand to a truly global scale of production. Traded goods are now just as likely to be intermediate goods as finished products, often sold between affiliates of the same multinational enterprise (MNE). More and more industries are exposed to this international competition. The services sector is now far more open to global competition. Commodity manufacturing is under intense pressure in all developed countries. In this market, many businesses must grow to survive. Their benchmarks are global—matching overseas competitors is essential, as is finding new ways to add value to products and

services. Australian businesses will need to reassess their management, their production processes and their use of technology.

Productivity Centres: Building world class businesses

The Howard Government will increase its support to help trade exposed businesses in the manufacturing and services sectors to become more competitive.

Support will be focused on businesses with strong potential for expansion. There are about 50 000 Small and Medium Enterprises (SMEs) which have grown beyond servicing just a regional market and stand on the cusp of significant national and international growth. To deliver this support, the Government will commit $351.8 million over the next ten years to establish and operate Australian Industry Productivity Centres. The Centres will offer a range of general and specialist services.

- The Centres will provide a free diagnostic service to help businesses assess their performance against world best practice and identify opportunities for improvement. Up to 2 000 businesses a year will use this service.
- The next step for many businesses will be to seek tailored advice on critical issues such as business planning, process improvement, and lean manufacturing. For many businesses, these professional services can be too costly. The Productivity Centres will meet up to 50 per cent of the cost of the service, up to $20 000.
- Businesses seeking technology advice or access to specialised equipment will be assisted, with the Centres meeting up to 50 per cent of the costs of professional advice, up to $20 000.
- The Centres will also connect businesses with leading technology and business experts in the universities, CSIRO and the private sector.

Seizing global opportunities

Global markets create unprecedented opportunities for Australian products and services. But most businesses lack the scale and expertise to seize these opportunities.

The Government helps many businesses by subsidising overseas marketing, providing market intelligence and overseas representation. But more can be done. The Government will launch a new co-operative programme with industry. Over ten years it will provide $254.1 million to fund the Global Opportunities

programme which will mobilise the critical mass and skills for international engagement and export success.

The Global Opportunities programme will target more than 30 large international projects each year, with a combined value of at least $16 billion. Drawing on the resources of the Department of Industry, Tourism and Resources, Austrade, the Industry Capability Network and industry partners, project teams will identify the most promising opportunities for Australian industry. Consortia of Australian businesses will be formed to pursue these opportunities, giving SMEs the chance to forge new links with Australian and international businesses. To further support the export efforts of Australian businesses, the Government will expand the mandate of the Export and Finance Insurance Corporation (EFIC). To date, EFIC's activities have been restricted to providing financial and insurance services for exports. EFIC's role will be broadened to support other export-related activities, such as the establishment of offshore distribution facilities. The Government will also extend for two years the 30 export facilitators supporting Australian firms chasing new business under the US/Australia Free Trade Agreement.

Australia as a global business hub

Foreign owned businesses in Australia contribute a disproportionate share of our exports and research and development. They account for two-thirds of manufactured exports and employ around one quarter of the workforce in the sector. They are the natural partners for other Australian businesses seeking to break into global supply chains.

Many of these businesses were established decades ago to exploit markets isolated by protectionism. That rationale for investment is gone. The local market is too small and too open; Australian subsidiaries must secure niches in their global businesses, based on a capacity to create value. And the key to creating value is innovation. The Government will introduce a new initiative for continued investment by multinational enterprises in Australia. Businesses which hold their intellectual property overseas—a growing trend—do not qualify for R&D Tax Concessions. From 1 July 2007, this restriction will be abolished for the 175 per cent premium concession. Firms which boost their long-term investment in Australian innovation will be rewarded with a subsidy on their additional research and development. Making Australia a more attractive place for world class innovation will boost investment, expand our skills base and help anchor in the local arms of leading multinationals in Australia. More than 300 companies are expected to benefit from this change, generating around $200 million in new research and development each year.

Linking businesses with innovation

SMEs seeking new ideas to strengthen their business are often unaware of the resources available in our public sector research agencies and in other businesses. To help close this information gap, the five year $20.1 million Intermediary Access Programme will fund services to link businesses with possible technology partners. SMEs will receive support to acquire and manage new technology and knowledge. Provision of an additional $90.3 million over ten years to the successful Commercial Ready programme will help public sector researchers and start-up companies take the first steps to commercialising their research. New grants offered through the programme will support proof of concept and early stage commercialisation.

CSIRO is a valuable knowledge asset for Australian business. The Government will strengthen the links between CSIRO and business through a $36.2 million National Research Flagship for Niche Manufacturing. This funding will be provided over four years. The Flagship will work with industry to create commercial opportunities from CSIRO research, in particular nanotechnology. The potential for products using nanotechnology is enormous: the global market for nanotechnology products and services could be as great as US$2.6 trillion over the next decade. The Government will provide $21.5 million over four years for a National Nanotechnology Strategy to ensure Australia captures the full benefits of nanotechnology. With food processing a key part of the manufacturing sector, the Government will continue to support Innovation in the sector by providing $54.2 million over four years for the Food Innovation Grants programme.

Initiatives for small business

The Government has long assisted small business operators seeking to improve their skills and business planning. $14.3 million over two years will be committed to extend the successful Building Entrepreneurship in Small Business programme. The programme funds a network of more than 60 Small Business Field Officers across Australia. The Government will slash the red tape involved in establishing a business. A single online registration for both the Australian Business Number (ABN) and State/Territory registered business names will be introduced. This streamlined process will simplify registration of about 600 000 ABNs and 250 000 business names each year, at a cost of $89.2 million over ten years.

H

Appendix H – National assistance organisations

Introduction

H.1 The Australian Government provides industry assistance through a mix of agencies and departments. Those most closely associated with the manufacturing sector include the Department of Industry, Tourism and Resources (DITR); its agencies AusIndustry and Invest Australia; and the Department of Foreign Affairs and Trade's (DFAT) export agency, Austrade. The Australian Government also contributes jointly with the states and territories to a buyer-supplier facilitation network, the Industry Capability Network Limited (ICN). The responsibilities and functions of these agencies are discussed below.

AusIndustry

H.2 AusIndustry is the primary support agency of DITR. Its role is to administer DITR policy by delivering direct and indirect support to all sectors of industry. It oversees a raft of industry programmes (as outlined in Appendix D); the most significant to the manufacturing sector have been discussed throughout the report.

H.3 Non-financial assistance provided by AusIndustry is largely restricted to advice about funding programmes. Much of this guidance is provided via customer service managers located in 26 Australia-wide offices. The agency's website focuses on the mechanics of financial support programmes only, supplemented by a telephone hotline to support officers.

H.4 AusIndustry also delivers the national Australian Technology Showcase[1] (ATS) jointly with states and territories. The ATS facilitates networking, provides international promotion of Australian advanced technologies and innovations, and maintains a database of Australian innovators. It is a mechanism for providing innovation linkages and promoting Australian innovation.

H.5 The ATS appears to be poorly promoted. The committee learned of the Showcase from a witness appearing in a private capacity. DITR did not refer to the ATS in its evidence. Mr Tony Strasser thought the Showcase was a worthwhile initiative:

> Things like Australian Technology Showcase are good because they put those manufacturers in front of others. When the international manufacturing community sees some of the capacity in Australia, they get quite interested, but they do not get in front of companies enough.[2]

Austrade

H.6 Austrade is the export market and international business focused agency of DFAT. It also provides advice on investment in other countries for trade purposes. The agency has 18 domestic offices and a presence in more than 140 overseas locations to help provide access to overseas markets and international business opportunities. It has the largest international trade office presence in China with 100 staff spread across 15 offices.

H.7 Austrade delivers one major grant programme—the Export Market Development Grants.

H.8 Austrade helps existing exporters and aims to foster a culture of export within domestically focused businesses. Whilst Austrade does not directly seek out potential exporters, it conducts regional fora and outreach programmes, often with grass roots manufacturing contact. The Austrade submission detailed its recent success in helping Australian industry globalise:

> Preliminary results for the 2005–06 financial year indicate that Austrade assisted 5,132 clients in exporting activities, a 17.8 per cent increase compared to the 2004-05 level (4358). Of these clients,

1 Website viewed 12 May 2007, < http://ats.business.gov.au/ATSCM/HomePage.aspx>.

2 Mr T Strasser, *Transcript*, 29 August 2006, p. 41.

> 3266 (63.6 per cent) were established exporters and, significantly, 1866 (36.4 per cent) were new exporters.[3]

H.9 Austrade and a range of local private and public sector organisations have formed 54 export assistance 'TradeStart' offices located in all Australian states and territories. TradeStart offices administer the New Exporter Development Programme (NEDP), which provides new, eligible exporters with free export market advice and on-site coaching over a twelve month period. An information portal, the 'Export Hub,' provides the internet face to both the TradeStart assistance and also export oriented AusIndustry programmes. Neither NEDP nor TradeStart featured in this inquiry's evidence.

Industry Capability Network Limited

H.10 The Industry Capability Network (ICN) operates in Australia and New Zealand to assist businesses maximise opportunities that arise from purchasing requirements in the government and private sectors. The original focus was on import-replacing manufacturers but it is now moving towards major international projects and global supply chain opportunities. Although it is an independently managed organisation, the national office is funded by the Australian government (which provides the IT interface to all the regional offices), and the state and territory offices funded by their governments.

H.11 To assist small to medium businesses with breaking into global supply chains or working on major overseas projects, the ICN has developed a nationwide database, called the Supplier Showcase, of industry *capabilities* (not *products*).[4] Information is fed in directly from the regional ICN offices.[5] The national ICN office outlined the process:

> Where we come in is that we provide the industry capability system, the ICS, which is the IT for all of them [ICN branches] to operate. That is funded through our office [national office] and has listed on it about 36,000 Australian companies...[6]

H.12 The database enables staff to identify and match capability with interested buyers who contact the ICN looking for a manufacturer's capability to produce a particular good. Registration of capability by a business is

3 Austrade, *Submission no. 18*, p. 3.

4 Austrade operates an *Australian Suppliers Directory* which promotes Australian goods and services on-line. A viewed, 16 May 2007, <http://www.austrade.gov.au/ASD/default.aspx>.

5 There are 24 offices located throughout Australia.

6 Mr D McLachlan, ICN, *Transcript*, 2 November 2006, p. 5.

voluntary and can be done on-line, however these résumés are not made public.

H.13 While the ICN do not provide accreditation of manufacturers on their database, they do ensure that businesses have genuine and suitable capabilities.[7]

H.14 An on-line register of major projects is also maintained and suppliers may register their interest in a particular project.[8] The 'applicants' are vetted by the ICN for capability suitability for a major project. This may involve site visits, but the ICN is not involved in awarding contracts.

H.15 Expert consultants may be funded to work with major project developers and act as intermediaries between project managers and capable suppliers under the Supplier Access to Major Projects (SAMP) scheme. The funding covers the transaction and time costs of researching the capability needs of projects and providing links to businesses that can meet these. SAMP Global extends the scheme to overseas major projects.

H.16 The ICN works collaboratively with Austrade to connect Australian businesses with supply chain opportunities and international major projects.

Invest Australia

H.17 Invest Australia is Australia's inward investment promotion agency, within the DITR portfolio. It was set up in 1997 as an initiative of the *Investing for Growth* statement, to amalgamate all of the federal government's then existing investment attraction functions.

H.18 The agency provides support, information and advice to prospective foreign investors on Australian regulations and incentives, and may tailor packages to assist setting up a business in Australia. The agency employs investment specialists in 15 international locations.

H.19 Australia may want to attract foreign direct investment for manufacturing for three broad reasons:

- Australians may not invest sufficiently in existing Australian manufacturing, either directly or indirectly;
- foreign direct investment can create 'technology transfers'; and

7 Mr D McLachlan, ICN, *Transcript*, 2 November 2006, p. 10.

8 The on-line version is called the Project Gateway.

- when foreign companies enter the 'global supply chain' by establishing within Australia, their presence may provide a stronger link between Australian manufacturers and international supply chains.

H.20 Invest Australia, in evidence to the Committee's concurrent services inquiry, reported that it had attracted considerable FDI across all industry sectors:

> In 2005–06 Invest Australia played a role in attracting or facilitating 94 projects which, if they all proceed, will be worth in excess of $16 billion and create nearly 6,000 jobs.[9]

9 Mr B Jones, Invest Australia, *Transcript (Services)*, 1 December 2006, p. 36.