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COMMISSION

COMPUTER HARDWARE SOFTWARE AND RELATED SERVICE INDUSTRIES

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INDUSTRY
COMMISSION

30 June 1995

The Honourable George Gear MP
Assistant Treasurer
Parliament House
CANBERRA ACT 2600

Dear Assistant Treasurer

In accordance with Section 7 of the *Industry Commission Act 1989*, we have pleasure in submitting to you the report on the *Computer Hardware, Software and Related Service Industries*.

Yours sincerely

Max Parker
Presiding Commissioner

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Associate Commissioner

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
ADCAL	Australian Development Capital Association Limited
ADP	automatic data processing
AEMS	Australian Electronic Manufacturing Services
AEEMA	Australian Electrical and Electronic Manufacturers' Association
AIIA	Australian Information Industry Association
ANAO	Australian National Audit Office
ANZ	Australia and New Zealand
APCMA	Australian Printed Circuit Manufacturers' Association
AS	Australian Standard
ASIC	Australian Standard Industrial Classification
ASQRI	Australian Software Quality Research Institute
ATG	Australian Technology Group
ATIA	Australian Telecommunications Industry Association
ATO	Australian Taxation Office
BIE	Bureau of Industry Economics
BSAA	Business Software Association of Australia
CCG	Copyright Convergence Group
CD-ROM	compact disk read-only-memory
CLRC	Copyright Law Review Committee
COAG	Council of Australian Governments
CRATMA	Canberra Region Advanced Technology Manufacturing Association
CUC	Common Use Contract
DAS	Department of Administrative Services
DCTWA	Western Australian Department of Commerce and Trade
DIST	Department of Industry, Science and Technology
EFIC	Export Finance and Insurance Corporation
EIAWA	Electronic Industries Association of Western Australia

EITO	European Information Technology Observatory
EMDG	Export Market Development Grant
EMP	Export Market Planning
EPROM	erasable, reprogrammable read-only-memory
ESA	Endorsed Supplier Arrangement
FBT	fringe benefits tax
FTA	Fixed Term Arrangement
GATT	General Agreement on Tariffs and Trade
GBE	government business enterprise
GIRD	Grants for Industry Research and Development
GITC	Government Information Technology Conditions
IAC	Industries Assistance Commission
IC	Industry Commission
IDC	International Data Corporation
IEC	International Electrotechnical Commission
IIP	Industry Innovation Program
IIS	Industry Impact Statement
IR&D	Industry Research and Development
ISDN	integrated services digital network
ISO	International Organisation for Standardisation
IT	information technology
IT&T	information technology and telecommunications
ITES	International Trade Enhancement Scheme
ITR	Invitation to Register
ITRG	Information Technology Review Group
LAN	local area network
MIC	management and investment company
MIPS	mega instructions per second
MOD	Ministry of Defence
MS-DOS	Microsoft disk-operating system
na	not available/applicable
NATA	National Association of Testing Authorities

NIES	National Industry Extension Service
NPA	National Preference Agreement
NSG	National Supply Group
NZS	New Zealand Standard
OEM	original equipment manufacturer
PABX	private automatic branch exchange
PC	personal computer
PCB	printed circuit board
PDF	Pooled Development Fund
PFD	Partnerships for Development
PSA	Prices Surveillance Authority
QMS	Quality Management System
R&D	research and development
RFI	Request for Information
RFP	Request for Proposal
RFT	Request for Tender
RISC	reduced instruction set computer
SCIP	Standing Committee on Industry Procurement
SIP	Systems Integration Panel
SMA	Spectrum Management Agency
SME	small and medium sized enterprise
SSDP	Software Standards Development Program
TEXCO	Tariff Export Concession
TCC	Tax Concession Committee
TCO	Tariff Concession Order
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UCC	Universal Copyright Convention
USA	United States of America
VLSI	very large scale integration
VQS	Vendor Qualification System
WIPO	World Intellectual Property Organisation
WTO	World Trade Organisation

TERMS OF REFERENCE

I, George Gear, Assistant Treasurer, under Part 2 of the Industry Commission Act 1989:

1. refer Australia's computer hardware, software and related service industries to the Industry Commission as an Industry Development Reference, for inquiry and report by 30 June 1995;
2. specify that in making its recommendations the Commission aim to improve the overall economic performance of the Australian economy;
3. request that the Commission report on:
   (a) emerging trends in local and global markets for the computer hardware, software and related service industries, including trends in technology convergence and protection of intellectual property and the role of government purchasing policies;
   (b) the international marketing environment, including barriers to Australian investment, exports and import replacement;
   (c) the availability and terms under which firms in the computer hardware, software and related service industries can access finance, including venture capital;
   (d) the current structure and competitiveness of the computer hardware, software and related service industries, including an identification of strengths and weaknesses, drawing international comparisons where appropriate;
   (e) the taxation treatment of computer hardware, software and related service industries and Australian standards for the production of computer hardware and software;
   (f) the potential for further development of the computer hardware, software and related service industries, including the scope for further value adding, investment, exports and import replacement;
   (g) any measures which could be undertaken to remove impediments or otherwise contribute to the efficiency, growth and internationalisation of computer hardware, software and related service industries, in ways that are consistent with efficient resource use in the economy;
   (h) the identification of groups who would benefit or be disadvantaged by 3(g) above; and
   (i) the effects on the computer hardware, software and related service industries, and the economy in general, of any measures recommended by the Commission;
4. without limiting the scope of this reference, request the report also include:
   (a) an evaluation of government programs aimed at improving industry performance, including the Computer Bounty and the scope to improve the efficiency of program delivery through better co-ordination within and between Governments;
   (b) without disclosing material provided in confidence, examples of past successes and failures in the computer hardware, software and related service industries, both in Australia and elsewhere, by way of case studies or other means;
5. specify that the Commission report on any relevant implementation strategies;
6. specify that the Commission take account of recent substantive studies undertaken elsewhere; and
7. specify that the Commission have regard to the established economic, social and environmental objectives of governments.

GEORGE GEAR
29 September 1994

COMPUTER HARDWARE SOFTWARE AND RELATED SERVICE INDUSTRIES

OVERVIEW
KEY FINDINGS AND RECOMMENDATIONS

OVERVIEW

Australia's IT industries ...

This report examines factors affecting the efficiency, growth and internationalisation of Australia's computer hardware, software and related service industries. The activities covered are broadly Australia's Information Technology (IT) industries.

The IT industries are important in their own right, and for the contribution they make to improving productivity and enhancing growth elsewhere in the economy. Indeed, developments in these industries, and in telecommunications, are having a profound effect on production processes and the manner in which business is conducted throughout the economy. They are amongst the fastest growing industries, globally and in Australia.

Australia's IT industries

... are growing at more than 10% per annum.

In 1994, revenue from IT sales in Australia was about $13 billion. In the years immediately ahead, revenue is expected to grow at about 10 per cent per annum, the fastest growth being in services (19 per cent) and software (14 per cent).

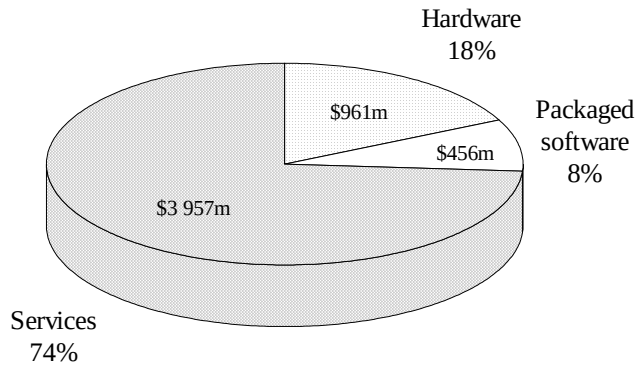
Niche market production ...

Australian-based firms manufacture or assemble personal computers (PCs) and a wide range of other hardware products, as well as some application-specific components. Australia does not have a major capability in the manufacture of components — volume production of standard electronic components ceased in the early 1990s. However, there is significant design and manufacture of niche market hardware.

... and service provision are important.

Much of Australia's IT production involves the design and development of software and the provision of IT-related services. A substantial part of the output of the IT industries is on the back of major telecommunications, banking and other commerce, and transport and mining projects within Australia and abroad.

Australian IT production, 1992-93



Total = $5 374 million

Most firms are small ...

At 30 June 1993, there were 6500 Australian IT firms employing a total of 46 000 persons. Most firms were small (95 per cent employed fewer than 20 persons each) but less than 1 per cent of firms accounted for nearly half of the industries' employment. Sixty five per cent of firms provided computer consultancy services.

... and there is significant trade in hardware.

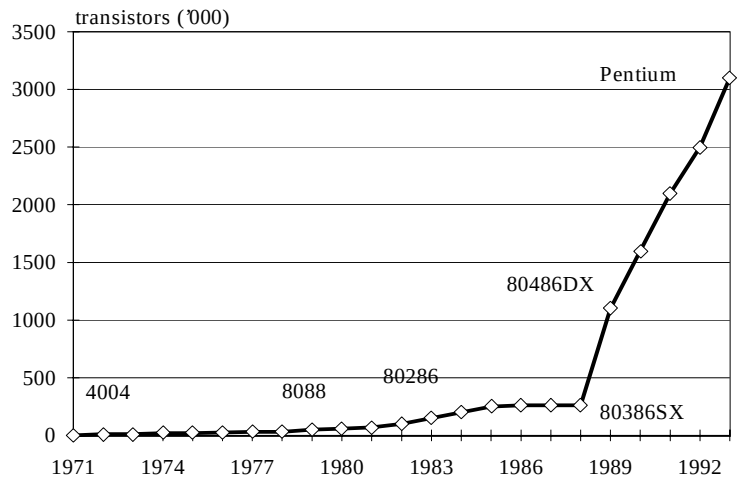
In 1993-94, Australia imported $6.1 billion in IT products and services and had exports of $2.3 billion. Of those exports, hardware accounted for 78 per cent and software and services, 22 per cent. APEC countries, which includes North America, provided 90 per cent of Australia's IT imports and purchased 74 per cent of exports.

Technological change

Rapid technological change is a feature of these industries ...

The rapid rate of technological change which has always been a feature of the IT industries has accelerated since the late 1980s. As microprocessor chip densities have increased, the price of computing power has plummeted. In parallel with these developments have been advances in telecommunications technology and in software engineering.

Chip density in Intel microprocessors



... which are converging with the telecommunications industries.

Although telecommunications is not under reference, developments affecting that industry are an important backdrop to this inquiry. The computer and telecommunications industries are rapidly converging as sound, text, graphics, image, and video are digitised.

Opportunities

IT&T exports were $2.6 billion in 1994 and ...

The convergence of technologies has created opportunities for innovation and the marketing of new products and services across the whole spectrum of information technology and telecommunications (IT&T) industries. The Australian Information Industry Association (AIIA), for instance, believes that revenues of the joint industries can rise from $23.5 billion in 1993 to $40 billion by 2000, with exports of $10 billion per year by the turn of the century compared with $2.6 billion in 1994.

... there are emerging opportunities in the East Asia region.

The East Asia region (which accounts for 19 per cent of the global IT&T market) is a very rapidly growing, and as yet relatively undeveloped, market for IT&T products. Our proximity to this market, with which we share a common time zone, provides promising export opportunities.

Inquiry participants held very positive views about the future of the IT industries and the ability of their own firms to take advantage of the emerging market opportunities. There are sound grounds for optimism.

Australia's IT strengths

The strengths which contribute to the favourable outlook are:

The industries have many strengths which provide sound grounds for optimism.

- *A skilled and innovative workforce:* There has been no recent serious shortage of staff with skills in IT. The industries attract innovative personnel, and the working environment and the cost of skilled labour in Australia compare favourably with leading countries abroad.

- *Access to technology:* Despite a comparatively small market, Australia is regarded as a sophisticated user of IT products and is occasionally used as a test bed for new products. Ready access to technology puts Australia in a strong position to be competitive in world markets. Many Australian firms are at the leading edge of technological developments in computer and telecommunications hardware and software design and production.
- *Development of niche markets:* Australian firms have demonstrated an aptitude for developing niche markets. Small scale is not necessarily an impediment to global sales of software and some hardware and peripherals. Firms producing for a niche market can be very competitive.
- *Government support of R&D:* Business R&D appears to be more generously supported by governments in Australia than in most other developed countries — and the IT industries require high levels of expenditure on R&D.
- *Economic and political stability:* The stable economic and political environment can add to investor confidence.

The industries' strengths can be enhanced ...

There is considerable scope to build on Australia's strengths in IT, notably in software, the integration of software and hardware, and the production of hardware for niche markets. The challenge is not only to achieve gains in productivity, but to innovate and stay ahead of overseas competitors in the commercialisation of new products of high quality.

... by the firms' own initiatives ...

Many of the initiatives required to take advantage of emerging opportunities can only come from the firms themselves. Indeed, these are industries in which the very survival of firms depends upon their own achievements in research and development and their capacity to market innovative products.

The search for new products is a driving force — particularly in those segments of the IT industries where products have a shelf life as short as 12 months before they are replaced or undergo major revision.

... and by governments.

However, the future of the IT industries also depends upon the actions of governments, including the ways in which they use their substantial presence in the marketplace as purchasers of IT products.

Government programs

Some government programs need close scrutiny.

The IT industries are relatively free of regulation, and reform of the regulatory arrangements for telecommunications has contributed to the burgeoning market opportunities across the IT&T industries. Nevertheless, there are three areas of government involvement in the IT industries which the Commission has identified as requiring close scrutiny and reform. They are:

- government IT procurement;
- government support for R&D; and
- industry assistance — the computer bounty and tariffs.

Government IT procurement

Governments influence the success of the industries ...

The Commonwealth Government is a major purchaser of IT products in Australia, accounting for more than 11 per cent of the total market. In 1993, Commonwealth Government agencies (not including government business enterprises (GBEs)) spent $1.3 billion on purchases of IT hardware, software and services.

... through their procurement of IT products.

Commonwealth Government IT purchases 1993

IT sector	*$ million*	*Percentage of IT sector sales*
Hardware	286	10
Packaged software	205	13
Data communications equipment	107	17
Services	198	11
Maintenance and other	524	11
Total	**1 320**	**11**

When State and local governments and GBEs are included, government purchases account for 40 to 50 per cent of the Australian IT market. Consequently, the procurement arrangements of governments can have a major influence on the performance of the IT industries — either to their benefit, or to their detriment.

Doing business with governments is costly.

The inquiry found many concerns about the cost and complexity of doing business with governments. The concerns stem from both the administrative arrangements and the ways in which governments use their buying power to influence the growth and location of industry.

Commonwealth purchasing programs

The PFD and FTA programs ...

In 1987, the Commonwealth Government announced an Information Industries Strategy, a central feature of which is the Partnerships for Development (PFD) program — a program to encourage international firms, which are major suppliers to government, to undertake more local investment and R&D, and to provide Australian companies with greater access to international marketing networks and technology. Since 1991, other government IT&T suppliers have been encouraged to undertake industry development activities by entering into Fixed Term Arrangements (FTA) with the Commonwealth Government.

... embody a national approach to industry development which could be ...

The PFD and FTA programs avoid many of the shortcomings of earlier programs that required companies to 'offset' part of the imported value of large government contracts with local activities such as investments, R&D and technology transfer. The PFD and FTA programs are not tied to specific contracts — companies have a desirable degree of flexibility in the ways in which they go about meeting their commitments. The programs also preserve a national approach to industry development.

... undermined by recent policy shifts.

Recent policy shifts are in danger of undermining these benefits.

Endorsed Supplier Arrangements and ...

An 'Endorsed Supplier Arrangement' has been introduced 'to further encourage world best practice and a commitment to long term value-added activities in Australia from suppliers'. The arrangement applies to all potential government suppliers and requires them to have manufacturing or service provision facilities in Australia before access to government IT business will be considered.

It is sound commercial practice, which benefits both suppliers and purchasers, for governments to prequalify suppliers of certain goods and services which are purchased by government agencies. For example, prequalification avoids the need to reassess the financial viability of an enterprise each time it submits a tender for government business.

The requirements which firms must meet for Endorsed Supplier status extend well beyond the obligations which could reasonably be expected of firms prequalifying as IT suppliers. They act as a barrier to small firms seeking access to the government market, discriminate against foreign firms and specialist distributors, and restrict government purchasing opportunities.

... a new approach for major acquisitions have shortcomings and are ...

In a new approach for major acquisitions, government purchasing agencies are now required to prepare Industry Impact Statements, which identify industry development opportunities arising from each contract, and to adopt a 'two-envelope approach' to tendering. Tenderers are expected to address these opportunities in an industry development proposal (the second envelope) when submitting tenders. Individual contracts will include industry development performance clauses.

... compromising the value for money objective.

The Commission has examined the difficult trade-offs that have to be considered where governments attempt to link industry development objectives with value for money in government procurement. Recent policy shifts are compromising the value for money objective.

One effect of imposing industry development obligations through specific contracts is to limit the flexibility of firms' operations. This is likely to result in a less efficient and less dynamic industry.

Industry development should not be pursued through individual contracts.

The Commission has concluded that industry development undertakings should not be pursued through individual IT contracts.

State Government purchasing

The IT procurement policies now being developed in some States reflect a degree of disenchantment with the PFD and FTA programs. Some States and Territories believe they should have a larger share of IT industry development through those programs.

State Governments are reverting to offset-like arrangements ...

They have reverted to offsets-like arrangements and are asking suppliers for industry development commitments over and above any that they may have under the PFD and FTA programs. There is increasing resort to incentive packages, preferential arrangements, and various forms of leverage to promote development at the local level.

The South Australian Government, for instance, has given priority to the nurturing of the software industry and sees the outsourcing of IT infrastructure as a means to leverage significant investment from a multinational firm. The Victorian Government required a data centre to be located at Ballarat in the outsourcing of IT services related to VicRoads and the Victorian Public Transport Corporation.

... which threaten to fragment the IT industries.

All of these arrangements carry the risk that firms and activities within the IT industries will be fragmented. They run counter to the national approach to government procurement and put at risk the development of competitive Australian industries.

In 1991, a national approach was re-affirmed by the States and the Commonwealth through the 'Government Procurement Agreement'. In the Commission's view the benefits of such an approach should not now be ignored. The task for governments is to ensure that the IT industries are encouraged to develop, across Australia, in ways which enhance, rather than detract from, their international competitiveness.

Transparency and discretion

There is too little transparency and ...

Transparency is important in highlighting the costs to the community of requiring firms to undertake activities over and above those that are commercially justifiable. The cost should not be disguised. At present the costs do not appear to be fully calculated, nor are they made public.

... too much administrative discretion.

The Commission is concerned at the high level of administrative discretion inherent in specifying industry development obligations; in deciding whether penalties for non-compliance will be imposed; and in setting the level and nature of penalties.

The IT industries in Australia are growing at a rapid pace and will do so *with or without* government intervention in the procurement process. There is a danger that the high growth rate will mask any detrimental effects of intervention. Indeed the pace of growth is likely to be presented as evidence of the value of intervention.

Potential costs

Tender prices can increase and other compensation may be needed.

Unless the industry development required to gain a government purchasing contract is commercially justifiable in its own right, tenderers will be unwilling to proceed or they will seek offsetting benefits. Governments will either have to accept higher tender prices or compensate firms with measures such as the provision of infrastructure, soft loans, tax concessions or tariffs. Experience demonstrates that compensation of this kind tends to be perpetuated.

Governments may eventually be faced with the choice of providing continuous support to a fragmented industry (an unsustainable long-run strategy) or dealing with the adjustment problems of many small IT firms if the larger firms eventually consolidate their operations within Australia, or offshore.

The major IT firms are aware of the costs of fragmentation but have no choice at present but to respond commercially to the various investment, location, and production inducements they are offered.

Support for research and development

R&D is a major expense of the IT industries.

The computer hardware, software and related service industries are characterised by high levels of expenditure on R&D, and government procurement programs require firms to make commitments to ongoing R&D expenditure. Consequently, the support that governments provide for R&D through the competitive grants scheme, the 150 per cent R&D tax concession, and concessional loans for commercialisation of technological innovation, is of great benefit to these industries.

Other assistance for R&D comes through the computer bounty, collaborative schemes (including the Cooperative Research Centres program) and government support of research institutions.

Government support of R&D has been beneficial, but ...

The Commission's report on *Research and Development*, found that the 150 per cent tax concession has brought net benefits to the Australian economy.

... companies not earning taxable profits are disadvantaged.

Participants in this inquiry are generally supportive of the R&D tax concession scheme, claiming that it is their major form of assistance. However, companies that are not earning taxable profits are unable to benefit from the concession — a bias only partly offset by the competitive grants scheme and by R&D syndication arrangements. This is important for firms in the IT industries which typically incur losses in their formative years.

In its report on *Research and Development* the Commission has proposed that, on equity, efficiency and administrative grounds, the discretionary arrangements for assisting R&D in tax loss companies be replaced by more generally available support.

A solution has been proposed.

In particular, in that report, the Commission has proposed that a generally available non-taxable grant should be introduced in place of competitive grants for companies not earning taxable profits. At the current company tax rate of 36 per cent, the grant would be at the rate of 18 per cent of expenditure on eligible R&D.

Such arrangements, if adopted, would remove an anomaly in the major form of assistance available to firms in the IT industries.

Industry assistance

Related and converging technologies ...

The IT&T industries are variously assisted by Customs duties on imports and the computer bounty. The assistance regime has not kept pace with technological change. At present:

- computer hardware is assisted by a bounty paid on value added, with imports entering free of duty;
- telecommunications equipment is assisted through a tariff on imports;

... are afforded different forms ...

- components, many of which are common to both computers and telecommunications equipment, attract a bounty or a tariff, depending on how they are described;

... and levels of assistance and ...

- some computer software classified as systems software attracts a bounty whereas applications software does not — imports of software enter duty free; and
- other computer services are ineligible for the bounty and can be imported free of duty.

... there is a bias against services.

Under this assistance regime, some software is bountiable, most is not, and the tariff treatment of components varies. There is also a bias against services and solutions and applications software.

The computer bounty

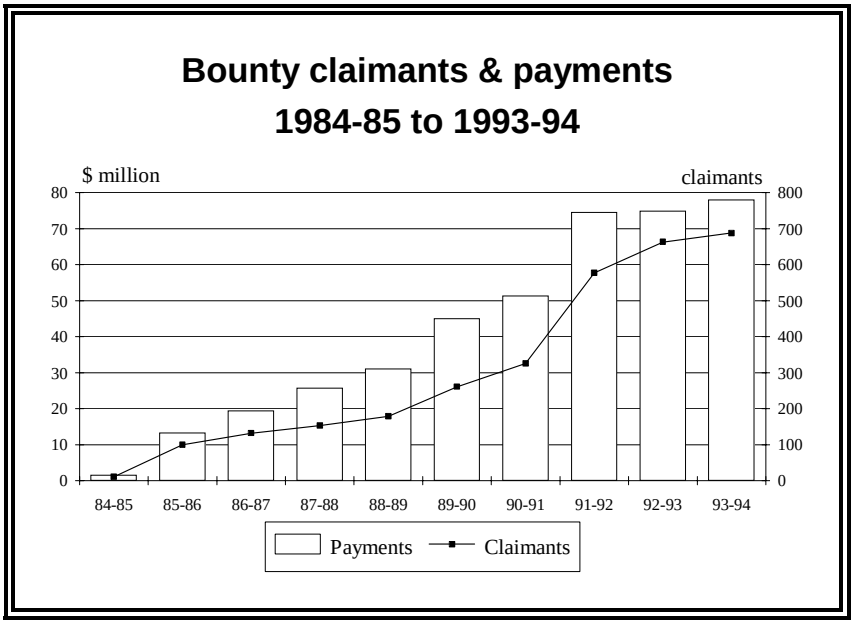
The computer bounty is due to expire in December 1995.

A bounty, paid at the rate of 8 per cent of factory cost, is available to domestic producers of eligible hardware and some software. The scheme commenced in 1984 (at a rate of 25 per cent of factory cost) and is scheduled to expire in December 1995.

The rate of bounty has been reducing in tandem with general reductions in assistance to Australian industry, but total payments have not fallen. There has been a steady increase in the number of firms claiming the bounty, including many firms undertaking simple assembly.

Bounty payments totalled $78 million in 1994 — a few firms got a lot, and many got a little.

Bounty payments totalling $78 million were made to 688 claimants in 1993-94. There is a wide dispersion in the value of payments. For instance, in 1993-94, the top 12 firms (2 per cent of claimants) were each paid more than $1 million and accounted for 40 per cent of the total value of payments, whereas the bottom 40 per cent of claimants accounted for less than 3 per cent of the value of the bounty.



Definition and classification problems ...

Since the bounty's inception, the arrangements referred to above have given rise to a succession of administrative disputes relating to the definition and classification of products for bounty or tariff purposes. Firms have been encouraged to lobby for favourable administrative decisions.

... have been compounded by the convergence of technologies.

The convergence of technologies is compounding these problems and is reinforcing the need to reduce assistance anomalies across the boundaries of computing and telecommunications based industries. It is clear that demarcation problems cannot be resolved through administrative changes to classifications and definitions.

The rationale which supported the bounty's introduction ...

The bounty was an appropriate form of assistance in the high tariff environment in which it was introduced (it compensated firms for the very high (input) tariffs at that time and for the loss of tariff protection on their output). Yet the main benefit arose from the duty free access to imports which accompanied its introduction — the competitive position of using industries was greatly enhanced.

... has been substantially eroded.

Since then, the 'compensation' rationale for the bounty has been substantially eroded by general reductions in tariffs. It no longer provides a compelling reason to provide a narrowly defined group of producers with bounty assistance.

The bounty is not an appropriate industry development tool ...

Some participants attribute an industry development role to the bounty. They see the bounty as an important source of finance. The Commission acknowledges that the bounty contributes to the upgrade of plant and equipment and supports expenditure on R&D. But this does not necessarily make the bounty an appropriate industry development tool for the IT industries. It is provided to less than 20 per cent of Australian IT production, the remainder being ineligible. Furthermore, much of that ineligible activity is undertaken in areas identified as having the most promising growth prospects — the development of software and systems integration and other computer services.

Inquiry participants suggested various ways to fine tune the eligibility criteria for the bounty — by the exclusion of small (or large) claims; paying only indigenous companies; excluding low value added assembly operations; including software; and restricting payments to computing and telecommunications applications. However reshaping the bounty to provide preferment to a different mix of hardware (or software) producers would not overcome the problems that result from the bounty arrangements in conjunction with the existing tariff regime.

... and should be allowed to lapse.

In recommending that the bounty should lapse, the Commission has taken into account the rationale for its introduction, the anomalies which exist in the structure of assistance to the IT industries, the selective assistance which the bounty now provides, the introduction of generally available schemes to assist industry development, and the prospect that future development and convergence of technologies will compound the definitional and administrative difficulties of the bounty.

Withdrawal of the bounty will contribute to a more consistent assistance regime across the IT industries and be a step towards the elimination of arbitrary distinctions at the interface between computing and telecommunications. The anomaly between assistance to systems software and applications software, as well as all other services, will be removed.

Current recipients of the bounty will be affected by its withdrawal. But the bounty's withdrawal should be viewed in the light of current industry policy settings which emphasise generally available schemes such as those directed at R&D, rather than providing industry-specific support for firms requiring protection from import competition.

Removal of bounty will trigger some restructuring ...

The Commission expects the high turnover of firms, which has been a feature of industries associated with rapid technological advances, to continue. The market for some of the high volume hardware products (for example, personal computers) will become more competitive. The removal of the bounty will affect the viability of some of the smaller hardware assemblers. In other areas, such as printed circuit board manufacture, rationalisation may be accelerated. Nevertheless, the growth of the IT industries as a whole will not be significantly retarded.

... but the net effect on firms will depend on future assistance arrangements for R&D.

If the Commission's proposals in its *Research and Development* report are implemented, companies not earning taxable profits will benefit from a tax credit or grant of 18 per cent of the value of their R&D expenditure. For some IT firms this will more than offset the loss of the bounty. But where firms currently receive the bounty and also benefit from the 150 per cent R&D tax concession, withdrawal of the bounty will mean a net reduction in assistance.

While the industry has been on notice that the bounty would terminate at the end of 1995, the request for the Commission to report on the bounty in this inquiry raised understandable expectations that the bounty might be extended. This contributed to some uncertainty in these industries, particularly in relation to the eligibility for bounty of current R&D expenditures. Consequently, at the time of release of the draft report, the Commission wrote to the Minister proposing that an early announcement be made to extend the computer bounty for six months to 30 June 1996. If this extension is not granted, the bounty will lapse on 31 December 1995.

Tariffs on imports

Some tariff anomalies will remain.

When the bounty on computer hardware comes to an end, the differential tariff treatment of telecommunications and computing equipment will remain. The tariff on telecommunications equipment is to be reduced to 5 per cent in July 1996 whereas computer equipment will remain on a zero tariff.

The Commission has not recommended reinstating a tariff on imports of computer hardware. To do so would remove one tariff anomaly but would create others. A tariff would provide assistance even more selectively than the bounty in that it would apply only to import-competing hardware manufacture (and not to exports) and not to any software or services. Furthermore, a tariff would inflate the prices of this important input to user industries.

The option was not proposed by any participant.

Further progress in removing anomalies between assistance to telecommunications equipment and computing equipment will depend on the results of the Commission's expected inquiry into telecommunications equipment, systems and services, and the Commonwealth Government's response to the findings of that inquiry.

Constraints on development

While government purchasing arrangements, support for R&D, and the future of the computer bounty are clearly areas of major concern for inquiry participants, there are other issues which they see as constraints on their further development. These include setting of Australian standards, access to finance, protection of intellectual property, and taxation issues.

Australian standards

Participants favoured international standards ...

Participants expressed two concerns relating to the setting of Australian standards which affect the IT&T industries: first, that wherever possible, Australian standards should mirror international standards; and second, that Australian standards not be mandatory unless a clear social benefit can be demonstrated.

Most Australian standards to which the IT&T industries must conform are set by Standards Australia and by the Australian Telecommunications Authority (AUSTEL).

... and were satisfied with Standards Australia.

Standards Australia publishes and markets all forms of Australian standards, from design codes and technical specifications to quality management system standards, and adopts international standards where possible. Most participants expressed satisfaction with Standards Australia.

Technology convergence is causing problems for AUSTEL and ...

AUSTEL determines technical standards for Australia's telecommunications networks, for customer cabling to those networks, and for customer equipment connected to networks. With the convergence of technologies, an increasing array of computer equipment is being directly and indirectly connected to the telecommunications network.

... there is concern about AUSTEL's mandatory standards and testing and conformance requirements.

Some participants expressed concern that AUSTEL's mandatory standards, and testing for conformance with those standards, will unnecessarily impede trade and deny Australia access to equipment incorporating the most recent technological developments. They suggested that Australia should adopt international standards where possible and that there be more widespread recognition of testing and certification conducted in other countries.

There is no doubt that the community will benefit when the costs of ensuring compliance with technical standards are minimised. This may mean authorising suppliers to self test products where they can demonstrate that the required standards will be enforced, and allowing third party accreditation for firms that can demonstrate testing capabilities.

The Commission notes that the Commonwealth Government is pursuing the issue of standards uniformity with the members of the Asia-Pacific Economic Cooperation Group, and that negotiations have commenced with the European Union on a mutual recognition agreement on conformance assessment.

Access to finance

Many firms have little access to finance.

The rapid growth of the IT industries has helped many firms to finance their activities internally and has provided the cash flow for others to attract debt finance. The strategic relationships which some firms have developed with larger companies have assisted their access to finance. However, many firms have little access to external equity capital. They are typically firms that have been established within the past 10 years and continue to rely upon the IT skills, business acumen and financial backing of their founders.

The reluctance of investors to provide risk capital to small and medium sized firms is well documented. It reflects the relatively high incidence of failure of small businesses and the difficulty and costs that investors face in assessing the risks — particularly where the major asset of a business is in the form of intellectual property.

Venture capital firms' lack of IT management skills ...

Firms in the IT industries may be disadvantaged in their access to venture capital, not because of a shortage of venture capital funds, but because venture capital firms lack management expertise relevant to the IT industries. This has been recognised by venture capital firms and some are employing people from the IT industries to help evaluate and oversee suitable investments.

... may be a temporary problem.

The shortage of evaluative skills within financial markets may be a temporary phenomenon. As Australia's venture capital market continues to develop and its links with the IT industries strengthen, the problem should recede. The process will be aided by access to concessional loans and other recent Commonwealth Government initiatives to improve communication between borrowers and lenders and generally minimise financial constraints on the development of firms with high growth prospects.

Notwithstanding the new initiatives, many firms are unlikely to get all of the financial support they are seeking. However, it would not be appropriate for governments to underwrite the high risks faced by fledgling firms seeking to commercialise an innovation. Such an approach would not improve efficiency, would penalise less risky ventures, and could impose significant costs on the rest of the economy.

Intellectual property

The main concerns of inquiry participants relating to the protection of intellectual property are in areas of computer software protected under copyright.

Extent of protection

Most participants are satisfied with the extent of protection offered, or recognise that copyright protection is often irrelevant because of the speed with which software is superseded. However, some raised issues about the parallel importing of software (imports other than by the licensed distributor) which is at present treated as an infringement of copyright. The current arrangements are supported by the importers and distributors of software who contend that a high proportion of illegal copies of software sold in Australia is imported.

The issue of parallel importing of software is still unresolved.

The issue of parallel importing of software was recently reviewed by the Prices Surveillance Authority (PSA) and the Copyright Law Review Committee (CLRC). The PSA concluded that parallel imports of legal copies of computer software should be permitted, whereas in its final report the CLRC recommended that restrictions on the parallel importation of computer programs should remain unchanged. The CLRC cited the threat of piracy as the principal reason to restrict parallel imports.

In the Commission's view, the parallel importation of software and the piracy of intellectual property are separate issues which need to be addressed with separate policies.

Restrictions on parallel imports of software limit competition in the distribution and retail markets and have the potential to raise the price of software — provided that measures to control piracy are adequate.

Moves to allow parallel imports should be supported.

An appropriate first step is to indicate to the World Intellectual Property Organisation Committee of Experts, Australia's strong support for allowing parallel imports of legal copies of computer software. There appear to be significant advantages in achieving multilateral agreement, at least among the signatories to the *Berne Convention*, that each country would remove the restrictions currently impeding parallel imports of legal software.

If multilateral agreement cannot be achieved, the Australian Government would then need to consider whether, in the light of the costs and benefits involved, it should take unilateral action to permit parallel imports into Australia.

Enforcement of protection

The enforcement of copyright protection is seen as a major issue by some participants. They drew attention to:

Small infringement penalties ...

- relatively small penalties prescribed by the Copyright Act;
- low levels of damages and costs awarded;
- difficulties in proving ownership of copyright; and
- the lack of resources devoted to detection and prosecution for software theft.

Some participants acknowledged that it may be unrealistic to expect law enforcement agencies to police the provisions of the Copyright Act and were resigned to undertaking that task themselves. But they advocated substantially greater penalties for successful prosecutions.

This issue has been examined by the CLRC which recommended that criminal penalties for software theft should be brought into line with those currently applying to films and those proposed for sound recording. The PSA also saw merit in bringing penalties into line across the range of copyright protected material.

... should be reviewed. The Commission agrees with the CLRC and the PSA and recommends that penalties for software theft be brought into line with similar breaches of the Copyright Act.

Taxation

Participants were concerned about ...

Many participants described Australia's taxation system as unnecessarily complex. They raised some general taxation issues which have broad implications extending well beyond the scope of this inquiry. Some said the system does not have regard for the unique characteristics of the IT industries. Specific concerns include sales tax, withholding tax, and depreciation provisions.

... sales tax ...

Sales tax concerns relate to the rates which apply to particular products such as software media, CD-ROMs, and programmable memory chips, and to the most appropriate sales tax schedule for computer products in general.

... depreciation provisions, and ...

Some participants argued that depreciation provisions for tax purposes have not kept pace with technological change, notwithstanding provisions to claim higher than the scheduled depreciation rate.

A distinction must be drawn between a product's effective life and the time a technology is regarded as 'leading edge'. Most software and hardware products have an effective life which extends well beyond the time the technology they contain is superseded, and it would be unreasonable to expect depreciation schedules to always reflect leading edge technology life rather than effective useful life.

... withholding tax.

On the issue of withholding taxes applied to royalties and licence fees, the AIIA said that these taxes have a similar effect to a tariff in that they raise the price paid by Australian firms for access to technology. The Commission is aware that this has the potential to deny Australia access to some technologies but has not been presented with any evidence that this has occurred.

The AIIA requested that Australia adopt the provisions of the Model Tax Treaty of the Organisation for Economic Cooperation and Development, which recommends that a zero rate of withholding tax be imposed on royalty payments. The Commission sees merit in this proposal.

The role of government

Governments can help.

Governments *can* help to improve competitiveness and growth opportunities in Australia's IT industries by:

- simplifying the administrative arrangements for government IT purchases;
- maintaining greater separation between IT purchasing and industry development objectives;
- strengthening arrangements for the support of R&D in companies not earning taxable profits;
- removing anomalies in the assistance accorded to activities within the IT industries;
- removing anomalies in the assistance accorded to activities across the IT&T industries, and between IT&T and other industries;
- applying a coordinated approach to standards, regulation and industry policy generally, across the IT&T industries; and
- furthering microeconomic reform in areas still impeding the performance of Australian industry generally.

Some advocated an interventionist approach, but ...

Some participants expected a blueprint for the future development of the IT industries. The Commission does not see this as an appropriate task for a government body.

If the expression of visions and the drawing of blueprints is to be of value, it is a task for the industries themselves, and their industry associations. Industry associations can provide informal guidance and market intelligence, but neither they nor governments are in a position to provide accurate forecasts of the future direction and pace of technological change, the demand for products not yet developed, and future supply conditions. Such a task is particularly difficult for the IT industries, which are characterised by rapid rates of technological change.

The future development of the IT industries will be determined by the commercial decisions of individual firms operating at the coal face of markets and technological change.

... commercial decisions are likely to produce the best outcome.

Their decisions, taken on commercial grounds, are more likely to be of benefit to the firms *and* the community than measures that governments might take to favour particular groups, activities, or outcomes.

IT firms have access to many support programs.

In the Commission's view, individual firms have to assess the trade-off between risk and reward and make their own decisions in each venture they undertake, taking into account the wide range of government support programs already available to firms in the IT industries.

The prime role of governments should be to remove impediments to better performance.

The Commission's proposed reforms — for instance, less complex forms of government procurement, and generally available support for R&D — would simplify the institutional and regulatory framework within which firms are required to operate. These are changes that have economy-wide (not industry-specific) application. They also promote a national approach to the development of competitive Australian industries.

A national approach to industry policy is critical.

In response to the Hilmer committee of inquiry, the Australian States have supported a national approach to competition policy. As a result, utilities such as water, electricity, ports and road transport are expected to face more open competition and come under the scrutiny of the *Trade Practices Act 1974*. A national approach to industry policy is no less critical to the competitiveness of Australia's industries. Government procurement, in particular, should be high on the agenda of microeconomic reform.

KEY FINDINGS AND RECOMMENDATIONS

Industry strengths

- *Australia's information technology (IT) industries demonstrate strengths in:*

  - innovation and development of applications software;

  - systems integration, the coupling of software and hardware systems, and solutions packages incorporating hardware and software;

  - innovative niche hardware; and

  - undertaking small high quality runs, where larger scale plants overseas tend to be uncompetitive. [Section 2.4.1]

- *Globally, IT activity is dominated by multinational firms, but there is a role for small and medium sized enterprises (SMEs), particularly in niche markets. International alliances, and/or links with multinational companies based in Australia, can contribute to the success of Australian SMEs.* [Section 2.4.2]

- *There is scope to build on Australia's strengths in IT. Governments can help by removing impediments to better performance, by providing a stable institutional and regulatory framework, and through judicious use of their substantial presence in the market as a purchaser of IT.* [Section 2.5]

Government purchasing

- *Government purchasing can foster development in the IT industries without producing significant extra costs. Net benefits are most likely where:*

  - industry development obligations are not sought through specific contracts; and

  - firms are given as much flexibility as possible in choosing activities that fulfil their obligations. [Section 5.2]

- *The Commission endorses a consultative approach for resolving concerns with the administration of the procurement process, as embodied in the approach of the Cost of Tendering Committee and the recent strategic review of the government IT contract conditions.* [Section 5.1]

- *The benefits of the Partnerships for Development (PFD) approach and Fixed Term Arrangements (FTA) programs are being undermined by policy shifts and inadequate information flows between governments.* [Section 5.3]

Recommendation 1

An independent review of the Partnerships for Development and Fixed Term Arrangements programs should be undertaken in 1998. It should include an assessment of the appropriate extent of administrative discretion.

[Section 5.3]

- *The benefits of a national approach to government procurement are increasingly at risk from State/Territory government policies. There is greater resort to incentive packages, preferential arrangements, and various forms of leverage to promote development at the local level.* [Section 5.4]

Recommendation 2

The Commonwealth, State and Territory Governments should recommit to a national approach, along the lines of the Government Procurement Agreement, in the use of government purchasing for industry development. The Council of Australian Governments (COAG) should seek agreement on ways to avoid damage from industry development obligations and measures intended to attract activity to particular locations. In so doing, COAG should be mindful that:

- adequate information flows (between the Commonwealth and the States/Territories) on opportunities for industry development are vital for the success of a national approach;
- procurement measures that discriminate against firms in other States/Territories can threaten the viability of a national approach;
- the costs and benefits of industry development commitments and incentive packages should be calculated and made as transparent as possible;
- incentives offered to attract firms can impose costs within the State, in other States and for the nation; and
- costs arising from industry development and investment attraction policies should be borne by the jurisdiction concerned.

[Section 5.4.3]

- *Government requirements for prequalification as an IT supplier should be confined to the commercial needs of purchasing agencies and should not extend to the pursuit of industry development objectives.*

- *The requirements that firms must meet under the Endorsed Supplier Arrangement (ESA) extend well beyond the obligations which could reasonably be expected of a firm prequalifying as a supplier to government. They are unduly onerous and act as a barrier to small firms seeking access to the government market.*
- *The industry development criteria of the ESA can act as a barrier to imports of IT products.*
- *The ESA is administered in ways that oblige overseas firms, regardless of size, to enter the FTA program.* [Section 5.5.1]

Recommendation 3

An independent review of the Endorsed Supplier Arrangement should be undertaken in 1996. The review should have regard to:

- the desirability of keeping prequalification as simple and inexpensive as possible;
- the potential for the Endorsed Supplier Arrangement to act as a barrier to the entry of small firms to the government market;
- the potential for the industry development requirements to act as a barrier to imports of IT products; and
- the discriminatory treatment of overseas firms.

[Section 5.5.1]

Recommendation 4

Governments should not seek specific industry development commitments in the context of individual tenders.

[Section 5.5.2]

Research and development

- *The Commission's 1995 report on Research and Development proposed that firms not earning taxable profits should have access to a non-taxable subsidy of 18 per cent. These firms would then receive assistance equivalent to that arising from the concessional component of the 150 per cent deduction for profitable companies. This change would remove an anomaly in the major form of assistance available to firms in the IT industries.* [Section 6.4].

- *As the computer bounty is payable in respect of R&D expenditures, some bounty recipients can receive greater support for R&D than other firms in the IT industries or within the economy generally.* [Section 7.5.1]

Recommendation 5

Firms not earning taxable profits should have access to R&D assistance in the form of a non-taxable subsidy.

[Section 6.4]

Tariff and bounty issues

- *The force of the argument underpinning the compensation rationale for the computer bounty has been substantially eroded by general reductions in tariffs, changes in the focus of industry policy, and developments in the IT industries, which now bear little resemblance to the IT industries of 1984.* [Section 7.2]
- *The bounty is paid predominantly on the production of hardware. Bounty is not paid on the bulk of software development, systems design and integration, and IT services. The latter activities, which have strengths in Australia, account for over 80 per cent of IT production.* [Section 7.4]
- *Most participants' suggestions for modifications to the computer bounty would make it even more selective. Measures that give preferment to selected industries or firms are difficult to justify and are unlikely to provide net community benefits.* [Section 7.5.2]
- *Related and converging technologies are variously assisted by the bounty and tariffs. Classification disputes and ad hoc adjustments to the bounty are a direct result of this assistance environment. Definitional disputes and associated administration problems will be compounded as computing, telecommunications and broadcasting technologies develop and converge.* [Section 7.6, 7.8]

Recommendation 6

The computer bounty should lapse.

[Section 7.10]

- *At the time of the release of the draft report, the Commission wrote to the Minister proposing that an early announcement be made to extend the computer bounty for six months to 30 June 1996. If the extension is not approved, the bounty will lapse on 31 December 1995.* [Section 7.10]

Recommendation 7

On cessation of the bounty, the tariff rates applying to bountiable items should remain at zero.

[Section 7.11.1]

Standards and conformance

- *The IT industries should be represented on any advisory body established to consider standards for equipment to be connected to Australia's telecommunications network.* [Section 8.2.2]
- *Where possible, standards adopted in Australia should be aligned with relevant international standards, and should not be mandatory unless a clear social benefit can be demonstrated.* [Section 8.2.3]
- *With technology convergence, an increasing number of IT products will be connected to Australia's telecommunications networks and the need to ensure conformance with AUSTEL regulations will rise. It is important that the costs of compliance are kept as low as possible.* [Section 8.3.1]

Access to finance

- *The Commission supports recent initiatives by government and industry to improve the channels of communication between small and medium sized enterprises and providers of debt and equity finance.* [Section 9.4]

Intellectual property

- *Restrictions on parallel importing (imports other than by copyright holders or their licensed distributors) limit competition in the distribution and retail markets and have the potential to raise the price of software.* [Section 10.3.1]

Recommendation 8

The Australian Government should actively support moves to allow parallel importing of legal (non-pirated) copies of software in the forum established by the World Intellectual Property Organisation to consider a Protocol to the *Berne Convention* (the Committee of Experts). If the agreed Protocol expressly prohibits parallel importing, the Australian Government would then need to consider whether, in the light of the costs and benefits involved, it should take unilateral action to permit parallel imports of computer software into Australia.

[Section 10.3.1]

- *A licensed owner of a computer program should be able to decompile that program in order to correct errors, providing that the conditions set out by the Copyright Law Reform Committee are satisfied.* [Section 10.3.2]

Recommendation 9

Criminal penalties for software theft should be brought into line with similar breaches of the Copyright Act.

[Section 10.4]

Recommendation 10

Government departments and agencies should not seek automatically to acquire intellectual property rights associated with the goods and services they purchase. Ownership of intellectual property rights should be resolved through negotiation on a case-by-case basis.

[Section 10.5.2]

COMPUTER HARDWARE SOFTWARE AND RELATED SERVICE INDUSTRIES

CHAPTERS

1 THE INQUIRY

1.1 Scope of the inquiry

The Assistant Treasurer referred the computer hardware, software and related service industries to the Industry Commission on 29 September 1994 for inquiry and report by 30 June 1995.

The terms of reference *inter alia* ask the Commission to report on any measures that could contribute to the efficiency, growth and internationalisation of the computer hardware, software and related service industries. For the purpose of this report, these industries will be collectively referred to as the 'information technology' (IT) industries. This accords with common practice in the industries concerned.

The activities directly under reference include:

- computer hardware (personal computers, mid-range and large scale systems and other workstations);
- peripheral computer equipment (input/output devices and other peripheral computer equipment);
- other computer equipment, components, parts and consumables;
- certain bountiable communications and networking hardware;
- computer software (applications, systems management and utilities and tools);
- services (consulting, systems integration, outsourcing, education); and
- maintenance (hardware).

The Commission is asked to report on government programs (Commonwealth and State) and coordination within and between governments. The computer bounty, presently scheduled to terminate at the end of 1995, is under reference, along with institutional and regulatory arrangements subject to influence by governments that affect the performance of these industries.

The telecommunications industry is not directly under reference. This poses some difficulty for the inquiry because the synergy between computing and telecommunications calls for a coordinated approach to standards, regulations and industry policies. There is a danger that continuing to treat the two sectors separately will entrench anomalies and distortions in the use of resources.

Given this concern, some of the matters raised in this report are relevant to the Commission's separate inquiry into the telecommunications industry, expected to commence later in 1995.

1.2 Key inquiry issues

This report responds to an 'industry development' reference in which the Commission is asked to investigate growth prospects and any impediments to better performance in Australia's IT industries.

The Commission has reported on emerging trends in local and global markets, on the strengths of Australia's IT industries, and on the opportunities being created for Australian firms in these and related industries. Attention is drawn to some institutional impediments — in particular, features of some State and Commonwealth Government purchasing programs — which could detract from the full achievement of the industries' potential.

Some participants expected the Commission to go further and to set out a blueprint for the future development of the IT industries. The Commission does not see this as an appropriate task for a government body.

If the expression of visions and the drawing of blueprints is to be of value, it is a task for the industries themselves, and their industry associations. The Commission notes that the Australian Information Industry Association (AIIA) has recently published its vision for the future of Australia's information technology and telecommunications (IT&T) industries (AIIA 1995). The AIIA document refers to the development of internationally competitive industries with a reputation for excellence, and sets targets for growth and exports to the year 2000.

The future development of these industries will be determined by the commercial decisions of individual firms operating at the coal face of markets and technological change. Industry associations can provide informal guidance and market intelligence, but neither they nor governments are in a position to provide accurate forecasts of the future direction and pace of technological change, the demand for products not yet developed, and supply conditions at the global, regional and country level. Such a task is particularly difficult for the IT industries, which are characterised by rapid rates of technological change. If governments seek to influence firms' behaviour on the basis of particular industry plans, expectations can be raised that compensation will be provided in the event that the planned outcomes are not achieved. In the Commission's view, individual firms have to assess the trade-off between risk and reward and make their own decisions in each venture they undertake.

The task for government is to create an environment in which firms and industries have the opportunity to develop to their full potential. This entails removing institutional and regulatory impediments to their operations and addressing any 'market failures' (providing incentives for research and development for example).

The report draws on discussions with a wide range of organisations and individuals with an interest in the IT industries, on the evidence presented at two rounds of public hearings, and on the 118 written submissions received in the course of the inquiry.

Multinational companies are well represented in these industries in Australia, but the majority of firms are small and Australian-owned. Many of these have been established within the last 10 years and continue to depend on the IT skills, business acumen and financial resources of their founders. Many are software and/or systems integration firms with innovative products but limited resources and skills to commercialise them. Their products may have a shelf life as short as 12 months before they are replaced or undergo major revision. Another group of firms undertakes the assembly of computer hardware from imported components and, numerically, these firms comprise the majority of recipients of the computer bounty.

This background is reflected in the issues raised by participants during the course of the inquiry. Matters of concern to participants and their associations included:

- access to finance;
- industry assistance (including the bounty);
- the cost of doing business with government;
- the industry development commitments that are often required of firms selling to governments;
- industry standards;
- the protection of intellectual property; and
- certain taxation issues relating to depreciation rates and sales and with-holding taxes.

Labour market and environmental issues were seldom raised.

Cutting across these specific inquiry issues are issues associated with the high rate of technological change, which is a feature of these and other closely related industries. The nature and pace of change are such that product descriptions which form the basis of the regulatory and assistance arrangements for these industries have become obsolete and of little relevance to current and emerging industry circumstances. Technology convergence — the merging of

computing, telecommunications, and broadcasting and publishing technologies — provides many compelling reasons to move away from the existing segregated approach to policy formation and regulation in respect of these activities.

1.3 Relationship with other inquiries

This inquiry is one of a number which will impact on the future development of these industries.

At one level are the Commission's broad ranging inquiries into Research and Development, and Competitive Tendering and Contracting by Public Sector Agencies (CTC). The *Research and Development* report was released on 8 June 1995 (IC 1995). Some of the proposals in that report are of direct relevance to the IT industries. The CTC inquiry is scheduled for completion in December 1995. The issue of government agencies outsourcing IT services is being examined by that inquiry. As mentioned earlier, an Industry Commission inquiry into the telecommunications industry is also scheduled to commence later this year.

Another current broad ranging review, the outcome of which will affect many participants in this inquiry, is addressing the post-1997 telecommunications environment. That review is being conducted by the Minister for Communications and the Arts.

There have been many reviews of government purchasing policies. In March 1994 the House of Representatives Standing Committee on Industry, Science and Technology reported on *Australian Government Purchasing Policies: Buying Our Future.* The Commonwealth Government subsequently released a response to that report (Commonwealth of Australia 1994). Other reviews include:

- a review of the Panel of System Integrators (Joint Steering Committee — Department of Administrative Services, Department of Industry, Science and Technology, Department of Finance);
- a review of the Partnerships for Development and Fixed Term Arrangements programs by the Bureau of Industry Economics which was released on 25 February 1995; and
- a joint AIIA/Government review of the Costs of Tendering.

Consultations between government and industry are also being held for the purpose of implementing recommendations flowing from the Strategic Review of the Government Information Technology Conditions.

Two other reviews relate to copyright. They are:

- Copyright Law Review Committee (CLRC 1995), *Computer Software Protection;* and
- Copyright Convergence Group (CCG 1994), *Highways to Change: Copyright in the New Communications Environment.*

1.4 Report structure

The following three chapters of the report describe the international and domestic structure of the IT industries, their markets, and technology trends which will influence their future development. These chapters provide a basis from which to assess the emerging opportunities for Australian IT firms.

Chapters 5, 6, and 7 describe the influence which various governments have on these industries. In particular, they describe government purchasing policies and their relationship with industry development objectives; research and development incentives; and industry assistance in the form of tariffs on imports and the computer bounty.

The remaining chapters deal with other inquiry issues which were seen by some participants as constraints on the development of the IT industries in Australia. The chapters cover standards, access to finance, the protection of intellectual property, taxation, and various social and environmental considerations.

2 INDUSTRY STRUCTURE

This chapter describes the structure of the global and Australian information technology (IT) industries and identifies factors influencing their development.

These industries have undergone rapid changes since the release of the first IBM personal computer in the early 1980s.

Australia's strengths lie in the design and development of niche hardware and software, and in the provision of IT-related services. Australia has not demonstrated a capacity for large scale manufacturing of computer hardware or standard components.

2.1 Industry data

There is a shortage of official data to describe the structure of the IT industries in Australia, and worldwide. The problem stems in part from the rapid rate of technological change which characterises these industries — rendering many historic product descriptions obsolete — and also from the intangible nature of much of the industries' output. There are major statistical difficulties in separating hardware from the software component of many products, and in assembling reliable data on international trade in software and services.

In order to supplement published data on the IT industries, the Commission engaged International Data Corporation (IDC), a private sector organisation which specialises in the assembly of data on the IT industries, to prepare a report on the structure of the Australian and global IT industries. Copies of the IDC report (IDC 1995), which was incorporated in the draft report, are available from the Commission on request.

The Australian Bureau of Statistics (ABS) recently released the results of a survey it conducted of the Australian IT industries in 1993 (ABS 1995a). While subject to some of the problems mentioned above, this survey provides a snapshot of domestic IT activity for 1992-93, and has been drawn on in Section 2.3.

The categorisation of activities is not always consistent between reports on the IT industries. This can explain some of the discrepancies between the figures reported by different agencies. Particular problems occur in the measurement of IT activities which can either be conducted in-house or contracted to a third party.

2.2 The global industries

2.2.1 Industry size

Estimates of the size of the world market for IT products and services vary, but are around $US400 billion for 1993.[1]

IDC (1995) identifies a number of separate segments of the IT market. They are:

- **Multi-user systems**, comprising mainframe and mid-range systems and associated peripherals.
- **Single-user systems**, comprising personal computers (PCs) and single-user workstations and associated peripherals.
- **Data communications equipment**, comprising network interface cards; internet hardware such as hubs, bridges and routers; and other data communications hardware.
- **Packaged software**, which includes applications solutions, applications tools and systems/utilities software.
- **Professional services**, which includes consulting, education, design and development, implementation and systems management (outsourcing).
- **Support services**, which comprises hardware maintenance services and some software support services.

Table 2.1 shows global IT revenues for the various market segments in 1993.

Table 2.1: **Global IT revenues, 1993**

Market segment	*$US million*	*Per cent*
Multi-user systems	65 249	16.7
Single-user systems	105 106	26.8
Data communications equipment	17 279	4.4
Packaged software	69 937	17.8
Professional services	85 435	21.8
Support services	48 852	12.5
Total	**391 858**	**100.0**

Source: IDC (1995).

[1] According to IDC (1995), the world market in 1993 was valued at about $US390 billion, while the European Information Technology Observatory (EITO 1994) estimated the value of the IT industries worldwide to be $US418.6 billion.

2.2.2 IT producers

As shown in Table 2.2, six of the world's top 10 IT companies are based in the United States of America (USA). The other four are Japanese. According to IDC, the high ranking of Japanese companies is more a reflection of their dominance in their own domestic market, than of a particularly active export industry.

While IBM is nearly three times the size of its nearest rival, Fujitsu, its market share has been falling since 1985.

Table 2.2: **Global top 10 IT companies (by revenue), 1990 to 1993** ($US million in 1993 constant prices)

Ranking	*Company*	*1990*	*1991*	*1992*	*1993*
1	IBM[a]	67 090	62 840	64 520	62 716
2	Fujitsu	12 362	19 331	20 142	21 872
3	NEC	12 350	15 318	15 395	16 675
4	Hewlett Packard[a]	9 515	10 726	12 688	15 600
5	Digital[a]	13 072	14 238	14 162	13 637
6	Hitachi	9 591	10 310	11 352	12 629
7	AT&T[a]	2 900	8 169	10 450	9 860
8	Toshiba	4 765	5 116	7 449	8 820
9	EDS[a]	2 870	3 666	8 219	8 507
10	Apple[a]	5 740	6 496	7 174	7 900

a United States-owned company.
Source: *Datamation* (various issues).

According to McKinsey (1993), the top 10 IT companies account for nearly half of global revenue, and the top 50 companies about three quarters of total revenue. The remaining quarter of industry revenue is accounted for by small and medium sized enterprises (SMEs).

The global industry structure has changed significantly since the release of the first IBM PC in the early 1980s. It has evolved from being a small number of vertically integrated companies which provided everything from basic hardware components to services, to a very diverse structure which has a high level of concentration in some activities and diversity in others.

2.2.3 Key structural influences

Capital intensity

The production of the basic hardware components of the IT industry — the electronic microprocessors, storage media, and memory — is capital intensive. There are few producers, operating a relatively small number of facilities on a large scale. The need to locate close to their input suppliers has led to some United States (US) companies relocating production plants in Asia, as well as the emergence of local Asian manufacturers.

Hardware assembly operations are less capital intensive and are typically located to take advantage of proximity to component suppliers and/or computer hardware markets.

The services and software sectors are characterised by intensive use of human capital and tend to locate close to potential customers and sources of skilled labour, respectively.

Research and development requirements

The design of basic hardware components, and the production of systems and applications software, require initially high and ongoing levels of expenditure on research and development (R&D). The resulting technological advances in hardware generate intensive R&D activity in the software sector, so that systems and applications can take advantage of hardware capabilities. Even so, software design has tended to lag at least one generation behind hardware advances.

Industry standards

IBM's decision in 1981 to outsource the development of both the microprocessor and the operating system of its first PC — to Intel Corporation and Microsoft Corporation, respectively — acted as a catalyst for the adoption of *de facto* industry standards for PCs. The emergence of many IBM 'clones', using the same processor and operating system as IBM, was the precursor to an environment in which PCs can be assembled from standard components and in which software developers have ready access to standard operating systems running on standard hardware (open systems architecture).

These developments have had an important influence on the international IT industries. While production of the major hardware components remains concentrated in the hands of a relatively small number of companies, the ready availability of these components at competitive prices has provided opportunities for many small scale operations either assembling PCs or adapting

the technology, using standard microprocessors, to a wide variety of new applications.

A similar situation exists for the software industry with a small number of multinationals providing the operating systems and major applications software, while a multitude of SMEs provide niche market applications, communications and networking software.

Markets

The location of markets has had a strong influence on the location of major production facilities. When the industries were in their infancy, a strong domestic sales base was very important, and the US market was by far the largest (accounting for 75 per cent of global revenues in 1964).

The USA has remained the largest single market, and US IT companies remain dominant in the world market. Nevertheless, strong domestic and/or regional industries emerged in Japan and Western Europe. While Japanese companies remain dominant in their own market, in Western Europe domestic companies are losing ground.

Over the past decade, the growth of the Asia-Pacific market has encouraged some US companies to relocate plants to Asia. It has also encouraged the growth of Asia's domestic IT industries.

The US market still accounts for over 40 per cent of global revenues and this has encouraged some non-US manufacturers to establish production facilities there in order to be close to both component suppliers and a major market for their products. One such example is the Australian company Stallion Technologies, which has a production facility in the USA.

Technological change

The high levels of capital and R&D expenditure required, reinforced by the rapid rate of technological change, have acted as barriers to entry to the production of components and major systems and applications software. But technological change has also provided many opportunities for the development of new hardware and software products, and for the provision of a new range of IT services.

The development of the PC has made computing power universally available. Improvements in technology have also provided the facility to link computers together, first within local areas, then between geographically separate sites within organisations, and finally between computer users worldwide. These developments have created opportunities for the design and production of the hardware and software necessary to provide efficient links between users. Both

the increasing penetration of PCs and progress in networking have contributed to the rapid growth of the IT service industries.

Technological change has deepened and broadened the range of products and services produced by the IT industries. New applications of this technology range from microprocessors which control the combustion and ignition in modern motor vehicle engines to point of sale readers and terminals in banks and retail establishments.

While a number of multinational organisations have emerged as major suppliers of global professional services, small independent suppliers can operate successfully in their own domestic markets, and some have a record of achievement in export markets. For hardware, although major component supply remains concentrated, at present there seems to be no limit to the scope for new niche market products to be developed and marketed on a relatively small scale.

2.3 The Australian industries

2.3.1 Industry size

Data describing the Australian IT industries is scarce and often unreliable. Most surveys of the industries report the value of domestic sales, which include imports but exclude exports of domestic production.

The ABS survey of the IT industries in 1993 (ABS 1995a) collected information on employment, income, expenses, stocks, profits, assets, and capital expenditure. The IT activities covered included the production of computer hardware, peripheral equipment and software, and the provision of computer services, and extended to telecommunications hardware, software and services.

There were 6544 businesses in Australia engaged in the production or provision of computer hardware, software and related services in 1993. Of these, 6494 were primarily involved in IT activities and 14 claimed IT as a secondary activity — the rest considered themselves non-IT firms. The survey included a further 2916 businesses involved in related activities — 63 per cent of which were classified to electrical and electronic equipment wholesaling. Some firms involved in these other activities, such as telecommunication, broadcasting and transceiving equipment manufacturing, and electric cable and wire manufacturing, are currently receiving the computer bounty.

The data in Tables 2.3 and 2.4 highlight important aspects of the computer industries in Australia — the small size of most IT firms and the concentration of firms in the services sector, particularly consultancy services.

Table 2.3 shows the number of firms involved in the computer hardware, software and related service industries at 30 June 1993. Over 65 per cent of the IT specialist businesses were classified to the computer consultancy services industry, while around 23 per cent were classified to computer wholesaling. In total, the services sector accounted for almost 75 per cent of IT businesses.

Excluding computer and business machine manufacturing (for which statistics have not been published), the industries listed in Table 2.3 employed 45 990 people in 1992-93. Of these, about 30 000 were employed in the services industries.

Businesses engaged in computer consultancy services employed 75 per cent of all persons employed in the services industries in 1992-93. Computer maintenance services employed 16 per cent, and data processing services 7 per cent (ABS 1995b).

Table 2.3: **Number of IT firms in Australia, 30 June 1993**

	IT specialists	*Secondary IT producers*	*Total*
Data processing services	262	–	262
Information storage and retrieval services	67	–	67
Computer maintenance services	242	–	242
Computer consultancy services	4 315	–	4 315
Total services	**4 886**	–	**4 886**
Computer and business machine manufacturing	120	3	158[a]
Computer wholesaling	1 488	11	1 500[a]
Total	**6 494**	**14**	**6 544[a]**

– Nil or rounded to zero.
a Includes non-IT producers.
Source: ABS (1995a).

The size of specialist IT firms by employment is shown in Table 2.4. Over 95 per cent of businesses (6196) employed fewer than 20 people, while only 46 (less than 1 per cent) employed 100 people or more.

Table 2.4: **Employment size of specialist IT firms in Australia, 30 June 1993**

	Employment size group			
	1-19	*20-49*	*50-99*	*100+*
Data processing services	244	15	1	2
Information storage and retrieval services	58	8	–	1
Computer maintenance services	222	12	3	5
Computer consultancy services	4 201	81	12	21
Total services	**4 725**	**116**	**16**	**29**
Computer and business machine manufacturing	96	19	4	1
Computer wholesaling	1 375	66	31	16
Total	**6 196**	**201**	**51**	**46**

– Nil or rounded to zero.
Source: ABS (1995a).

Almost 97 per cent of businesses in the computer services industries employed fewer than 20 people. These small businesses accounted for 42 per cent of employment in the services industries and 28 per cent of the industries' operating profit before tax. The 29 businesses employing 100 or more persons (representing less than 1 per cent of businesses in the computer services industries) also accounted for 42 per cent of employment, but represented 58 per cent of operating profit before tax (ABS 1995b).

Table 2.5: **Revenue from Australian IT production, 1992-93**

Market segment	*$A million*	*Per cent*
Computer hardware	961	17.9
Packaged software	456	8.5
Computer services	3 957	73.6
Total	**5 374**	**100.0**

Source: ABS (1995a).

The revenue from Australian production of IT goods and services in 1992-93 is shown in Table 2.5[2]. Of total revenue from own production of over $5.3 billion, computer services accounted for almost $4 billion.

[2] In Table 2.5, 'computer hardware' refers to digital computers, analogue or hybrid computers, and other computer equipment, components, parts and consumables.

In 1992-93, computer hardware, software and related services businesses earned, on average, just over 50 per cent of their income from IT goods and services which they produced. The proportion ranged from 100 per cent (for computer and business machine manufacturing and information storage and retrieval services) to just over 15 per cent (for computer wholesaling). Excluding computer and business machine manufacturing (for which statistics have not been published), the firms made an operating profit before tax of $535 million, of which the services sector accounted for $365 million.

2.3.2 International influence

There is a strong international influence on the structure of Australia's IT industries. The dominance of US firms has always been in evidence, and at present, 42 of the top 100 IT companies in Australia, ranked by sales revenue, are headquartered in the USA.

The second largest group of companies in the top 100 comprises 37 domestic companies, most of which are in the software and service sectors. However, there are several PC hardware manufacturers/assemblers such as Ipex Information and Edge Technology.

Multinationals from Europe and Asia are also represented in the Australian market. According to IDC, the Australian market is a microcosm of the US market. Australia is said to be used as a testing ground for some products from European and Japanese vendors, providing Australia with early access to the latest technology. Australia is also seen as a useful base from which to enter the growing Asia-Pacific market (see Section 2.4).

The top 10 IT companies in Australia in 1993 are listed in Table 2.6.

The structure of Australia's IT industries is also influenced by the strategic production and marketing decisions made by multinational IT companies. A company will sometimes 'allocate' markets to its subsidiaries according to the location of its production facilities. A multitude of other factors, such as political and economic stability, input costs and access to markets, also influence a multinational's global location decisions.

'Computer services' refers to software and system services, data entry, processing and timesharing devices, database services, hardware servicing, repairs and maintenance and cabling services, computer training and education, and software licence fees and royalties (ABS 1995a).

Table 2.6: **Top 10 IT companies in Australia, 1993**

Ranking	*Company*	*Sales revenue ($A million)*
1	IBM Australia[a]	1 165
2	DEC (Australia)[a]	560
3	Telstra	445e
4	Fujitsu Australia	351
5	Hewlett-Packard Australia[a]	319
6	Apple Computer Australia[a]	264e
7	Unisys Australia[a]	224
8	AT & T Global Information Solutions[a]	205e
9	Ferntree Computer Corp	185e
10	Osborne Computers Corp	175e

a United States-owned company.
e IDC estimate.
Source: *Computerworld (The)* (1994).

2.3.3 Influence of technological change

The technological factors which have influenced the global IT industries (see Section 2.2.3) are reflected in the structure of Australia's IT industries. There is minimal electronic component production, but strong software and service sectors.

According to IDC, Australia's aptitude for software development was first evident when Australian software engineers gained a reputation for fine-tuning software as an alternative to upgrading expensive mainframe hardware. That early strength in software production has been maintained and is now directed towards the development of new niche market applications and software products, as well as towards some leading edge technological developments such as those being undertaken by the Centre for Information Technology Research at the University of Queensland.

2.3.4 Government influence

The Commonwealth Government has used a wide range of programs to influence the structure and performance of the domestic IT industries. These are described in Chapters 5, 6, 7 and 11 of this report.

2.4 Strengths and weaknesses

As a location for IT production, Australia has both strengths and weaknesses. Some of these relate to factor endowments, others to characteristics such as political stability, that influence Australia's ability to attract mobile capital.

Factors that participants regard as strengths for Australia include:

- political and economic stability;
- innovative and creative people, particularly in software;
- a substantial skills and knowledge base;
- well developed transport, services and research infrastructure;
- a solid grounding in telecommunications expertise;
- sophisticated users of IT such as the finance sector;
- proximity to, and experience in dealing with, growing markets in Asia;
- an educated workforce;
- lower wages for skilled employees, such as engineers, relative to other advanced economies; and
- low cost of living, executive salaries and office rentals compared with other corporate headquarter sites in Hong Kong, Singapore and Tokyo.

Participants also referred to a number of weaknesses:

- the small local market;
- difficulties in obtaining finance;
- a limited domestic supply of components;
- occasional skill shortages;
- the small scale of many businesses; and
- distance from markets.

Perceptions about Australia's location vary. For local assembly and manufacturing operations, ensuring supply of small volumes of components can be a problem. IBM Australia (Sub. 17) purchases components at least 90 days in advance, as it cannot use just-in-time ordering. These components (for example, hard disks and microprocessors) are subject to sudden price reductions and can quickly become obsolete.

On the other hand, for providers of software and services, advances in telecommunications have virtually eliminated problems arising from Australia's geographic location. For example, software needs can often be met over the phone, particularly in Asian markets on a similar time zone.

2.4.1 Domestic activity

Australia's IT strengths lie in software, the integration of software and hardware and the production of niche hardware. The high degree of intellectual property and value added associated with many software applications provides scope to avoid the thin margins associated with commodity hardware items.

Australia has not demonstrated a capacity for large scale computer hardware or commodity component manufacture. However, it is important to distinguish between the information technology and telecommunications sectors.[3] As noted by the Australian Telecommunications Industry Association (ATIA 1995), 'Australian telecommunications equipment is the only sector of the information industries (IT&T) in which Australia has a significant manufacturing presence'.

Software, services and innovative niche hardware

Wormald Technology suggested reasons why Australia is principally engaged in software, systems integration and assembly:

> ... any Australian based hardware manufacturer is faced with not only the initial high entry barrier associated with setting up and maintaining a hardware production environment, but also the prospect of having to venture into an export market almost immediately to try to secure sufficient market to support the volume needed to keep manufacturing costs at a competitive level.
>
> In contrast, the development of software and the integration of systems software and hardware involving final hardware assembly is accessible to a relatively large number of Australian based small to medium industry participants due to the low initial entry barriers ... For these reasons, Australia has not shown many signs of becoming a high volume mass producer of hardware, particularly due to its limited local market and the competitiveness of the export market. (Sub. 22, p. 9)

Other participants also perceived Australia's strengths to lie in the design and development of niche hardware and software production, and the provision of IT services, rather than in large scale hardware manufacturing. Siemens (in industry discussions) stated that Australia's comparative advantage lies in research, design and development, and applications. It added that Australia is in a region with manufacturing strength, but weaknesses in research and development (R&D) and applications. Intellect Australia noted that:

> One of the strengths we have as a country is our ability to design leading edge useful technology. Australians have an aptitude for coming up with solutions to problems in a clever manner, and there is a lot of untapped export potential. (Electronic News 1995, p. 22)

[3] Telecommunications equipment manufacture is the subject of a future Commission inquiry.

The South Australian Government said 'Australia's advantage lies with software (particularly applications) and services, rather than hardware and systems software' (Sub. 26, p. 4). This strength in human capital was also reported by the BIE (1994a):

> ... the main areas of strength of the Australian IT&T industries lie in accumulated productive experience, human resources and comparative wage levels for skilled employees. (p. 48)

The removal of tariffs on imported hardware platforms has given Australia access to new technologies at competitive prices. This has provided an impetus for Australian firms to develop innovative software products and IT solutions. Wormald Technology said:

> The existence of readily available and competitively priced hardware strongly promotes the opportunity for Australian organisations to develop value added software and perform system integration functions in support of local market requirements and to develop such capabilities for the exploitation of export opportunities. (Sub. 22, p. 10)

The service sector is growing rapidly in Australia. The growth in the spectrum of services such as customised system design and integration, network installation, application-specific programming, systems management, consultancy and training, has been encouraged by the ready availability of IT hardware. Repairs and maintenance activities have also benefited.

The world software market is dominated by a few large multinationals such as Microsoft and Novell. Some Australian firms have successfully marketed shrink-wrap software. Sybiz Software, which develops accounting packages, derives about 30 per cent of its revenue from exports to the USA and the United Kingdom, as well as countries in Asia and Eastern Europe.

Many Australian software developers specialise in niche products. For example, Mincom is a world leader in the supply of software to mining companies; Moldflow specialises in plastics engineering software; Fundi Software specialises in a utility that allows databases to be reorganised without taking them off line; and Computer Management Centre has developed advanced warehousing management systems (Box 2.1).

Australian firms have also succeeded in niche hardware products (for example, Intellect Australia — see Box 2.2 — and Stallion Technologies). These products contain a high degree of intellectual property.

Assembly operations

There is significant activity in computer assembly in Australia. There is some production of computer peripherals (for example, printers and keyboards), but not mainframes.

Box 2.1: **Computer Management Centre**

Computer Management Centre (CMC), is an Australian owned company. Established in 1970, it has grown to become one of Australia's largest independent computer solutions houses, employing over 70 staff. CMC is based in Adelaide and has offices in Sydney, Melbourne, Kuala Lumpur, Manila and Singapore. CMC has successfully exploited a niche in 'real-time' warehousing systems for distribution companies.

The PULSE warehouse marketing system (WMS) concept was developed around 1987 by Intertrack Pty Ltd — a company with a background in warehousing rather than software. Despite early sales of PULSE WMS, Intertrack suffered from project over-runs and lack of an effective customer support structure. In 1991, CMC acquired the property rights to PULSE WMS which it re-engineered after redefining it as a 'core' applications package. The new core PULSE WMS package was reinstalled at existing PULSE sites, new clients came on stream and the product was promoted in Singapore and Malaysia.

In June 1993, Hambro Grantham invested in CMC to consolidate PULSE Logistics Systems market leadership in Australia and improve its coverage of South East Asian markets — PULSE Logistics Systems Pty Ltd was established in Singapore. By September, export orders were announced for a multi-site contract including installations in Singapore and Malaysia for Davids Asia and for Zuellig Pharma Corp's Philippines operations.

CMC's international business has continued to develop with the signing of WMS agreements with Inchcape Group, Diethelm and Changi Logistics. On the domestic front, sales have continued to grow to a range of Australian and multinational companies and government enterprises.

Source: Industry discussions.

Box 2.2: **Intellect Australia — niche hardware and software**

Intellect Australia is an Australian IT company specialising in secure technology for the electronic exchange of data. The development of data security products is a specialised field that is growing rapidly. Intellect is filling this large and growing niche. It has grown from 15 staff in 1989 to a worldwide company of 160. The company's revenue increased from $6.6 million in 1992 to $32.7 million in 1994 — international revenues increased from $2.3 million to $25.1 million. It has supplied more than 130 000 products into 17 countries.

Intellect manufactures host and network security modules; point of sale terminals; self service devices; indoor and outdoor payment terminals; PIN pads; printers; reading devices and transaction authentication cards for access control to computers, bank accounts and buildings. It produces business management systems that combine specialised hardware and software for restaurants and retail stores, and loyalty systems that track customer expenditures to accumulate prizes, discounts or frequent buyer points.

Many major corporations use Intellect products including: Coles Myer; Australia Post; Hong Kong Shanghai Banking Corporation; ELF Petroleum (France); BP; Shell; USA Post; Dutch Post Office; Commonwealth Bank of Australia; National Australia Bank; Banco San Paulo (Italy); Benetton (Belgium); Dassault (France); Den Norske Bank (Norway); ING Bank (Netherlands); KMart and other major banking networks and retailers in Europe and Australia.

Intellect is committed to research and development. The software, intellectual property and systems management embedded in its niche hardware is the key to its success.

Source: Intellect (1994) and industry discussions.

Some multinational firms have a manufacturing/assembly presence in Australia — IBM has a large operation in Wangaratta and Fujitsu is to expand its operations in Dandenong.

Although it is essentially three factories in one (personal computers, board mounting and RISC 6000 — a mid-range computer), the IBM factory at Wangaratta is not atypical of IBM facilities. Local content, however, is not as high as in its US operations, where there is local sourcing of metals, power supply units and other components.

IBM Australia imports nearly all of the parts that make up its computers (for example, cases and power units used in Wangaratta are imported from China, while the microprocessor and other high technology components are sourced from the USA). Australian content is limited to items such as sockets and connectors, with value adding arising through the loading of components on raw card — IBM Australia does not import loaded boards.

The bulk of IBM Australia's output from Wangaratta is exported. Its production facility is thus located some distance from both its sources of supply and its markets. This points to the relatively footloose nature of the IT industries. At the public hearings, IBM Australia said it is not in a position to forecast what its domestic operations will be in two years time (Transcript, p. 476). Germane to the issue of footloose capital, the BIE (1994a) reported that Australia has high production labour costs compared with those developing countries that are attracting investment in production and assembly operations.

The Australian Customs Service, using bounty claim data, pointed to the high number of firms engaged in low value added assembly in Australia. Difficulties encountered by Australian computer hardware firms in achieving high levels of value added were illustrated by Computer Vision International (Box 2.3).

Component manufacture

Some multinational firms in Australia undertake bountiable production of printed circuit boards (PCBs) for own use in telecommunications products. There are also around 20 small to medium sized independent PCB manufacturers, most with annual turnover below $5 million. Two large scale PCB plants closed in 1991, after failing to earn sufficient return on investment (see Box 7.2).

Box 2.3: **Computer Vision International**

Computer Vision International (CVI) was established in 1990 to produce an Australian personal computer. In two years it produced a PC with a claimed Australian content of 42 per cent. Its second generation product — the Rainbow — is said to have 63 per cent Australian content. CVI sought high local content to secure a 'marketable' Australian Design and Manufacture Award — Standards Australia required a local content of 60 per cent. According to CVI, on a computer that costs around $2300, the increase from 50 per cent to 60 per cent local content added $187 to the unit cost.

Achieving high local content has been difficult given that the three main components in a computer — the central processing unit, the hard drive and the memory — are imported as complete units. Several other components are also imported and power supply units are made overseas and assembled locally. According to CVI, the Australian content is made up of design, assembly and manufacturing, quality control, testing and programming of product. CVI suggested that creative engineering and design should be eligible for the 150 per cent R&D tax concession.

Source: Transcript (pp. 107-126).

The PCB industry has revenues of about $30 billion worldwide and $160 million in Australia (Precision Circuits, Transcript, p. 39). The batch sizes handled by Australian operations are small (Box 2.4). According to the Australian Printed Circuit Manufacturers' Association, 75 per cent of orders for PCBs in Australia are for less than 100 boards, compared to the USA, South-East Asia and Japan, where 90 per cent of orders are for over 1000 boards (Sub. 19, p. 4).

PCB manufacturers said that Australia's competitive advantage is in low volume, high quality boards and in innovative design and manufacturing. International 'world scale' plants (runs of up to 10 000 boards) do not find it economic to compete for this low volume business because it involves stop-start assembly line reconfiguration and short lead times. Australian firms attract overseas orders for short production runs — Precision Circuits said PCB designs can be transmitted electronically (Transcript, p. 32).

Australia does not have a significant component manufacturing presence apart from the PCB manufacturers and some integrated circuit production by AWA Microelectronics and Philips. Several participants (including IBM Australia, Omnitech Engineering and Hypertec) raised concerns about the lack of component manufacture. Hypertec, a producer of PC enhancement products, argued that governments should foster the development of a semiconductor industry, requiring an investment of about $2 billion (Transcript, p. 310). A previous attempt to facilitate development of the component sector was not successful (see Box 7.2).

Box 2.4: **Email Printed Circuits**

Email Printed Circuits (EPC) is an autonomous profit centre within Email Ltd, supplying most of its output to external buyers, rather than to its parent. Like most Australian PCB operations, EPC produces small runs of high quality prototype and pre production circuit boards. EPC is operating at 20 per cent over capacity and is seeking to double current capacity.

Although small by world standards, EPC's advantages stem from the flexibility of its production plant and its design and development staff. Most of its production runs are in the 50 to 200 board range although it undertakes some runs of 500 boards. EPC has an alliance with Wus — a PCB manufacturer in Taiwan which is not interested in production runs under 1000 boards.

EPC's main disadvantage is a lack of automation which prevents it achieving consistent quality over long production runs. In Taiwan, factories are fully automated and can achieve consistent quality over large quantities of boards. However, Taiwanese firms are less skilled in troubleshooting and the design/development of prototype boards. It may take three to five days to produce a prototype board in Australia and 3 weeks to produce the same board in Taiwan, but for the production of 5000 boards, Wus in Taiwan may be 30 per cent cheaper than EPC.

EPC is for sale as part of Email's strategy to consolidate its core businesses.

Source: Industry discussions.

The size of the domestic market does not appear to justify the capital investment required for world scale manufacture. Local production of components is therefore likely to be confined to that required to service the domestic and/or niche markets. The BIE (1994a) concluded that:

> Generally, component production appears to be the weakest segment in Australia's IT industries where problems related to limited economies of scale and the implementation of appropriate quality standards are reported to be most acute. (p. 50)

Australia's IT industries demonstrate strengths in:

- *innovation and development of applications software;*
- *systems integration, the coupling of software and hardware systems, and solutions packages incorporating hardware and software;*
- *innovative niche hardware; and*
- *undertaking small high quality runs, where larger scale plants overseas tend to be uncompetitive.*

2.4.2 Strategic alliances

The importance of strategic alliances for Australian firms was raised by AT&T Global Information Solutions:

> Almost all domestic producers are satisfying niche markets and will continue to do so for the foreseeable future. It is unlikely that any indigenous company can marshal the necessary resources to undertake the broad product development of organisations such

> as AT&T. The most successful local producers will closely align themselves with the large trans-national corporations (TNCs) and develop niche products to comply with emerging standards, enhancing the TNC's offerings in the local market, with the opportunity to use the TNC's international distribution channels to reach world markets. (Sub. 28, p. 3)

Strategic alliances may be encouraged through industry-run programs, such as AIIA's Strategic Alliance Symposia. Governments may also become involved — a pilot program is run by the National Industry Extension Service and alliances with multinational vendors are encouraged through the Partnerships for Development program (Chapter 5). The ATIA was particularly supportive of government efforts to promote alliances, and suggested that these schemes 'remain an integral part of the Information Industries Strategy' (Sub. 32, p. 10).

Strategic alliances are good business practice and, in many cases, will occur without government 'marriage broker' programs. Intellect Australia (see Box 2.2) said:

> A question we are asked is how do you get from designing the technology to manufacturing the technology, marketing the product and exporting. Exporting appears to be a natural barrier. We had a strategy which was to market our products through OEMs [original equipment manufacturers]. To achieve that status, we marketed into companies such as AT&T GIS, Fujitsu/ICL, Siemens Nixdorf and IBM. We also use those relationships to sell our products overseas and that was our move from local to overseas markets. (Electronic News 1995, p. 22)

QPSX Communications also emphasised the benefits of arrangements with multinational firms:

> Following a strategy that collaboration with top international telecommunications suppliers will enhance its products' prospects on the world, in 1989 QPSX negotiated manufacturing-marketing agreements with Siemens and Alcatel. Siemens is Europe's biggest company and one of the world's leading electronic and electrical engineering groups ... Alcatel, a world leader in communications systems, is active in the development, manufacture and supply of all forms of telecommunications equipment. (Sub. 91, p. 1)

Stallion Technologies is another Australian firm that has created export opportunities by marketing through a global network of distributors and OEM relationships. The company produces intelligent serial input/output controllers for PC-based systems and a range of performance enhancement software products, local area network servers and wide area network communications controllers. Stallion has enjoyed very rapid growth over the last five years and now has manufacturing facilities in the USA and Asia as well as Australia, and exports to several countries from these production sites.

Part of Computer Management Centre's success with its warehousing system (see Box 2.1) derives from the development of its relationship with Davids

Holdings. However, a number of systems integrators and software firms have been marketing independently in Asia. Generally these firms have already sold into the Australian market.

Fundi Software, a small Western Australian software development, support and technical and systems development consultancy company, attempted to enter the export market in 1990. It sought multinational partners which it could represent in Australia in exchange for access to their sales and distribution channels in the USA and Asia.[4]

It is not only the smaller companies that benefit from strategic alliances. It can be in a multinational firm's interest to form an alliance with a smaller company which can provide specialised products that form part of a total solution. MN Information Technology Group suggested that large companies lack the flexibility of smaller operations:

> It's the large organisations that have difficulty in being able to ... turn the oil tanker on a dime. The small operators ... can do some amazing things very, very quickly. So in the software area ... I wouldn't agree that being large is a help. (Transcript, p. 5)

This is consistent with the view that multinational firms, while interested in total solutions, cannot fill niches as quickly as smaller companies.

Globally IT&T activity is dominated by multinational firms, but there is a role for SMEs, particularly in niche markets. International alliances, and/or links with multinational companies based in Australia, can contribute to the success of Australian SMEs.

2.5 Participants' views on the industries' potential

The Commission sought information on areas of IT where there is demonstrated potential for Australia. Few participants suggested that Australia should attempt to move into commodity hardware.

The New South Wales Government stated that:

> In the short term, the production of CD-ROM multimedia titles is a booming area. The services sector is still expanding rapidly as outsourcing of IT services continues to grow. Another area of strong growth will be in software development tools — especially object oriented languages and databases, groupware, conversion of legacy systems and multimedia applications — authoring, delivery and reception tools. (Sub. 52, p. 4)

[4] For various reasons these relationships failed, although Fundi has now succeeded in exporting its unique products directly to South East Asia, South Africa and the USA.

According to the AIIA:

> There are ... significant opportunities for application of IT&T in creating new services and industries, such as those arising through the development of interactive multimedia technologies. These systems span education, entertainment and the provision of information either for general consumers or for specific interest groups. Multimedia can be delivered using technologies such as CD-ROM or in its presently-conceived ultimate development, through high speed broadband services as a component of Australia's pay-TV networks.
>
> Australia's access to technology, its geographical and time zone location as well as its potential to provide a base for merging the cultures of Asia, North America and Europe mean we are ideally placed to play a key role in developing, customising and rolling out these products and services within our region. (Sub. 27, p. 3)

AT&T Global Information Solutions said:

> The high growth areas in the computer industry are multi-media, object-oriented languages and databases, groupware, and the re-implementation of 'legacy systems' as organisations move to the new open client-server architectures to meet competitive and cost pressures. (Sub. 28, p. 3)
>
> To bring the components of a solution together either the customer must invest in resources to do the integration, testing and ongoing management of the end result or an emerging class of organisation called a 'systems integrator' is used. (Sub. 28, p. 5)

Microsoft was cautious in nominating growth areas:

> Australia is in a good position to be a significant participant in a new information based economy ... As the outcome is unpredictable, we must be flexible and be able to adapt quickly as the tools, techniques and applications become clearer. (Sub. 43, p. 11)

Wormald Technology agreed:

> ... new market opportunities will not necessarily be obvious and may only become apparent through the further exploitation of core technology generated in response to a particular customer's requirements. Furthermore, our experience proves that system integration, not 'standard platform' hardware offers a key to a sustainable high value added Australian computer industry. (Sub. 22, p. 15)

The views expressed by Wormald Technology and Microsoft are timely reminders that forecasting future trends is especially difficult in the face of rapid development and convergence of technologies. What is required is a flexible environment that allows innovative firms and individuals to respond to changing circumstances.

There is scope to build on Australia's strengths in IT. Governments can help by removing impediments to better performance, by providing a stable institutional and regulatory framework, and through judicious use of their presence in the market as a purchaser of IT.

3 MARKETS

This chapter examines the markets for information technology (IT) products globally, in the Asia-Pacific region, and in Australia, and Australia's international trade in IT products.

3.1 Information technology use in Australia

Australia has one of the highest per capita rates of personal computer (PC) ownership in the world. In 1993, its per capita rate of PC ownership was 22 per cent, compared to 26 per cent in the United States of America.

Household use of IT

The main results of a survey of the *Household Use of Technology* by the Australian Bureau of Statistics (ABS 1994) are presented in Box 3.1. The ABS found that 23 per cent of households frequently use a computer. The Australian Capital Territory had the highest proportion of computer users (36 per cent of households), followed by New South Wales (24 per cent) and Victoria (24 per cent).

The main uses of home computers were for education (25 per cent), entertainment (23 per cent) and word processing (15 per cent). Only 3 per cent of homes had CD-ROM (compact disc read-only-memory) equipment and 4 per cent had modems.

International Data Corporation (IDC)[1] considers that these data provide a misleading (dated) picture of household expenditure. It suggests that CD-ROM ownership is now at 10 per cent (rather than the 3 per cent reported by the ABS).

According to IDC, Australian home computer demand will increase by 27 per cent in 1995 to $A800 million.

Corporate use of IT

Managing Information Systems (MIS) conducted a survey of the top 100 computer-using organisations in Australia and New Zealand, ranked according to the number of screens used (PCs, workstations and terminals) (MIS 1994). Data relating to the top 20 are presented in Table 3.1.

[1] This chapter draws on a report prepared for the Commission by IDC (1995).

Box 3.1: **Household use of technology**

The main findings of the 1994 survey conducted by the ABS were:

- 23 per cent of households frequently use a computer at home;
- 4.4 per cent of all households have a fax machine;
- 2.9 per cent of all households have CD-ROM equipment;
- 2.9 per cent of households have a home based business and a fax machine;
- 3.8 per cent of households have one or more portable computers;
- 20 per cent of households have one or more desktop or personal computers; and
- 18 per cent of households have a dedicated games machine which is regularly used by persons in the household.

Of the households in which a computer is used, the survey found that:

- 74 per cent use word processing software;
- 34 per cent use general purpose spreadsheet software;
- 41 per cent had a member of the household who had undertaken computer training from an employer;
- 41 per cent had a member of the household who had undertaken computer training from a secondary or primary school;
- 80 per cent also used printers;
- 25 per cent mainly used home computer equipment for education purposes; and
- 42 per cent used computer equipment on average one to five hours per week.

Source: ABS (1994).

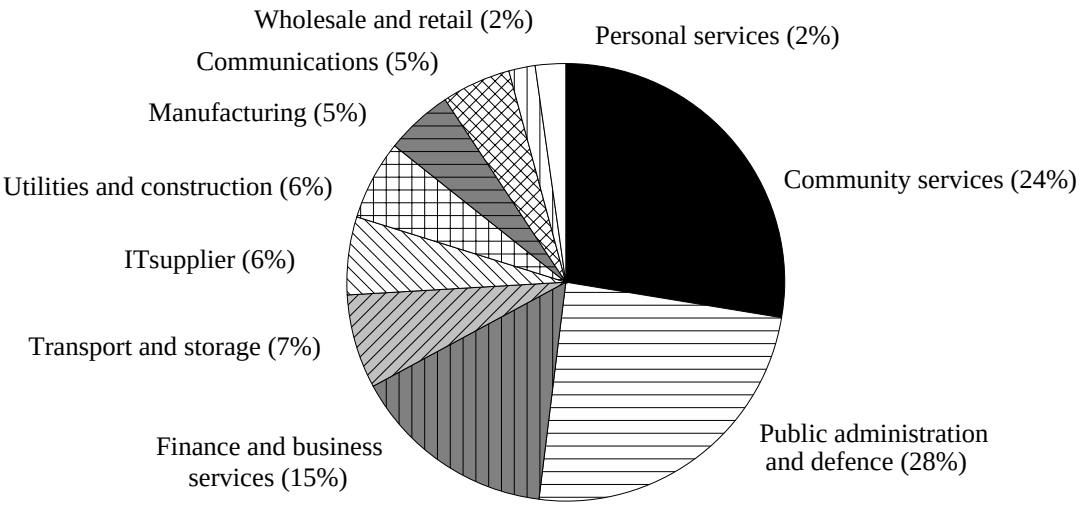
Table 3.1: **Top 20 computer-using organisations, 1994**

Rank	*Organisation*	*Industry*	*Screens*	*PCs*	*Terminals*
1	Telecom Australia (Vic)	Communications	40 000	25 000	15 000
2	ANZ Banking Group (Vic)	Finance	38 500	13 500	25 000
3	Commonwealth Bank (NSW)	Finance	32 000	15 000	17 000
4	Coles Myer (Vic)	Retail	25 000	20 000	5 000
5	DEET (ACT)	Public Admin.	22 500	7 500	15 000
6	National Australia Bank (Vic)	Finance	22 400	11 400	11 000
7	Dept of Social Security (ACT)	Community services	20 000	10 000	10 000
8	BHP Information Technology (Vic)	IT supplier	17 000	8 500	8 500
9	Australian Taxation Office (ACT)	Public Admin.	15 900	900	15 000
10	Westpac Banking Corp (NSW)	Finance	12 000	2 000	10 000
11	Defence — Navy (ACT)	Defence	10 900	10 000	900
12	NSW TAFE Commission (NSW)	Community services	9 200	7 000	2 200
13	EITC (Vic)	Utilities	8 800	3 000	5 800
14	University of Melbourne (Vic)	Community services	7 800	6 000	1 800
15	Australia Post (Vic)	Communications	7 500	4 900	2 600
16	Qantas (NSW)	Transport	7 500	7 500	–
17	National Mutual Life Assoc. (Vic)	Finance	7 450	3 200	4 250
18	SA Dept Employment and TAFE (SA)	Community services	7 050	7 000	50
19	University of Queensland (Qld)	Community services	7 014	6 548	466
20	AMP (NSW)	Finance	7 000	4 000	3 000

Source: MIS (1994).

Of the top 100 computer users by industry, over half were classified to 'community services' and 'public administration and defence' (Figure 3.1). Most of these organisations are publicly owned.

Figure 3.1: **Top 100 computer-using organisations by industry**



Note: Industry sectors based on ASIC classes as defined by the ABS.
Source: MIS (1994).

Public sector spending

According to the Department of Administrative Services (DAS), Commonwealth Government spending on IT totalled $1.3 billion in 1993 (Table 3.2) — around 11 per cent of the total market.

Technology Transactions (1995) reported that measured Commonwealth Government spending on IT increased by 44 per cent between 1993 and 1994. However, it said that in 1993 around 20 per cent of IT expenditure by Commonwealth departments went unreported. After taking unrecorded expenditure into account, Technology Transactions suggested that the real increase between 1993 and 1994 was closer to 25 per cent (Table 3.3). The major spenders in 1994 were Defence ($305 million), Social Security ($115 million) and Administrative Services ($68 million).

The top 5 suppliers to the Commonwealth Government in 1994 were: BHP-IT ($101 million); Telecom Australia ($62 million); IBM Australia ($61 million); Computer Power ($28 million); and Digital Equipment Corporation ($23 million). (Technology Transactions 1995)

Table 3.2: **IT expenditure by product category, 1993**
($ million)

Category	*Overall market expenditure*	*Comm Govt expenditure*	*Percentage of overall expenditure*
Packaged software	1 538	205	13.3
Professional services	1 343	188	14.0
Desktop systems	2 105	161	8.0
Data communications	629	108	17.1
Engineering maintenance	974	99	10.2
Large-scale systems	330	67	20.3
Mid-range systems	507	57	11.3
Processing services	410	10	2.5
Other	3 898	425	10.9
Total	**11 645**	**1 320**	**11.3**

Source: DAS (Sub. 38, Attachment A).

Table 3.3: **IT expenditure by Commonwealth Government departments, 1993 and 1994**
($ million)

Department	*1993*	*1994*	*No.'94 Contracts*
Defence	193.78	304.68	6 762
Social Security	37.67	114.73	832
Administrative Services	24.96	68.40	2 590
Employment, Education and Training	84.26	67.24	1 608
Treasurer	69.87	66.01	1 694
Attorney-General	40.66	41.71	1 404
Foreign Affairs and Trade	21.05	39.81	1 421
Immigration and Ethnic Affairs	16.51	32.44	894
Human Services and Health	26.97	26.89	1 061
Primary Industries and Energy	18.53	21.47	1 071
Veterans' Affairs	13.05	18.20	634
Industry, Science and Technology	13.71	17.25	943
Communications and the Arts	11.92	14.80	516
Parliamentary Departments	9.28	14.15	589
Environment, Sport and Territories	10.14	12.57	765
Prime Minister and Cabinet	14.19	10.63	595
Transport	...[a]	10.48	462
Industrial Relations	2.63	5.98	298
Finance	10.93	5.93	312
Tourism	0.73	0.66	62
Housing	...[b]	0.54	40
Total	**620.84**	**894.58**	**24 553**

a 1993 figure is included in 'Transport and Communications'.

b 1993 figure is included in Health, Housing, Local Government and Community Services.

Source: Technology Transactions (1995).

The final report of the Minister for Finance Information Technology Review Group (ITRG 1995), *Clients First*, noted that IT expenditure totalled around $1.4 billion per annum. If other costs are accounted for, the total would be in excess of $2 billion.

Later this year, the ABS is expected to release the results of a 1993-94 survey of in-house production and use of IT by businesses and government. Around 8500 companies are being asked how many employees have PCs and how many are needed to underpin them; how many mainframes, minicomputers and PCs are installed; and the size of their annual IT budget.

3.2 Global information technology markets

Global IT sales revenue in 1993 was $US392 billion in 1993 prices (IDC 1995). IDC anticipates that future growth will be around 7 per cent per annum between 1993 and 1998 — computing power' will increase at a much faster rate because of continuing technological advances.

IDC's revenue estimates for the global market are based on its 'Worldwide Black Book' model. Product segments used by IDC in this model are listed in Chapter 2.

Care is needed in interpreting IDC's figures as they relate to IT sales revenue and not to the aggregate output of the IT industries. IT activities carried out in-house by firms which are engaged primarily in other industries are excluded from these estimates. Outsourcing (or vertical disintegration) will therefore result in an apparent increase in IT revenue, when in fact there has been no increase in production. For example, where functions like systems management are 'outsourced' by a firm in another industry, all of the amount paid by the firm will be recorded by IDC as an increase in 'professional services'[2] revenue. This would have previously been recorded by IDC under other product segments (eg hardware and software purchases, support services etc). Part of it would not have been previously recorded, inflating IT sales revenues without actually increasing the demand for, or the production of, IT goods and services.

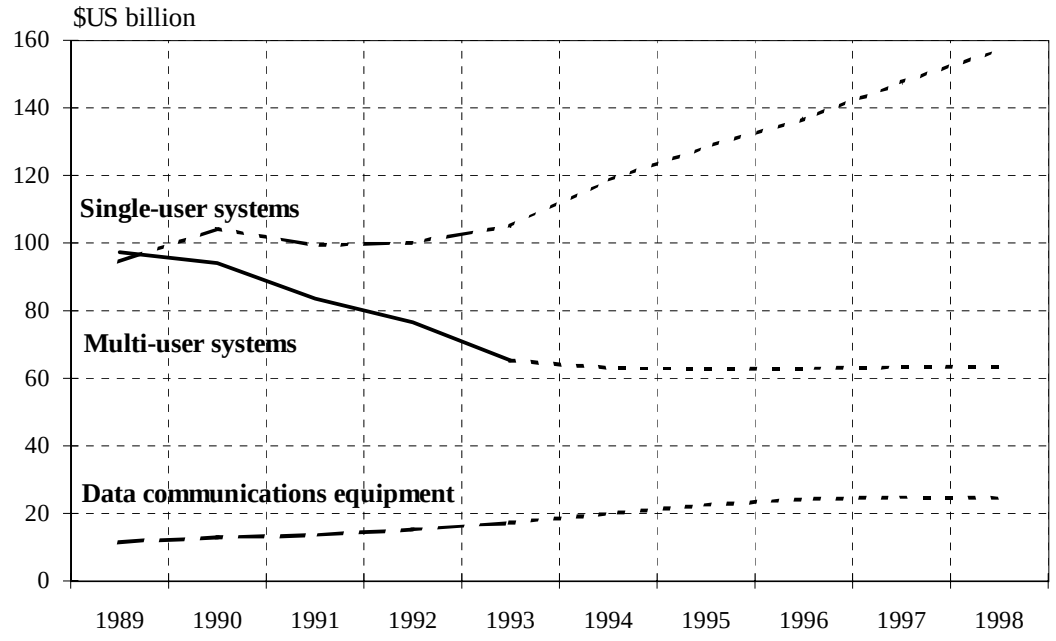
Hardware

Hardware includes multi-user systems, single-user systems and data communications equipment. According to IDC, global expenditure on multi-user systems declined over the period 1989 to 1993. IDC forecasts that this decline will 'bottom out' in 1994, and remain at that level through to 1998

[2] 'Professional services' includes consulting, education, design and development, implementation and systems management.

(Figure 3.2). This segment is in decline because of a move away from centralised mainframe architectures to cheaper mid-range and PC/local area network-based solutions. Revenues are also falling because of reductions in the cost of multi-user systems hardware.

Figure 3.2: **Global IT sales revenue: hardware, 1989 to 1998[a]**
($US billion in 1993 constant prices)



a Forecast beyond 1993.
Source: IDC (1995).

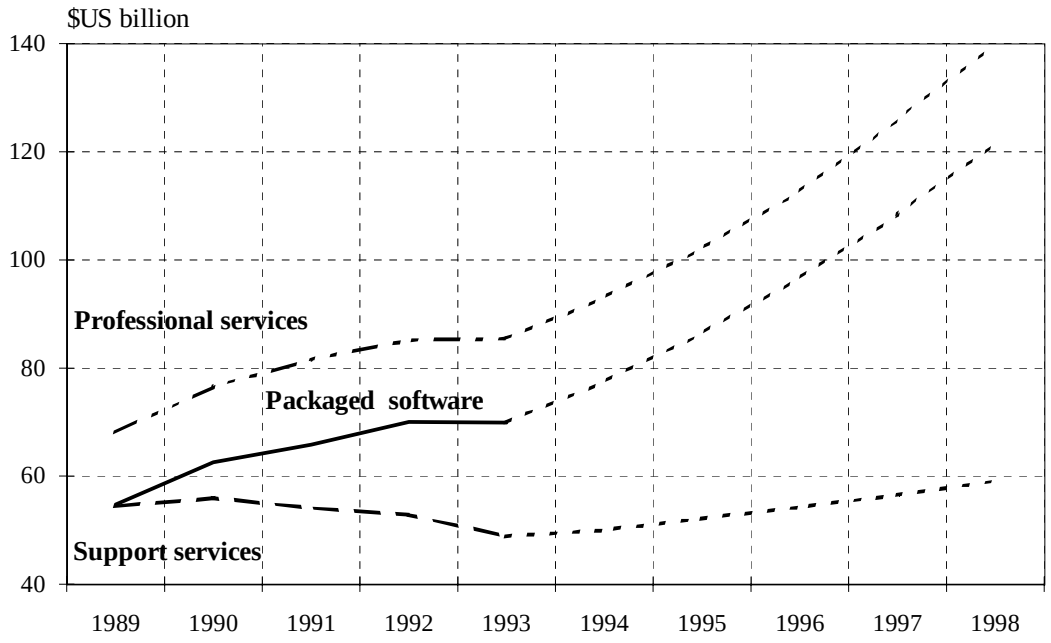
Expenditure on single-user systems dipped as a result of the 1991 recession, but had recovered by 1993, and IDC forecasts strong growth for the sector through to 1998. Growth in this segment is being driven by improvements in single-user computing power and networking technology, enabling single-user systems to replace multi-user systems in many applications. The cost of single-user systems and components is also falling.

Global expenditure on data communications increased steadily between 1989 and 1993, and IDC forecasts steady growth in sales revenue for the sector through to 1998, as the demand for PC networks and mid-range server systems increases, and the cost of data communications equipment and components continues to fall.

Software and related services

IDC expects expenditure on packaged software and related services to accelerate over the period 1993 to 1998 (Figure 3.3), with sales of packaged software being driven by the development of open standards for operating systems environments and the extension of computers to more complex business and administrative activities. Demand for professional services is expected to grow as IT systems are becoming more complex, requiring specialists to configure, install and maintain them, and because firms and government departments are increasingly outsourcing their IT operations.

Figure 3.3: **Global IT sales revenue: software and related services, 1989 to 1998[a]**
($US billion in 1993 constant prices)



a Forecast beyond 1993.
Source: IDC (1995).

Expenditure on support services declined between 1989 and 1993, reflecting improvements in hardware reliability and the decline in the multi-user hardware sector. IDC forecasts that this downward trend will reverse over the period 1993 to 1998, as the demand for third party support of packaged software applications rises.

Changes in market shares

According to IDC, in 1993, hardware revenues accounted for 48 per cent of total global IT revenues, down from 56 per cent in 1989. IDC forecasts that this decline will continue (Table 3.4). Packaged software and professional services increased their share of the global market between 1989 and 1993 and IDC expects this trend to continue.

Table 3.4: **Global IT sales revenues by market segment** (per cent)

Market segment	*1989*	*1993*	*1998[a]*
Multi-user systems	25.6	16.7	11.2
Single-user systems	24.8	26.8	27.8
Data communications hardware	14.4	17.8	21.5
Packaged software	3.0	4.4	4.3
Professional services	17.9	21.8	24.7
Support services	14.3	12.5	10.5
Total	**100.0**	**100.0**	**100.0**

a Forecast.
Source: IDC (1995).

Regional breakdown

A regional breakdown of demand for, and supply of, IT products for 1987 and 1992 is shown in Table 3.5.

Table 3.5: **Regional demand and supply of IT, 1987 and 1992**

Region	*Demand*			*Supply*		
	1987 (US$bn)[a]	*1992 (US$bn)[a]*	*Change 1987-1992 (per cent)*	*1987 (US$bn)[a]*	*1992 (US$bn)[a]*	*Change 1987-1992 (per cent)*
North America	123.9	128.9	3.8	176.3	212.9	20.8
Europe	90.9	114.9	26.4	44.1	43.9	-0.3
Asia and Rest of World	60.6	94.6	56.1	55.1	81.1	47.2
Total Worldwide	**275.5**	**338.0**	**22.7**	**275.5**	**338.0**	**22.7**

a At constant 1992 $US prices and current exchange rates.
Source: McKinsey & Company (1993).

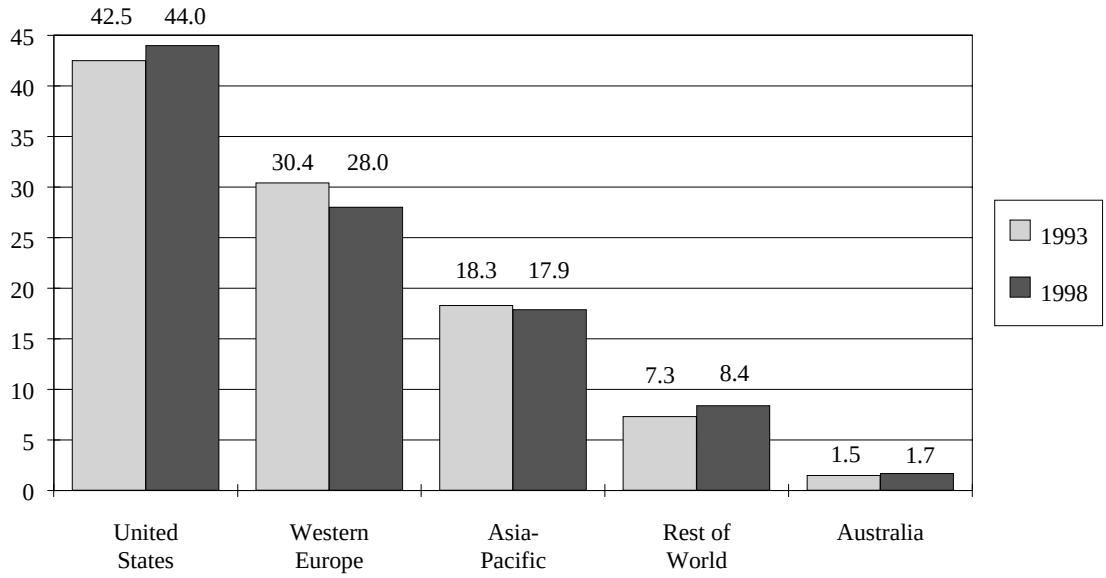
North America was a net exporter of IT over the period 1987 to 1992, while Europe, Asia and the rest of the world were net importers.

According to McKinsey & Company (1993):

> The [Asia-Pacific] region is the only market that continues to grow at double digit rates. ... Demand in the US has slowed, and growth in the US market was about half that of the worldwide market over the past five years. The European market grew at the worldwide average. (pp. 2-11)

IDC provided a breakdown of global IT sales revenue by region for 1993 and 1998 (Figure 3.4). According to IDC, demand for IT products and services in Western Europe and Asia-Pacific will grow less rapidly than in other regions. Australia's share of the global IT market is forecast to remain small.

Figure 3.4: **Global IT sales revenue by region, 1993 and 1998[a]** (per cent)



a Projected.

Source: IDC (1995).

3.3 Asia-Pacific information technology markets

According to IDC, expenditure on IT in the Asia-Pacific region[3], valued in 1993 constant prices, grew from $US73.9 billion in 1989 to $US77.8 billion in 1993.

[3] IDC (1995) classifies the IT market into four regions: United States of America, Western Europe, Asia-Pacific (excluding Australia) and Australia. All residual countries fall under the heading of 'Rest of World'.

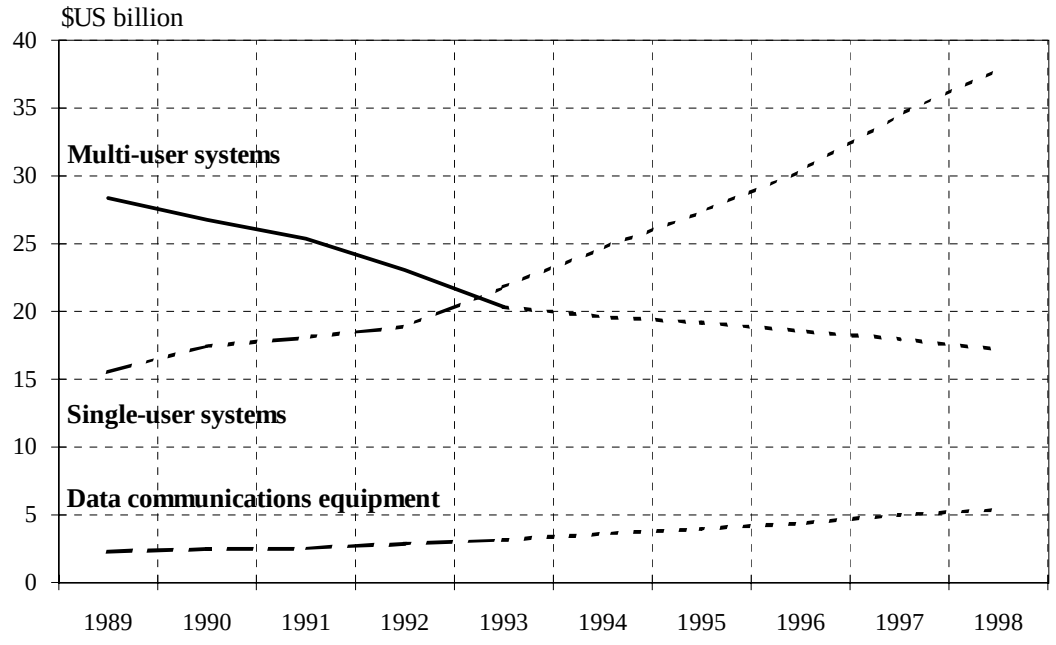
IDC forecasts that expenditure on IT in the region will grow by around 6 per cent per annum over the period 1993 to 1998.

Hardware

There has been a steady decline in expenditure on multi-user systems in the Asia-Pacific region since 1989. IDC forecasts that this decline will continue, albeit at a slower rate. Japan and Australia are the only two countries in the Asia-Pacific region which have a 'sizeable' multi-user systems market.

Growth in expenditure on single-user systems was tempered by the recession in 1991, but recovered in 1993, and strong growth is estimated for the sector over the period 1993 to 1998. There has also been a steady increase in expenditure on data communications equipment, and IDC expects this growth to continue, as countries in the region seek to establish national and international computing infrastructures (Figure 3.5).

Figure 3.5: **Asia-Pacific IT sales revenue: hardware, 1989 to 1998[a]** ($US billion in 1993 constant prices)



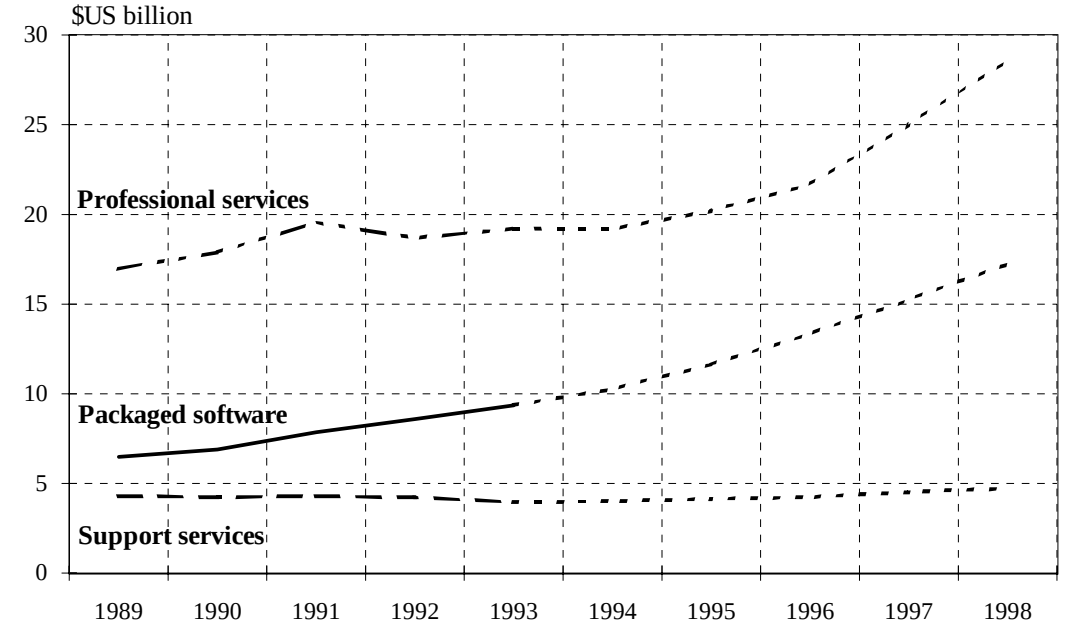
a Forecast beyond 1993.
Source: IDC (1995).

Software and related services

Expenditure on professional services rose steadily from 1989 to 1991, fell in 1992 and remained static into 1993. IDC expects the sector to grow over the

period 1993 to 1998, with strong growth after 1996. Sales of packaged software showed steady growth between 1989 and 1993. Strong growth is expected to continue through to 1998, driven by the high penetration of PCs and server systems within countries in the region. Expenditure on support services was static between 1989 and 1993. IDC forecasts moderate growth in the sector through to 1998 (Figure 3.6).

Figure 3.6: **Asia-Pacific IT sales revenue: software and related services, 1989 to 1998[a]**
($US billion in 1993 constant prices)



a Forecast beyond 1993.
Source: IDC (1995).

Changes in market shares

Sales of hardware in the Asia-Pacific region accounted for 62 per cent of total IT revenue in 1989, and 58 per cent in 1993. IDC forecasts that hardware will account for 55 per cent of total revenue in 1998. Sales of single-user systems are forecast to account for 34 per cent of total revenue by 1998, compared with 21 per cent in 1989, and 28 per cent in 1993 (Table 3.6).

Table 3.6: **Asia-Pacific IT sales revenue by market segment** (per cent)

Market segment	*1989*	*1993*	*1998[a]*
Multi-user systems	38.3	26.1	15.5
Single-user systems	21.0	28.0	34.1
Data communications hardware	3.1	4.0	4.9
Packaged software	8.8	12.0	15.5
Professional services	23.0	24.7	25.7
Support services	5.8	5.1	4.3
Total	**100.0**	**100.0**	**100.0**

a Projected.
Source: IDC (1995).

Regional breakdown

According to IDC, the Asia-Pacific IT market (with Japan excluded) was worth $US17 billion in 1993. IDC forecasts that this market will grow to $US29 billion (in constant 1993 prices) by 1997.

The BIE (1994a) presented a regional breakdown of the market by country share (Table 3.7). Australia's share of the Asia-Pacific market is forecast to decline, but it will remain the most significant market in the region after Japan.

Table 3.7: **Country share of the Asia-Pacific IT market (excluding Japan), 1993 and 1997[a]** (per cent)

Country	*1993*	*1997*
Australia	**35.0**	**28.3**
China	10.2	18.1
Korea	16.7	14.5
Taiwan	9.1	8.8
India	5.7	7.3
Thailand	4.8	5.7
New Zealand	5.9	5.1
Hong Kong	4.9	4.7
Singapore	4.7	4.4
Malaysia	3.0	3.1
Total	**100.0**	**100.0**

a Projected.
Source: BIE (1994a).

3.4 Australian information technology markets

Based on IDC's Australian IT industry model, total expenditure on IT in Australia in 1989 (in constant 1993 prices) was estimated at $A11.9 billion. Expenditure rose to $A12.1 billion in 1990 and fell to $A10.9 billion in 1991, largely as a result of the recession. Expenditure in 1993 was estimated at $A11.8 billion. IDC forecasts expenditure on IT in Australia to grow by around 8 per cent per annum between 1993 and 1998.

The Australian IT industry model includes data on some components not included in IDC's Worldwide Black Book model. These are:

- **Other communications**, which includes some private automatic branch exchange (PABX) equipment, communications processors and other non-Telecom switching devices.
- **Processing services**, which includes payroll and other human resources processing, electronic commerce, and dedicated information services.
- **Other**, which includes consumables such as laser cartridges and printer ribbons, non-computer electronic equipment, industry-specific terminal equipment and other associated products not classified elsewhere.

In addition, estimates of revenue from hardware are further disaggregated — peripherals are included as a separate item.

As mentioned in Section 3.1, these estimates relate to sales revenue which do not account for funds spent on IT services provided in-house by firms classified to other industries.

Hardware

Data on hardware sales in Australia are separated into four categories: multi-user systems, single-user systems, peripherals and communications equipment (Figure 3.7).

Sales of multi-user systems declined between 1989 and 1990, and dropped sharply in 1991. Sales steadied through to 1993, and IDC forecasts very slow growth, due mainly to sales of mid-range servers, through to 1998.

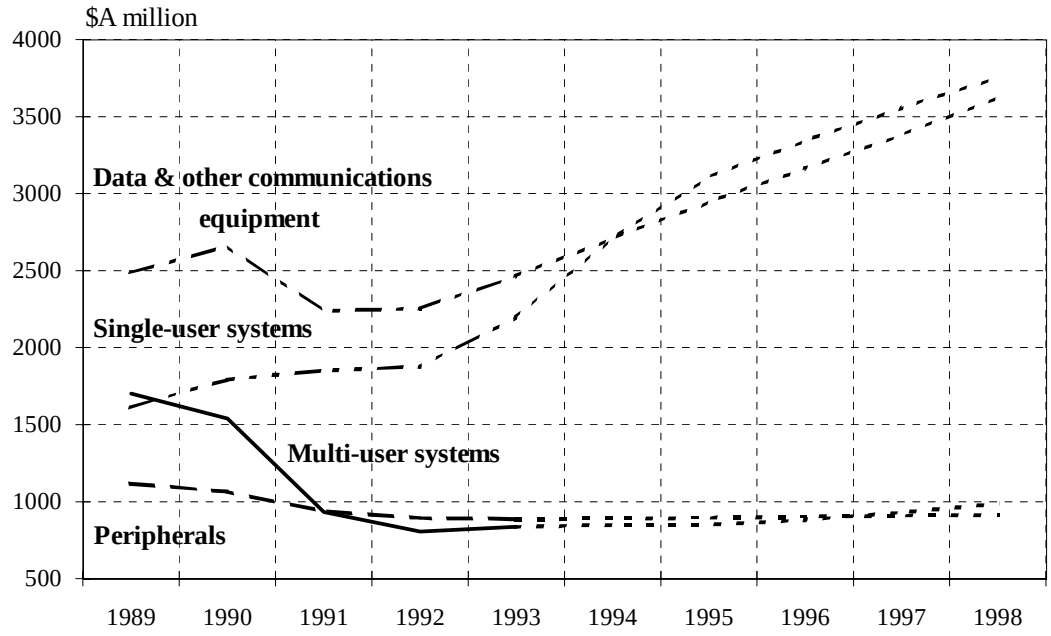
Expenditure on peripherals also declined between 1989 and 1991, levelling out in 1993. IDC anticipates limited growth in expenditure on peripherals between 1993 and 1998.

Total expenditure on single-user systems slowed because of the recession in 1991, but had recovered by 1993. IDC forecasts strong growth in sales of single-user systems between 1993 and 1998, driven by increasing demand for

'notebook' computers in the business market, and by increasing demand in the home consumer market.

Sales of communication equipment declined in 1991, but recovered slightly in 1993. IDC forecasts a strong period of growth for the sector between 1993 and 1998 driven by the high penetration rates of PCs in Australia and the geographic spread of Australia's commercial centres.

Figure 3.7: **Australian IT sales revenue: hardware, 1989 to 1998[a]** ($A million in 1993 constant prices)



a Forecast beyond 1993.
Source: IDC (1995).

Software and related services

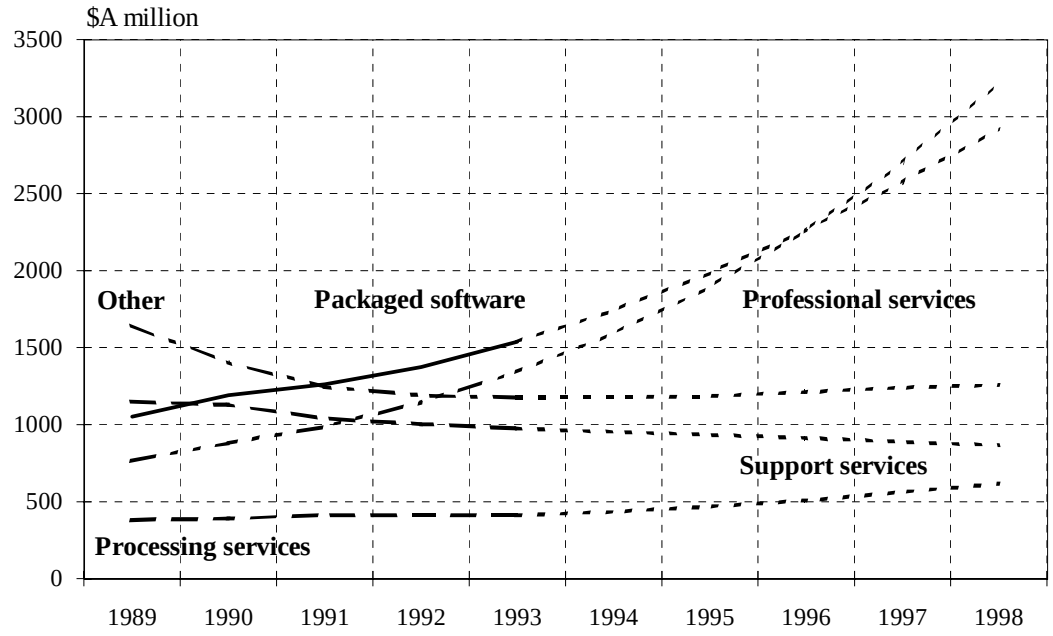
Expenditure on packaged software in Australia rose strongly over the period 1989 to 1993, and this growth is expected to continue through to 1998, sustained by the extension of computerisation to more complex business applications (Figure 3.8).

Expenditure on professional services grew steadily between 1989 and 1993, and IDC expects the period 1993 to 1998 to be one of strong growth. Two factors driving this growth are the increasing complexity of new computing systems, requiring specialists to purchase and install them, and the trend in business and government to outsource their current IT operations. As mentioned above,

outsourcing may not increase the size of Australia's IT industries, but rather transfer activity from one segment of the industries to another.

Expenditure on processing services remained steady between 1989 and 1993, and IDC forecasts a slight increase between 1993 and 1998. Expenditure on support services and 'other' (eg laser printer cartridges, printer ribbons etc) declined between 1989 and 1993, hastened by the recession in 1991. IDC expects expenditure on support services to continue to decline through to 1998, while expenditure on 'other' is forecast to rise slightly.

Figure 3.8: **Australian IT sales revenue: software and related services, 1989 to 1998[a]**
($A million in 1993 constant prices)



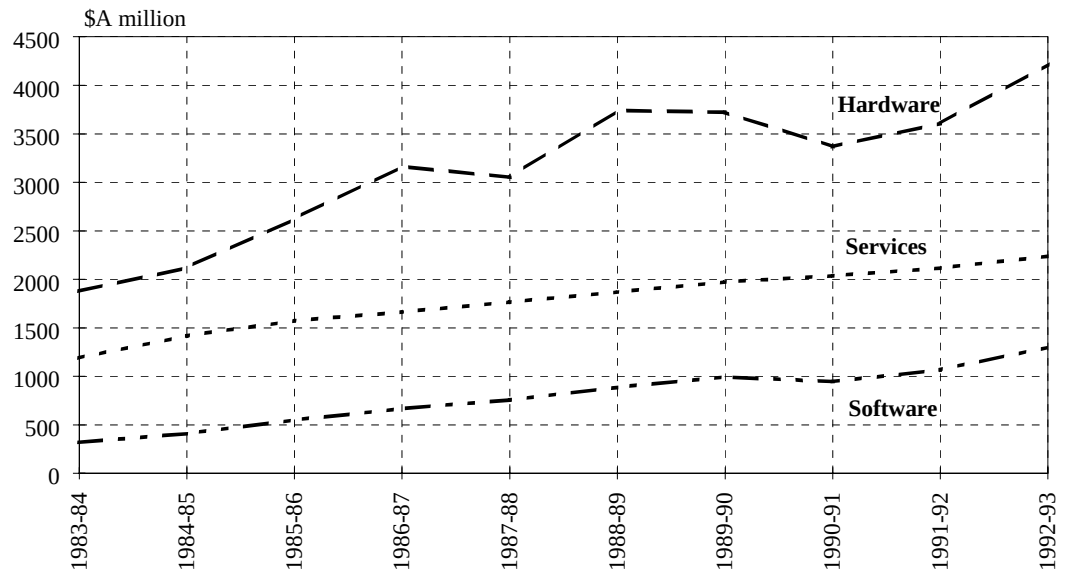
a Forecast beyond 1993.
Source: IDC (1995).

Changes in market shares

Sales of IT hardware, packaged software and IT services in Australia are illustrated in Figure 3.9.

According to IDC, in 1993 hardware revenues accounted for about 33 per cent of total IT revenues, software accounted for 13 per cent and services 23 per cent (Table 3.8). If 'communications' and 'other' are excluded, these shares become

Figure 3.9: **Sales of IT hardware, packaged software and IT services in Australia, 1983-84 to 1992-93**
($A million in constant 1992-93 prices)



Source: BIE (1994a).

Table 3.8: **Australian IT sales revenue by market segment**
(per cent)

Market segment	*1989*	*1993*	*1998*[a]
Multi-user systems	14.3	7.1	5.4
Single-user systems	13.5	18.6	20.7
Peripherals	9.4	7.5	5.0
Communications hardware	20.9	20.8	20.0
Packaged software	8.8	13.0	16.1
Professional services	6.4	11.4	17.7
Processing services	3.2	3.5	3.4
Support services	9.6	8.2	4.8
Other	13.8	10.0	6.9
Total	**100.0**	**100.0**	**100.0**

a Forecast.
Source: IDC (1995).

48 per cent, 19 per cent, and 33 per cent respectively. This compares with BIE estimates of market shares of 57 per cent for hardware, 18 per cent for software, and 25 per cent for services.

IDC anticipates that the single-user systems, packaged software and professional services segments will increase their share of the Australian market between 1993 and 1998.

3.5 Australia's international trade in information technology

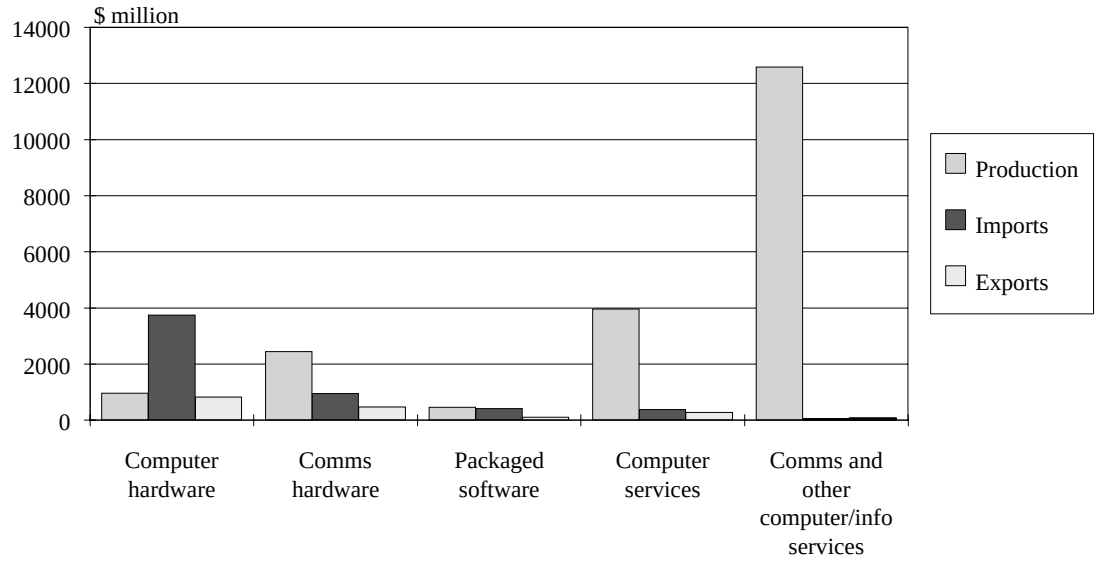
The trade data reported in this section comes from a range of sources including ABS, BIE and Commission estimates. Differences in trade data often reflect differences in composition and definitions of IT. The ABS includes some communications data which would otherwise be classed as telecommunications.

The survey of *Information Technology in Australia* by the ABS (ABS 1995a) shows that in 1992-93, Australia imported $5.5 billion in IT products and services and recorded exports of $1.8 billion. In the following year, imports increased to $6.1 billion and exports increased to $2.3 billion (ABS 1995c, 1995d).

Australia's production, imports and exports of IT commodities (as defined by the ABS) for 1992-93 are illustrated in Figure 3.10. Some salient features are:

- imports of computer hardware exceed domestic production;
- production of communications hardware is twice the value of imports;

Figure 3.10: **Production, imports and exports of IT commodities: Australia, 1992-93**



Source: ABS (1995a).

- computer services are produced and consumed domestically, with only a small proportion traded; and
- communications and other computer and information services are produced and consumed locally.

Table 3.9 lists the region and country shares of total IT merchandise imports into, and total merchandise exports out of, Australia. The greatest proportion of imports are sourced from North America, followed by the Asia-Pacific region and Japan. The greatest proportion of exports are destined for the Asia-Pacific region, followed by North America and New Zealand.

Table 3.9: **Share of total IT merchandise imports and exports by region and country, 1993-94**
(per cent)

Region/country	*Imports*	*Exports*
North America	41.9	18.1
Europe	9.1	7.9
Asia-Pacific[a]	30.9	32.3
Japan	16.8	9.1
New Zealand	0.4	14.2
Rest of World	0.8	18.4
Total	**100.0[b]**	**100.0**

a Excludes Japan and New Zealand.
b Error due to rounding.
Source: Commission estimates based on ABS (1995c, 1995d).

From 1992-93 to 1993-94, exports of IT products grew by 28 per cent, compared to imports, which grew by 11 per cent (albeit from a larger base).

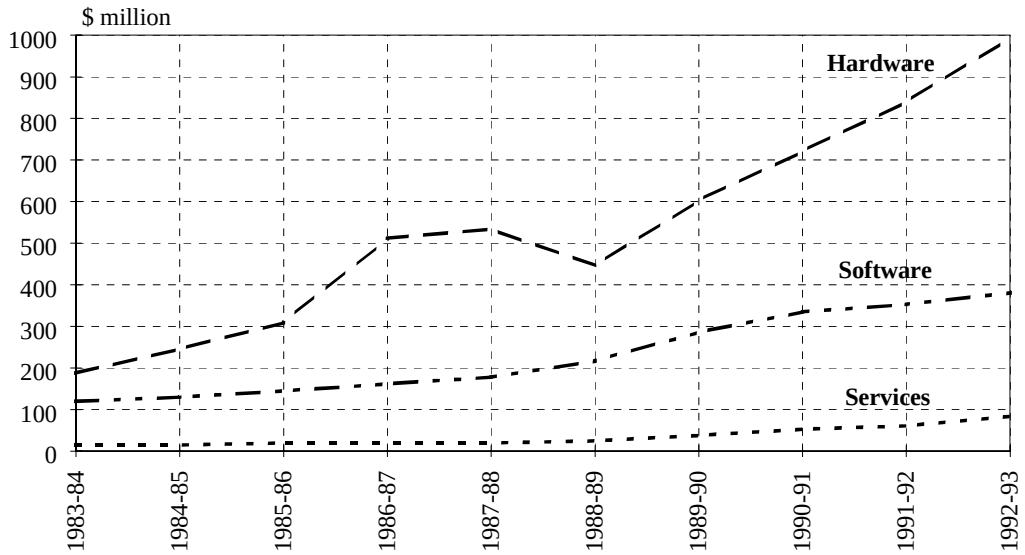
The Australian Information Industry Association (Sub. 27) has set a target of $10 billion for information technology and telecommunications exports and offshore revenue in the year 2000.

3.5.1 Australian exports

Australia exports a wide range of IT products and services, including computer hardware (PCs, circuit boards and components), software (applications and systems software and development tools), data communications and networking equipment, and services (software development, systems design and training).

Exports of IT hardware, packaged software and IT services from Australia between 1983-84 and 1992-93 are illustrated in Figure 3.11.

Figure 3.11: **Australian exports of IT hardware, packaged software and IT services, 1983-84 to 1992-93**
($ million at constant 1992-93 value)



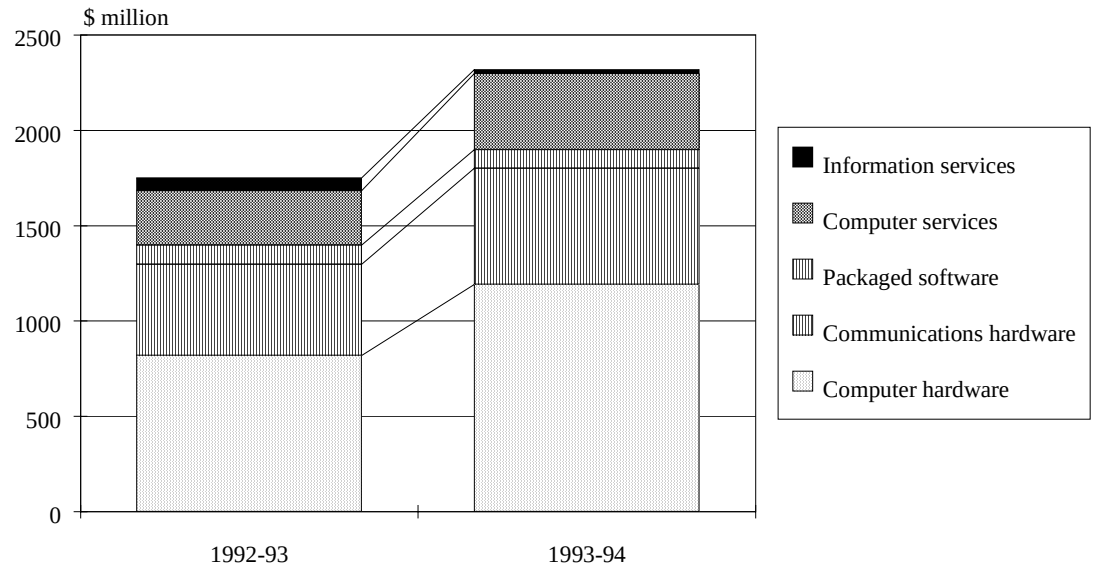
Source: BIE (1994a).

According to the ABS (ABS 1995c, 1995d), in 1993-94 computer hardware was the major export earner ($1193 million), followed by communications hardware ($609 million), computer services ($399 million); packaged software ($98 million) and communication and other computer and information services ($20 million).

A breakdown of exports of IT commodities by regions and selected countries for 1993-94 is listed in Table 3.10. Australia's chief export markets for computer hardware are North America and the Asia-Pacific region. North America is also the destination for over 46 per cent of Australian exports of computer services. Over 17 per cent of computer hardware is exported to New Zealand and around 14 per cent to Japan. The Asia-Pacific region is also a significant market for Australian communications hardware and packaged software exports.

The breakdown of IT exports by activity for 1992-93 and 1993-94 is shown in Figure 3.12.

Figure 3.12: **IT exports by market segment, 1992-93 and 1993-94**



Source: ABS (1995a, 1995c, 1995d).

Multinational companies dominate the list of Australia's top IT export earners (Table 3.11). With export revenue of $481 million in 1993, IBM Australia accounted for 63 per cent of the total export revenue of the top 100 IT export revenue earners. The next highest, Digital Equipment Corporation (DEC), earned $115 million in export revenue.

3.5.2 Australian imports

Australian imports of IT hardware, packaged software and IT services from 1983-84 to 1992-93 are shown in Figure 3.13.

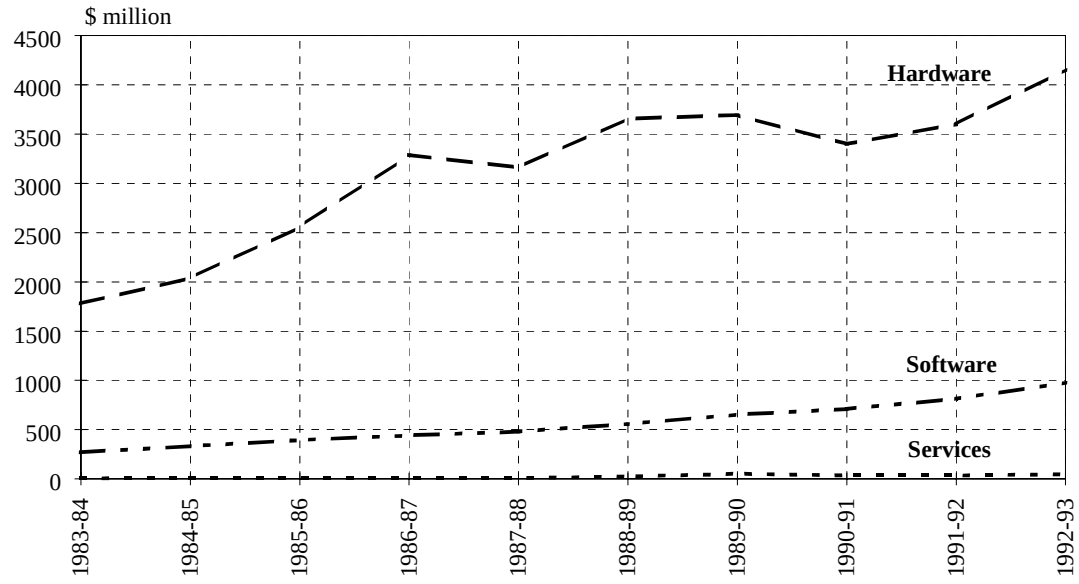
According to the ABS (1995c, 1995d), in 1993-94 Australia imported $4314 million in computer hardware, $954 million in communications hardware, $295 million in packaged software, $459 million in computer services and $39 million in communication and other computer and information services.

Table 3.11: **Australia's top 10 IT export revenue[a] earners, 1992 and 1993**
($ million)

Ranking 1993	*Company*	*1993*	*1992*	*Ranking 1992*
1	IBM	481.0	381.0	1
2	DEC	115.0	107.0	2
3	Tech Pacific[b]	85.8	52.3	4
4	Computer Power[b]	85.0	90.0	3
5	Datacraft[b]	50.7	41.8	5
6	Amdahl	49.0	0.0	-
7	Compaq	41.8	30.7	8
8	Fujitsu	35.0	35.4	6
9	Apple	23.8	19.5	9
10	Unisys	23.8	30.7	7

a Export sales and other offshore revenue.
b Australian-owned company.
Source: *Computerworld (The)* (1994).

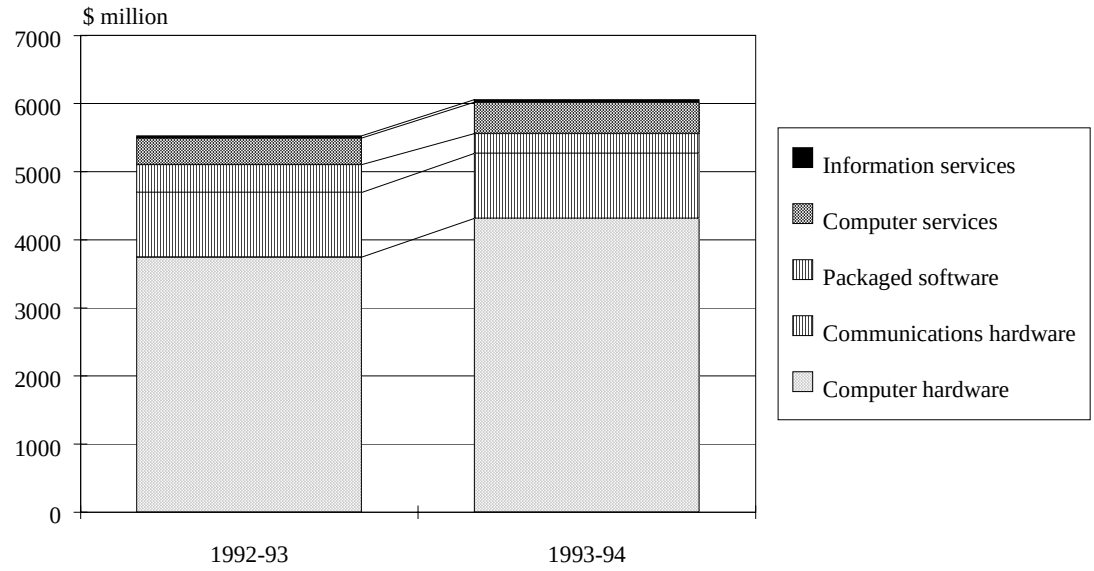
Figure 3.13: **Australian imports of IT hardware, packaged software and IT services, 1983-84 to 1992-93**



Source: BIE (1994a).

Australian IT imports by market segment for 1992-93 to 1993-94 are illustrated in Figure 3.14.

Figure 3.14: **IT imports by market segment, 1992-93 and 1993-94**



Source: ABS (1995a, 1995c, 1995d).

A regional breakdown of IT imports for 1993-94 is listed in Table 3.12. Over 40 per cent of Australia's computer hardware imports are sourced from North America, with around 35 per cent imported from the Asia-Pacific region. Sixteen per cent of Australia's computer hardware requirements are imported from Japan. Over half of Australia's imports of communications hardware are sourced from North America and Japan and over 60 per cent of packaged software is imported from North America. Over 85 per cent of imports of computer services are sourced from North America.

4 TRENDS IN TECHNOLOGY

In thirty years, computers have advanced from cumbersome calculating machines to powerful and portable machines linked to networks through modems. Advances in microelectronics have coincided with developments in communications and software. A convergence of technologies is opening up opportunities for the much vaunted information highway.

4.1 From calculators to the personal computer and beyond

The forerunner of the modern computer can be traced to World War II and the use of computational machines to decipher coded messages and to calculate ballistic firing tables. The first custom-built electronic digital machine, ENIAC, was developed in 1943. Early machines were cumbersome and expensive.

The release of the IBM Type 650 heralded the modern computer age.

> If anything ushered in computing's first age, it was the Type 650 Magnetic Drum Calculator, a mountain of a machine unveiled in 1953 by International Business Machines. The type 650 did not have the obvious makings of a winner. For a start, the 'numerical, stored program, data-processing machine' had about as much computing power as a modern video cassette recorder. And it cost $3250 a month to rent — equivalent to $18 000 in today's money. Small wonder that IBM was cautious. After all, just a few years earlier, it had thought the global market for computers to be five machines at best. Nonetheless, quietly confident of the Type 650's appeal, IBM designed it to make a profit if 50 were sold. By the time the Type 650 was withdrawn in 1962, several thousand had been sold, making the primitive machines the world's first mass produced computer. (Economist 1994, p. 3)

The early computer industry was dominated by hardware vendors that developed their own architecture and peripherals. Operating systems, applications software and data could not easily be transferred from one computer system to another. These vendors were supported by third-party software, peripherals and maintenance companies that developed products for the specific environments of the vendors.

A trend away from the integrated vendor occurred in 1969 when IBM began to 'unbundle' hardware and software. This led to increased competition as companies such as Amdahl and National Semiconductor commenced manufacturing computer hardware that would run on IBM operating systems.

Up to this time, mainframe systems required much ancillary environmental support such as air conditioning and water cooling. The minicomputer was

introduced in the 1970s and emerging companies such as Digital, Data General, Wang, Prime, Hewlett-Packard, Datapoint, Nixdorf and Tandem began producing them. Market leaders such as IBM, NCR, Burroughs, Control Data and Honeywell also began to offer minicomputers.

In 1973, an anti-trust suit was instituted against IBM. This investigation lasted several years and may have further facilitated competition in the industry — IBM and others developed minicomputers with increasingly common systems architectures.

In 1978, scientists at Wollongong University completed the first 'port' of the Unix operating system from a Digital minicomputer to an Interdata minicomputer. This was the first time that an operating system and applications had been transferred to a computer for which it had not been designed. Unix emerged as a *de facto* industry standard.

The advent of the personal computer (PC) in the 1980s brought major changes in the industry. This was especially precipitated by IBM's decision to outsource the development of the microprocessor and the operating system for its first PC to Intel and Microsoft respectively. Initially, a range of hardware and software was offered, but the IBM PC-DOS/Microsoft MS-DOS operating environments eliminated most competition apart from Apple's proprietary environments.

The PC led to a more fragmented industry with companies focussing on particular ranges of products. International Data Corporation (IDC 1995) reports that this period saw the emergence of:

- microprocessor manufacturers (Intel and Motorola);
- PC manufacturers (IBM, Compaq and Apple);
- storage manufacturers (Conner, Seagate and Quantum);
- printer manufacturers (Hewlett-Packard, Epson and Canon) and network hardware suppliers (3Com, Cisco and Cabletron);
- workstation suppliers (Sun Microsystems, Hewlett-Packard and Digital); and
- companies specialising in spreadsheets (VisiCorp), word processing (WordStar) and database development (Ashton-Tate). Survivors from that time include Microsoft, Lotus, Oracle and Novell.

These firms marketed through third-party distributors and computer vendors. While some vendors continued to offer a full range of hardware, software and services, many sold their non-core business units.

These developments led to the emergence of services providers that sourced products from a number of vendors and assembled a package to provide a

completely integrated solution. In the United States of America, systems integrators such as Electronic Data Systems (EDS) and Andersen Consulting were born.

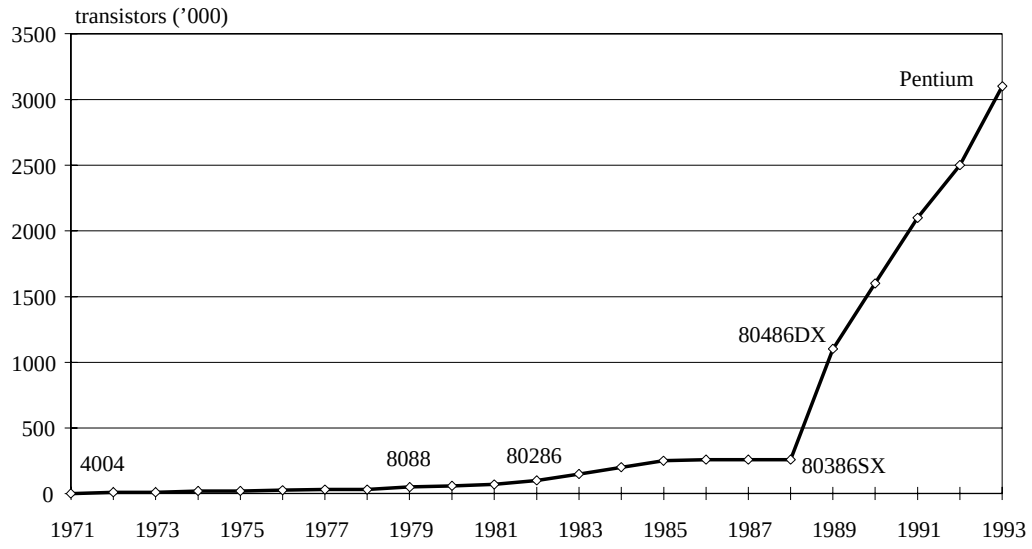
Intel's X86 and Motorola's 680XO (for Apple's Macintosh) are the primary microprocessor architectures now in use. However, a joint development by Motorola, IBM and Apple, known as PowerPC is making its mark. The PowerPC will largely supplant the 680XO processor and some of Intel's market share — further penetration will depend on licensing of the technology to others (IDC 1995). This PowerPC runs operating systems for both IBM compatibles and Apples.

4.2 The plunging costs of computing power

The information technology (IT) industries are characterised by rapid technological change. The Bureau of Industry Economics (BIE 1994a) reported that the cost of computing has dropped by 25 per cent per annum for the last 30 years. The rate of technological advancement is illustrated in Figure 4.1.

Intel's first 4004 microprocessor consisted of 2300 transistors and could execute 60 000 instructions per second. The 8088 chip contained 30 000 transistors and ran ten times faster than the 4004. A pentium chip contains 3.3 million transistors — a pentium-based PC offers over 1000 times as much 'number crunching' power as a mid-1980s IBM mainframe (Economist 1994).

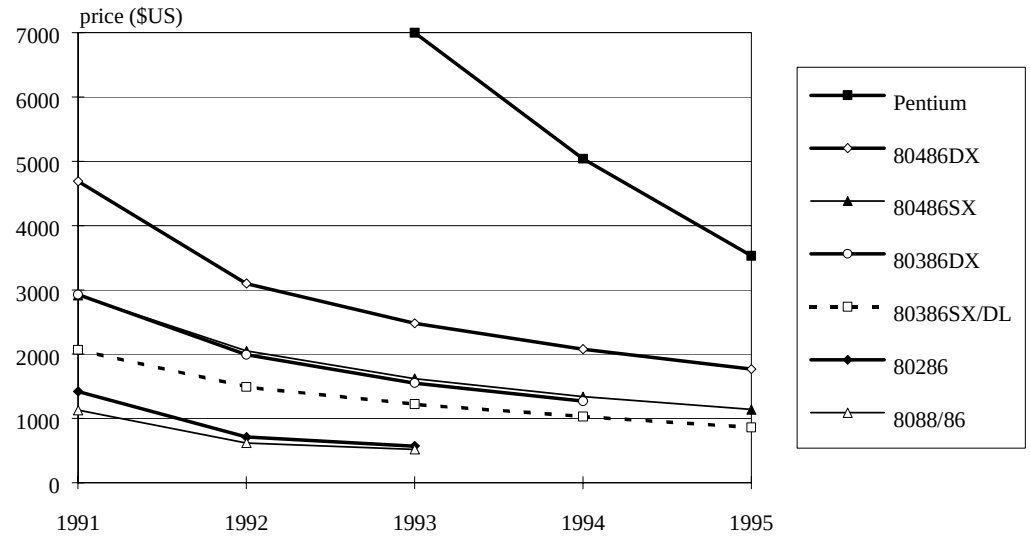
Figure 4.1: **Chip density in Intel microprocessors, 1971 to 1993**



Source: EITO (1994).

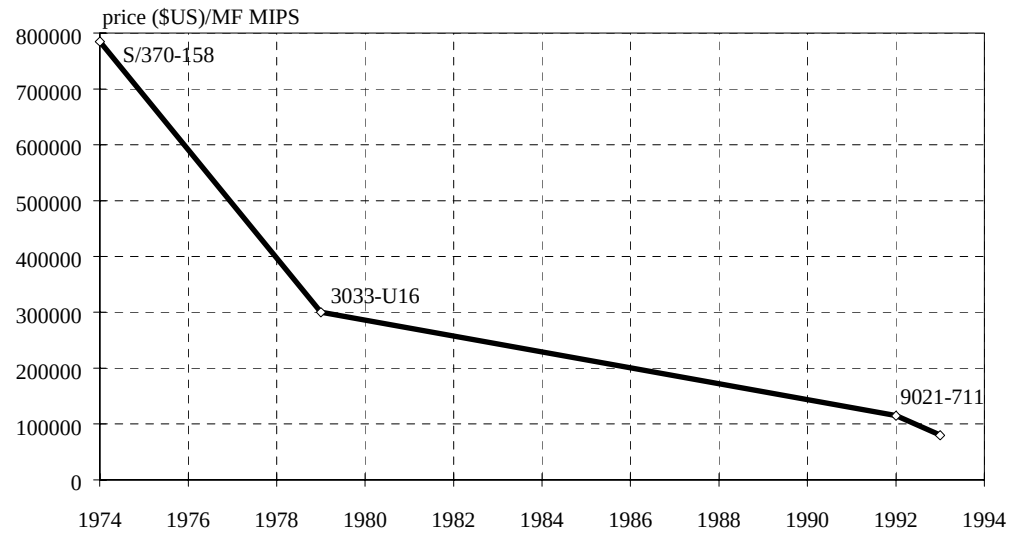
These technological advancements have been reflected in impressive price reductions in tandem with increases in computing power. Figure 4.2 shows selling prices for (increasingly powerful) PCs. Figure 4.3 shows the extent of decline in the price of mainframe computing power (measured in MIPS — mega instructions per second) for several generations of IBM computers.

Figure 4.2: **Average selling prices for PCs, 1991 to 1995**



Source: EITO (1994).

Figure 4.3: **Price of mainframe MIPS, 1974 to 1993**



Source: EITO (1994).

4.3 The changing nature of computing

Developments in technology have radically transformed computing. Table 4.1 indicates that the scale of computing has increased and users have become less specialised and more dispersed. This will continue with advances such as the wireless modem that increase the potential for mobile computing. Hardware and software have become more powerful, useful, user-friendly and flexible, and communication networks have become more sophisticated. These trends have accompanied a fall in computing costs by a factor of 10 000 since the 1960s.

Table 4.1: **The changing nature of computing**

	Batch	*Time sharing*	*Desktop*	*Network*
Decade	1960s	1970s	1980s	1990s
Technology	medium scale	large scale	very large scale	ultra large scale
Location	computer room	terminal room	desktop	mobile
Users	experts	specialists	individuals	groups
User status	subservience	dependence	independence	freedom
Data	alpha-numeric	text, vector	font, graphics	script, voice
Objective	calculate	access	present	communicate
User activity	punch and try	interact	see and point	ask and tell
Operation	process	edit	layout	orchestrate
Inter-connect	peripherals	terminals	desktops	palmtops
Applications	custom	standard	generic	components
Languages	Cobol, Fortran	PL/1, Basic	Pascal, C	object oriented
Relative cost of computation	10 000	1 000	100	1

Source: EITO (1994).

Microsoft cautioned that the profound changes in the IT industries do not provide a basis to forecast future developments.

> The past 30 years has seen the Information Technology industry undergo extraordinary technical development and bring about major social change. The behemoths of mainframe computers with their specialised staff have given way to networks of personal computers which are becoming everyday tools in enhancing and re-engineering business.
>
> Yet the technological and social changes of the recent past do not provide a reasonable basis for a 30 year forecast because of a unique phenomenon that has become known as 'convergence' ... (Sub. 43, p. 1)

The phenomenon of converging technologies is taken up next.

4.4 Convergence

IDC (1995) identified two areas of convergence, one within the IT industries, the other involving the merging of IT with other technologies. Convergence between technologies within the IT industries has led to, for example, components such as processors and storage devices being used in desktop, mid-range and even mainframe environments. In a similar vein, software environments operate across diverse platforms.

The more common perception of convergence relates to the merging of technologies in computing, communications, information services, consumer electronics, distribution and publishing — a step toward the so-called 'information industry'. Driving convergence is the digitisation of text, voice and graphics to enable these distinct forms of communication to be treated as digital streams and delivered by a range of modes.

The South Australian Government (Sub. 65) said that hardware and software are becoming affordable 'commodities' and that this will lead telecommunications companies to supply broadband services. Once available, broadband services will lead to a convergence of electronics, business and other media with the computer and communications industries — 'we see the internal convergence as a stage, or a driver towards the "Information Age"' (Sub. 65, p. 3).

According to Microsoft (Sub. 43), the convergence of three enabling technologies based on digital electronics is driving the information economy. These technologies include:

- *very large scale integration (VLSI) computer chips*: the price and performance of chips has improved more than one thousand fold in the past 20 years. VLSI chips are used in video cassette recorders, video games, 'smartcards', fax machines and telephone switchboards;
- *high speed digital networks*: incompatible devices for telephone, data, broadcast and facsimile abound. The digitisation of sound, text, graphics, image and video, will facilitate the development of tools to better use this information. A single strand of fibre optic cable can carry 200 megabytes rapidly — 10 000 times greater than Australia's current network; and
- *software*: software can now be engineered so that complex information structures and processes can be built from sub-assemblies known as 'objects'. Object-oriented information, design and programming has enabled the development of sophisticated networks and applications.

Microsoft considers that these technologies have converged into a single industry and accelerated development of associated products and services. This alliance comprises microelectronics (chips), the ability to move information (networks) and the intelligence to do so efficiently and quickly (software).

The European Information Technology Observatory (EITO 1994) notes that 1993 was the year of mergers, acquisitions and alliances in Europe as various players in the IT and information services industries manoeuvred to take advantage of opportunities. Telecommunications companies offer the wired, cellular and satellite technology. The cable companies offer higher capacity broadband 'pipes' that can take voice, data and images into homes. Finally, the entertainment companies hold resources in film libraries and archives.

Box 4.1: **The merging of computer, consumer electronics, media and telecommunication industries**

Computers, telecommunications, consumer electronic products and media are converging into a single new medium: the electronic highway. This convergence promises to create a revolution as profound as the Industrial Revolution of the last century. Building the new digital media infrastructure involves not only a range of industries. It also demands both expanding the functions of existing products and building completely new products. Different trends are coinciding to drive the new concept.

i. *Information technology industry*: Computer companies have strong positions for winning a large number of home customers, due to:
   - development of wireless computer technology;
   - commoditisation of PC products;
   - enhancements in networking hardware and software technologies;
   - their hardware/software expertise, their solution integration and their standard setting expertise will be valuable to IT makers in these new markets. Through joint venture and alliances they have started to develop new hardware platforms and new languages for creating communication-oriented applications.

ii. *Communications industry*: Many factors are giving telecommunications and cellular carriers a major role in the convergence trend:
   - infrastructure;
   - switching and digital compression enhancements;
   - financial strength to continue investments;
   - cellular technology brand awareness;
   - continued price declines caused by increasing competition;
   - adoption of international standards.

iii. *Media and entertainment industries*: Globalisation in the media and cable industries is encouraging growth of entertainment empires and global news networks. They combine such assets as huge film libraries, cable TV channels and control of access to huge numbers of domestic TV viewers. Many strengths built up through managing their core business will help these companies in the convergence era.

iv. *Consumer electronics*: The lines are blurring between pocket organisers or portable multi-media players and personal computers. These new developments are helping consumer electronics makers address new markets such as integrated home/office information. Their key strengths in the new market include:
   - time-to-market capabilities;
   - low-cost manufacturing;
   - brand awareness.

Source: EITO (1994).

Ways in which convergence can affect firms in the IT, communications, media and entertainment, and consumer electronic industries are outlined in Box 4.1. These developments provide a challenge for policy makers and regulators.

The Australian Information Industry Association (AIIA) pointed out that convergence has implications for industry and tariff policy. For example, telecommunications and computer-related manufacture in Australia are afforded markedly different assistance regimes.

> ... AIIA submits that the continuing segregation of the industries for policy analysis or review purposes has inherent dangers which intensify as telecommunications and computing continue to merge. This is because the underlying processes are now almost universally digital and electronic in form, as opposed to analogue or mechanical. In addition, we are seeing further convergence with broadcasting and some consumer electronics technologies increasingly based on digital electronics. (Sub. 27, p. 2)

While conceding crossover 'at the margin', the Australian Telecommunications Industry Association downplayed problems in distinguishing between computers and telecommunications arising from convergence. It said:

> The related and converging technologies argument is often raised, not by the telecommunications industry but frequently by the computer industry. The former has absolutely no difficulty with its identity. Alcatel and Ericsson for example see themselves and their products as clearly being in the telecommunications industry. Likewise, DEC and IBM would see themselves as clearly being in the computer business. The latter do not make telephone exchanges and the former do not make PCs. True, at the margin there may be some overlap but the degree of that overlap remains relatively insignificant. (Sub. 62, p. 6)

The anomalies and ongoing problems for tariff and bounty administration arising from these 'marginal' areas (eg computer networking equipment) are discussed in Chapter 7. IBM Australia refuted the assertion that it is a computer company and not a telecommunications company:

> Increasingly, as telecommunications and computing converge, in terms of technology, regulation, and providers, IBM will continue to participate in both aspects ... High-performance computing and high-performance communication are now inseparable opportunities. We have, for example, provided value-added network services for many years: we are an international X.400 carrier; and we have made significant investments in multimedia content projects ... Most of our products contain communications features ... (Sub. 82, p. 4)

Other participants to comment on these issues considered that convergence has already occurred with respect to hardware and latterly, content. For example, Telstra Corporation Limited said:

> The convergence of telecommunications and information technology through broadband media products has made it essential that the telecommunications industry be at the leading edge of technology. (Sub. 89, p. 1)

4.5 Future directions in technology

This section draws on work undertaken for the Commission by IDC (1995).

Client/server computing

The IT industries have become less centralised as PCs and servers are deployed through user organisations. This has constrained growth in many sectors of the multi-user systems market, but has created opportunities for suppliers of desktop systems, networking hardware, software and professional services.

Mobile computing

Current technology no longer constrains computers to be physically connected to networks. Mobile PCs are providing the capability for people to maintain contact with employers and customers away from the office.

Mobile PCs have computing power equivalent to desktop models (limited by battery life). With wireless modems and similar devices, users can access 'real time' information. According to IDC, the increase in efficiency which mobile computing entails is fuelling market growth and opportunity. Others view mobile computing more cautiously.

Interactive multimedia

Whereas previously it was only possible to access text and data from computers, performance and capacity improvements now enable access to other digital information formats such as graphics, video and audio. While in the main, this is occurring at the desktop level, the technology is increasingly being used across networks and is becoming available on mobile devices.

Multimedia is important for the 'content' industries such as print, television, audio and film. IDC considers that interactive multimedia alters the nature of computing environments and will have a profound effect on future users and IT market activity.

The Commonwealth Government has indicated an interest in this area. Its recent *Creative Nation* statement (DCA 1994a) provided assistance for firms to produce more information on CD-ROMs.

Global information highways

Much of the attention given to the concept of information highways has focused on pay television. However, IDC contends that the current 'pay TV' initiatives offer little more than has been provided by cable TV in the USA for more than

20 years. Nevertheless, pay TV gives consumers an opportunity to assess the range of electronically available information.

Information 'highways' are emerging through networks such as the Internet. IDC considers that while the focus of the Internet is on electronic mail, the 'true' information highways will emerge as the bandwidth and infrastructure to handle large volume multimedia applications become accessible and affordable.

IDC foresees the arrival of 'pervasive computing and the information society' with instantaneous access to information. It considers that:

> Fundamental to the emergence of ... information systems will be set-top boxes connected to television receivers which will provide access to a startling array of information resources. However, the providers of the hardware, software and services which characterise this era may not be today's market leaders but new organisations which capitalise on the convergence of technologies and increasing consumer demand. (p. 58)

This view is supported by United States cable TV and telephone companies which contend that fewer than 15 per cent of multimedia users will interact with the 'information superhighway' via PCs. Intel, on the other hand, believes that the PC will be the medium of choice. Intel already has a deal with CNN to provide news programs over PC networks. The Economist (1994), reporting Intel's view, notes:

> ... although 97 per cent of American homes own colour TV sets, none is yet wired up to interactive set top boxes. One-third of American households, by contrast, already own PCs. And most of those PCs are used far more interactively than the typical TV set, with CD-ROMs, software-based computer games and on-line services. As PC screens get larger, they can be viewed by more than one person, making them more like surrogate TVs. Add a remote control, perhaps with a small screen to operate the computer via the icon based software with which most PC users are familiar, and the transformation is complete.
>
> But the PC's biggest advantage, reckons Intel, is that it already contains a large dollop of computing power — easily enough for most interactive applications. (p. 18)

These diverse views suggest that the market has yet to play a major role in bringing some technology trends to fruition. For example, the economics of set-top boxes is still developing and concerns have been raised about the profitability of new ventures. A nationwide video-on-demand service for the USA would need to generate more than $20 per week from each subscriber to make a return on investment in ten years. (Economist 1994)

While the likely trends in technology are evident today, the applications and uses that will prevail in the future are still unclear. Indeed, there are parallels in the early battle for market dominance by VHS and Beta video cassette recorders.

5 EFFECTS OF GOVERNMENT PURCHASING ARRANGEMENTS

The magnitude of government information technology (IT) purchasing inevitably influences the structure and size of Australia's *IT industries. Commonwealth Government purchases alone have been estimated at around $1.3 billion per annum, roughly 11 per cent of the Australian IT market (see Chapter 3).*

In this chapter, the Commission concludes that the Australian community can gain from the judicious use of government buying power to promote the IT industries. But there are many trade-offs to be considered.

Concerns about the cost and complexity of doing business with governments stem from both the administrative arrangements and the ways in which governments use their buying power to influence the growth and location of the IT industries.

5.1 The procurement process

Participants raised a number of concerns about Commonwealth Government procurement processes. They variously argued that:

- insufficient recognition is given to quality or 'whole-of-value' evaluation, thus tending to penalise higher performance solutions;
- there is insufficient whole-of-life costing evaluation, tending to:
  - penalise extra design effort aimed at reducing maintenance costs; and
  - favour off-the-shelf packages, which are often obsolete and unlikely to be ideal for the use in question;
- there is too much reliance on technical rather than functional specifications, forcing firms to compete on price, rather than on approach, for a solution which is effectively predetermined;
- purchasing officers are too risk averse, disadvantaging Australian suppliers who diverge from standard approaches accepted overseas;
- purchasing officers wrongly perceive overseas products to be better and less risky;

- the standard contract, the Government Information Technology Conditions (GITC), is not operating as it should because:
  - it varies across the States and Territories;
  - it is still too complex;
  - inappropriate modules are being included in specific contracts; and
  - unreasonable liability is imposed on suppliers;
- Commonwealth agencies, in particular, have been slow in implementing outsourcing; and
- the 2.5 per cent service charge levied by the Department of Administrative Services (DAS) on Common Use Contract (CUC) purchases should be removed.

The costs of tendering for government business were seen as an impediment to the development of the IT industries in Australia, particularly for small and medium sized enterprises (SMEs). Costs were perceived to be greater than those encountered in supplying the private sector. For example, the Australian Information Industry Association (AIIA) said:

> AIIA's own anecdotal analysis is that, at the most basic level, the cost of doing business with government is significantly higher than for an equivalent procurement in the private sector. (Sub. 27, p. iv)

Participants identified the length and the complexity of the purchasing process as the key factors underlying the higher costs. They argued that these costs are over and above costs arising simply from being in the market and that the burden is magnified by the number of tenders and firms involved.

DAS submitted that most complaints about costs of tendering arise from large scale, complex acquisitions, whereas the majority of purchasing takes place through the CUC arrangements (see Section 5.5.1).

However, the AIIA drew attention to the costs of being in the market. It referred to the 'cumulative cost impact on firms' arising from:

> ... answering, meeting or complying with Endorsed Supplier Arrangements, Partnerships for Development/Fixed Term Arrangements, two-envelope tendering, industry impact statements, responding to Common Use Contract tenders, examining the GITC, arranging forms of indemnity and professional liability insurance as well as less well documented State government policies. (Sub. 79, p. 9)

Length of process

The AIIA (Sub. 27) submitted that the time taken to award a government contract of $10 million through a tender process is twice the time taken in the private sector.

The Australian Telecommunications Industry Association (ATIA) questioned the appropriateness of comparing public and private tendering processes:

> Decisions by governments to spend the community's funds must, by their nature, be subject to more stringent checks and balances than private sector spending. The latter is not subject to Auditor-General scrutiny, public announcement, appeal through the [Administrative Appeals Tribunal], etc. Of course the time taken in public decisions on procurement takes longer. (Sub. 62, p. 2)

IBM Australia also referred to 'the much more regimented evaluation processes that necessarily occur in government' (Transcript, p. 489). The New South Wales Government supported streamlining the tendering process but noted a need to also 'recognise the public accountability required in Government purchasing' (Sub. 111, p. 3).

Complexity

Complex tendering processes and documentation can add to tenderers' costs. Indeed, Potent Professionals (Sub. 11) commented that the complexity of the process has resulted in tendering becoming an industry in its own right, with firms such as itself providing consulting services on 'how to tender'.

Some participants saw the tender documents as too complex. They argued that considerable effort is needed to understand their content, partly due to inconsistencies in format across the tender documents of various projects. There was said to be confusion as to the importance to be placed on various characteristics and as to the level of performance sought. This was said to result in tenders which are themselves voluminous and complex as tenderers feel bound to 'cover all bases'.

Participants complained that the amount of documentation required is onerous — in some cases amounting to 'design by tender'. The need for certain information to be documented in tenders was also questioned, the Canberra Region Advanced Technology Manufacturing Association (CRATMA) (Sub. 30) suggesting that visits to tenderers' premises could substitute for much of the documentation now required.

The AIIA (Sub. 27) drew attention to the many other policies impacting on government purchasing — including industry development policies — which add to the complexity of doing business with government.

Duplication of costs

The greater the number of firms submitting full tenders, and the longer they maintain project teams in anticipation of winning the contract, the greater will be the total industry cost of tendering. Governments' costs will also reflect the

number of full tenders they evaluate. The shortlisting of tenderers before full tenders are prepared reduces these costs. But against this must be weighed the risk that shortlisting may reduce competitive pressures on suppliers and thereby result in higher tender prices.

The AIIA (Sub. 27) said a quick cheap shortlisting would help. However, IBM Australia (Sub. 17) contended that, for major acquisitions, a shortlist should be drawn up using suppliers' credentials to do the job, without first calling for draft tenders.

The AIIA cited multistage tendering as a source of undue cost, both because of the multiple submissions required to win a contract and because of 'extensive time delays' at each phase of the process (Sub. 27, p. 14). This highlights the importance of adequate shortlisting before large submissions are sought.

Recent Commonwealth Government measures

As part of its response to the *Report of the House of Representatives Standing Committee on Industry, Science and Technology* (House of Representatives 1994), the Commonwealth Government (Commonwealth of Australia 1994) announced that:

- the National Procurement Board (NPB, see Appendix D) has been asked to:
  - examine the costs associated with tendering [Recommendation 35 (i)];
  - review the costs associated with the preparation of Requests for Tenders and tender evaluation at five-yearly intervals [Recommendation 35(iii)]; and
  - review Commonwealth purchasing documentation to reduce the overall number, variety and complexity of documentation [Recommendation 37]; and
- Commonwealth agencies are to:
  - regularly review the cost of tendering as part of their purchasing management responsibilities [Recommendation 35(ii)];
  - advise bidders of estimated evaluation periods in Requests for Tenders [Recommendation 36(ii)]; and
  - consider, on a case-by-case basis, meeting reasonable costs incurred by those tenderers invited to re-tender when a tender process has been aborted for reasons within the agency's control [Recommendation 36(iii)].

DAS submitted that 'enhanced purchasing professionalism' will, in time, 'contribute to better performance' (Sub. 105, p. 2). Mandatory competency-

based requirements based on the Commonwealth Procurement Competency Standards (endorsed by the National Training Board) are being phased in for all Commonwealth procurement officers and holders of purchasing delegations. Three new Commonwealth courses based on the standards are being developed for basic, intermediate and advanced level procurement.

Cost of Tendering Committee

In response to industry concerns about the costs of tendering for government IT contracts, DAS set up a Cost of Tendering Committee in conjunction with the AIIA, the Department of Employment, Education and Training, and the Australian Taxation Office. The main objectives were:

- to identify key areas in the Government IT tendering process, as practised by the various purchasing agencies, where the associated costs to industry or government of tendering could be reduced without adversely affecting the overall effectiveness of the purchasing process; and
- to make recommendations for change which might reduce the costs of tendering, for consideration by the Government and the AIIA.

The Committee's Report is understood to address such matters as:

- time-tabling the procurement process;
- pre-RFT (Request for Tender) market assessment;
- shortlisting of tenderers;
- purchasing skills;
- industry development prequalification; and
- use of prototyping where the IT solution is not readily apparent.

Information Technology Review Group

Government purchasing was also addressed by the Minister for Finance's Information Technology Review Group (ITRG 1995). The ITRG's report, *Clients First — the Challenge for Government Information Technology*, focuses on ways of helping government, as a user, to take advantage of technological developments. A number of recommendations relate to the purchasing process, including:

- shorter procurement processes to keep pace with IT technological change;
- specifications which do not lock in existing practice and technology;
- greater emphasis on partnering arrangements; and
- resolving problems with the GITC.

Further ITRG recommendations relating to purchasing are presented in Appendix B.

Industry Commission Report on Defence Procurement

In a report on *Defence Procurement* (IC 1994a), the Industry Commission found potential for savings to both the Department of Defence and industry from multistage tendering involving more rapid shortlisting and less documentation. The Commission's Defence Procurement recommendations on costs of tendering are presented in Appendix B.

Commission assessment

Eliminating any unnecessary costs and time delays in the procurement process will, in itself, be to the advantage of industry. Inefficient procedures can result in competitive firms being deterred or prevented from participating in the government market.

Because of the more formal review processes inevitably associated with public procurement, it may never be as quick and simple as private procurement. However, some differences between public and private purchasing procedures are more apparent than real. The key issue is whether the public process can be made more efficient without unduly compromising its integrity. Participants' comments indicate considerable scope for improvement. The willingness of firms to forgo some of the appeal rights that they would not enjoy in the private sector, may be a factor in expediting the public process.

In the Commission's view, improvements can best be achieved by an ongoing consultative approach. While not yet satisfied with the levels of efficiency, the AIIA (Sub. 79) acknowledged that progress is being achieved.

The Commission endorses a consultative approach for resolving concerns with the administration of the procurement process, as embodied in the approach of the Cost of Tendering Committee and the recent strategic review of the GITC.

However, in addition to administrative concerns, participants raised the more fundamental policy issue of the use of government purchasing as a tool for industry development. The remainder of this chapter focuses on this issue.

5.2 Using government purchasing for industry development

The use of government purchasing to pursue IT industry development objectives takes place within the framework of the Information Industries Strategy, which has four key goals:

- integration of Australian firms into regional and global markets;
- fostering innovation;
- development of 'reference sites' (demonstrating companies' capabilities); and
- compliance with and influence on international standards. (Cook 1994)

The PFD and FTA programs, key components of the Strategy, have recently been reviewed by the Bureau of Industry Economics (BIE 1994a) (see Section 5.3). This section draws on the BIE's analysis to discuss the circumstances in which the use of government purchasing for industry development is likely to produce net benefits.

The ability to use government purchasing to pursue industry development objectives arises from the significance of government as a buyer of IT products and services. Access to the government market is used as a 'lever' in three ways:

- inducing firms, particularly overseas firms, to invest in local activity, such as production, research and development (R&D) and exporting;
- inducing overseas firms to work with or assist local firms by:
  - providing orders;
  - transferring technology;
  - assisting in product development;
  - providing distribution channels;
  - facilitating exports; and
- inducing local firms to behave in ways governments believe will improve their competitiveness and expand their opportunities (eg with respect to standards, quality, strategic planning, and services).

Government procurement can be an effective means of fostering industry development. The justification for governments to intervene in this way rests on the view that reliance on market forces alone will not always lead to the most efficient outcome.

The BIE (1994a) found two convincing grounds for short-term intervention: generating 'agglomerative economies/critical mass' and fostering innovation and knowledge-related externalities. It said:

> Attaining critical mass is important to being competitive in attracting IT&T activity. Temporary intervention can be useful in demonstrating Australian capabilities, establishing linkages into international production and marketing networks, and realising the benefits of clustering and agglomeration. Innovation and knowledge

> related externalities are important in this high-tech sector and the programs can help stimulate the infusion of firm-specific knowledge from abroad into Australia. (p. xv)

The footloose nature of many international IT firms provides scope for governments to entice those firms to establish/foster activities in Australia. By linking access to the government market to industry development undertakings, governments can give overseas firms an incentive to locate in Australia and to consider using Australian suppliers. Often, the costs of an IT activity (be it investment in production or R&D, or sourcing of components) are similar across a number of countries (including Australia). If transport costs are low, a transnational firm may be largely indifferent as to where the activity is undertaken. In the absence of government intervention the decision may simply reflect the sequence in which options are considered.

Likewise, using access to government markets to induce local firms to adopt 'improved practices' may not increase costs. Firms may, with hindsight, judge those measures to be worth doing of their own accord. Where the improvements are needed to satisfy the genuine needs of the government as a customer, the costs could be viewed simply as a necessary part of tendering for the contract.

Where industry development commitments (or 'world best practice' requirements) cause significant additional costs, a firm is likely to participate only if it expects profits in the government market to offset any such costs. If tendering firms are obliged to undertake activities that are not commercially justified in their own right, tender prices will be raised or firms will seek other measures to offset the extra costs.

The costs of meeting industry development obligations are likely to be high where commitments are integrated into specific purchasing contracts. Such arrangements add to the cost and complexity of tendering, while affording firms the least flexibility in seeking internationally competitive activities. The greater the degree of flexibility that firms have in fulfilling their industry development obligations, the less likely it is that they will incur significant extra costs and the less likely that the Australian IT industries' pattern of development will be distorted away from activities which reflect their competitive advantage.

Government purchasing can foster development in the IT industries without producing significant extra costs. Net benefits are most likely to occur where:

- *industry development obligations are not sought through specific contracts; and*
- *firms are given as much flexibility as possible in choosing activities that fulfil their obligations.*

Leverage should be used with caution and not simply because governments have scope to do so. Its use should be restricted to circumstances where there are strong grounds for expecting net benefits.

5.3 Evolution of the Partnerships for Development approach

The PFD and FTA programs evolved in response to problems recognised in the previous purchasing preference and offsets schemes.

Purchasing preferences

Prior to 1986, State Governments operated purchasing preference schemes which favoured producers in their own States when evaluating tenders for government contracts. These 'State preferences' contributed to a fragmented industry structure which reduced the competitiveness of Australian industries.

In 1986, the National Preference Agreement came into force with the consent of all States. This required any margin of preference to be applied only in favour of Australian content, without discriminating on the basis of State/Territory of origin. It was up to each individual government to decide the rate at which this 'national preference margin' was applied. The Commonwealth initially applied a margin of 20 per cent but subsequently abandoned the preference as it was having little effect on purchasing decisions. When New Zealand joined the Agreement in 1989, the margins of preference — where still applied — were to be based on Australian/New Zealand (ANZ) content.[1] The Agreement was retitled 'Government Procurement Agreement' (GPA) in 1991. It is to be reviewed in 1996.

Offsets

Offsets operated in various forms from 1970. Essentially, the program required firms to 'offset' 30 per cent of the imported value of large government contracts with activities such as local investments, R&D, export facilitation and technology transfer. By the late 1980s, computing and telecommunications had accounted for over 40 per cent of Commonwealth civil offset commitments.

Several State Governments introduced offsets programs in the early 1980s. Concern over the potential for industry fragmentation led to the Australian Civil

[1] Queensland applies a margin of 20 per cent and Western Australia and the Northern Territory apply a margin of 10 per cent. New South Wales occasionally applies a margin of 20 per cent. Tasmanian has not applied its rate (10 per cent) for several years. Victoria, South Australia, the Australian Capital Territory and New Zealand do not apply a preference margin.

Offsets Agreement in 1988, under which the States/Territories agreed not to apply their own offsets. Rather, the Commonwealth, in consultation with the States, would negotiate offsets agreements for all State IT purchases, and offsets work on those commitments could be carried out anywhere in Australia.

A 1985 review of the civil offsets program found that foreign suppliers were having difficulty finding economic activities to fulfil their offset obligations, resulting in considerable unmet obligations.[2] It was also difficult to monitor and enforce obligations. Moreover, offset-driven activities tended to be short-term in nature — one participant described them as 'make work' type activities — rather than contributing to long-term industry development.

Concerns over the offsets program led to the establishment of the PFD program in 1987, as an alternative to offset commitments for firms making IT sales. The civil offsets program was abolished in 1992.

Partnerships for Development and Fixed Term Arrangements

The PFD program — along with the associated FTA program — continues the use of government purchasing for IT industry development, whilst seeking to avoid the problems which had been identified with the civil offsets program. Essentially, the program isolates industry development obligations from specific government contracts. It also continues the national approach to industry development to which governments had agreed in the late 1980s.

The PFD program has been described by the Minister as 'the centrepiece of the Federal Government's Information Industries Strategy' (DIST 1995a, p. 3). It seeks to provide a framework for overseas and Australian companies to exploit opportunities for increased Australian participation in the global IT industry. The emphasis is on fostering niche opportunities for Australian firms in ways which are mutually beneficial.

Initially, firms participating in the program benefited by being exempt from civil offsets obligations (see above). Following the termination of the civil offsets program, the main benefit for Partners was their promotion as 'good corporate citizens'. The BIE (1994a) also identified perceptions that Partnership improves access to the government market (see below).

The PFD and FTA programs are outlined below, and in Appendix D. References to the PFD program should, unless otherwise indicated, be taken to also include the FTA program.

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[2] The review (IAC 1987) found that, against a target of 30 per cent, less than 12 per cent of the contract value of purchases with foreign firms had been placed as offset orders. By 1987, outstanding offset obligations were estimated at over $1.5 billion.

- *Partnerships for Development program*

The PFD program is designed for overseas firms making annual IT and communications equipment or software sales of over $40 million to government. Firms enter into a 'Partnership' with the Commonwealth, State and Territory Governments, agreeing to implement strategic business plans within seven years. The (confidential) agreement is formalised with a Memorandum of Understanding, signed by the Commonwealth Government, the international company's head office and the local subsidiary.

Partners undertake to reach, within seven years, the following targets, allowing for some variation between firms to suit their individual strengths:

- expenditure on R&D in Australia equivalent to 5 per cent of annual local turnover;
- exports:
  - of goods and services equivalent to 50 per cent of annual imports into Australia; or
  - for software firms, equivalent to 20 per cent of Australian turnover; and
- an average of 70 per cent local value added across all exports.

Other qualifying activities include strategic capital investment or investment in approved venture capital funds. The business plans are to focus on commercialising Australia's competitive strengths in the information and communications industries. Within these broad parameters, Partners have flexibility to structure their agreement to reflect their strengths: some companies may opt for higher R&D commitments whereas others may emphasise manufacturing or exporting. Activities must be integral to the company's global product development and marketing strategies and should be commercially sound in their own right, preferably sustainable long after the Partner has 'graduated' from the program. Companies are expected to maintain their activity level after graduating from the program.

Partners are encouraged to enter strategic alliances with local firms and institutions (eg universities) where it is commercially viable and appropriate to do so. Australian firms (known as alliance Partners) are assisted in their exporting by gaining access to the marketing and support networks of their transnational Partners. They are also expected to benefit from technology transfer and development assistance. In turn, Australian firms are expected to provide specialised skills and techniques to help overseas firms win new niche markets.

- *Fixed Term Arrangements program*

The FTA program extended the PFD approach to overseas firms with annual sales of $10 to 40 million to government. The program was originally for overseas firms, and had a minimum threshold of $10 million. Upon the introduction of the Endorsed Supplier Arrangement (ESA), the minimum threshold was removed and participation effectively made compulsory for overseas firms that sell to government (see Section 5.5.1). Australian firms are also permitted to participate.

FTA Partners agree to a four-year program of activity in much the same way as under the PFD program. The range of recognised activities is broader than under the PFD program.

- *BIE review of the program*

In February 1994, the Department of Industry, Science and Technology (DIST) commissioned the BIE to evaluate the PFD and FTA programs. The review was conducted under the guidance of an advisory committee drawn from DIST and other government and industry representatives. The report (BIE 1994a) was released in February 1995. The inquiry's objectives, major findings and recommendations are presented in Appendix B.

The BIE (1994a) judged that the program has made at least a modest net contribution to national welfare, and may have made a more significant contribution. The report found that the main apparent impact of the program on Partners had been to increase their levels of exports and R&D. It found the information technology and telecommunications (IT&T) industries and the economy in general had benefited from the transfer of knowledge and the fuller integration of Australia's IT&T base into the global scene. However, most of the benefits for local firms had been shared among a relatively small number of hardware producers.

The BIE was unable to identify any formal leverage mechanism in the program, but noted a 'real perception by some Partners and non-Partners that the PFD/FTA program represents an implicit contract between the Government and the Partner, involving preferential treatment in the awarding of government business in exchange for industry development commitments by Partner companies'. The BIE remarked that this perception appeared to be based on 'observation and informal communication'. (BIE 1994a, p. 79)

The BIE recommended that the program continue and be reviewed in four years, but with a much stronger focus on building business relationships between Partners and local firms. In response to perceptions that poor communication among governments has weakened the effectiveness of the programs, the BIE

recommended that regular consultation be re-established between the Commonwealth and State/Territory Governments.

The BIE raised concerns about trends in State/Territory industry policies which are in conflict with the national approach of the PFD program. This issue is discussed in detail in Section 5.4.

The BIE also raised concerns over the decline in information about the program's operation subsequent to the termination of the offsets program in 1992. It recommended an annual reporting requirement covering the administration, operation, performance and auditing outcomes of the program.

- *Participants' views*

In general, participants to this inquiry considered the PFD program to have made a positive contribution to the IT industries' development. The AIIA supported the PFD approach as 'the most effective and least prescriptive mechanism to encourage investment in Australia by international companies', favouring its use of broad, outcome-oriented goals and not attempting to 'second-guess market developments' (Sub. 27, p. 11). Several participants — including overseas Partners — commented that the PFD program had increased their awareness of the benefits of locating activity in Australia and of the capabilities of Australian industry.

The Western Australian Department of Commerce and Trade (DCTWA) submitted that the IT industries do not warrant a sectoral program of assistance because they are a 'strengthening, mature sector of the Australian economy' (Sub. 108, p. 1). The Electronic Industries Association of Western Australia (EIAWA) wanted to see the program abolished. The EIAWA saw it as assisting overseas firms rather than Australian firms:

> This program provides the federal government agencies the justification to purchase higher price IT products over locally manufactured/assembled products. PFD/FTA programs are in no way benefiting local industry. In fact this program acts as a deterrent for local industry to compete for the business. ...
>
> You have got to push and push before they commit to getting into partnership with a smaller local company. The amount given doesn't justify the amount taken by the multinational. (Transcript, pp. 534-535)

IBM Australia acknowledged that the scheme has always been 'a fairly fluid type of arrangement'. However, it favoured a more qualitative set of criteria over the 'hard and fast formulae which prevail at the moment, because the world is changing' (Transcript, pp. 854-856).

Some participants commented on the tendency for Partners to overlook small, innovative Australian firms. MN Information Technology Group argued that

the Australian software industry would not reach its potential by relying on the PFD approach, and that more direct government involvement is necessary (Transcript, p. 3). NetComm raised similar concerns, but added there are signs of Partners now showing a preparedness to take positions in innovative companies (Transcript, pp. 378-379).

IBM Australia contended that greater recognition needs to be paid to firms' industry development undertakings when awarding contracts:

> ... essentially it's a ticket to the game. ... if they're going to expect companies to continue long-term investment commitments of this type then maybe the ticket to the game is no longer enough; probably they have to do some more for Partners. (Transcript, p. 486)

Boomerang Imaging Supplies called for the PFD program to recognise import replacement as equivalent to exporting (Sub. 74, p. 5).

The Queensland Government contended that there are problems with the performance indicators used to measure the success of the PFD program:

> ... the program measures exports, a worthwhile objective, however, there is no real measure of local activity, technology transfer or import replacement. (Sub. 46, p. 6)

Concern was expressed in Western Australia and South Australia about information flows on PFD opportunities. The South Australian Government commented:

> ... the information flows have been poor, and we have found out actually at the last minute about certain major multinationals intending to relocate or wanting to put something here. ... originally Austrade only sent [information regarding a possible American Express investment] to two States, and we found out on the grapevine. (Transcript, pp. 579-580)

Several States expressed the view that the PFD program should result in a 'sharing around' of the investments of overseas firms, and that it has been ineffective in doing so (see Section 5.4).

The DCTWA contended that 'the failure of the program to function equitably at a State level' is more due to 'inadequate attention given to meeting PFD/FTA commitments outside of [Partners'] home States'. It argued that the success of the PFD program in New South Wales and Victoria 'suggests larger potential is being ignored', other State branches being composed of 'sales/service personnel who have neither the incentive nor staff to pursue Partnership obligations'. (Sub. 108, p. 4)

Commission assessment

Under the PFD approach, firms have a reasonable degree of flexibility in constructing their industry development commitments. Industry development

considerations do not intrude on the assessment of value for money for specific purchases and a national approach is taken. The BIE's review found that the PFD program has made at least a modest net contribution to national welfare. The Commission has found no reason to differ from the BIE assessment.

The Commission supports the BIE's recommendation that regular consultation be re-established between the Commonwealth and State/Territory Governments. Reliable information flows are vital to the effectiveness of the PFD program, both to allow States/Territories to fulfil their 'marriage broking' function and to maintain their commitment to the PFD approach. Continuity of information flows requires arrangements which respond appropriately to any changes in bureaucratic structures within the various governments.

Overseas firms have been prepared to make commitments on the understanding that this will improve their access to the government market. Outsourcing will limit direct sales to government. Pressure may arise to ensure that Partners receive a 'fair share' of available contracts. However, this would be difficult to achieve without compromising on value for money and without favouring Partners over Australian firms.

The Commission also shares the BIE's concerns over the degree of administrative discretion in the PFD/FTA program. DIST is responsible for approving Agreements and approving subsequent changes to those Agreements, based on broad guidelines. Whilst Agreements are independently audited, there is a good deal of discretion in determining whether penalties for non-compliance will be imposed and the level and nature of such penalties. Given the vagueness of the connection between the schemes and the awarding of contracts (see Appendix B), Partners are vulnerable to informal pressure, both before and after investments have been undertaken. The potential arises for Partners to be pressured into including specific undertakings in their Agreements, and for Partnership Agreements to be used to mask commitments sought in specific tender evaluations. This potential is heightened under the new policy for major acquisitions. In the context of the ESA, administrative discretion appears to have been used to extend the coverage of the FTA program.

Given these concerns, a further review of the PFD program, in 1998, as proposed by the BIE, is appropriate. Any such review should be conducted by an independent body and include an examination of the extent and implications of administrative discretion.

The benefits of the Partnerships for Development (PFD) and Fixed Term Arrangements (FTA) programs are being undermined by policy shifts and inadequate information flows between governments.

Recommendation 1

An independent review of the Partnerships for Development and Fixed Term Arrangements programs should be undertaken in 1998. It should include an assessment of the appropriate extent of administrative discretion.

5.4 State/Territory purchasing

In recent years the States and Territories have reverted to offsets-like arrangements for major IT purchases and are asking suppliers for industry development commitments over and above any that they may have under the PFD and FTA programs. The effect is to put at risk the national approach to industry development which evolved in the 1980s in response to the costs arising from State preferences and State offsets. The AIIA said:

> ... the outcomes in terms of exports and in terms of investment in R&D certainly show a much stronger growth through a single national program ... and the abolition of State preferences. (Transcript, pp. 435-436)

While the States appear willing to pursue a national approach in most of their purchasing decisions, IT related activities are seen as different. For example, the South Australian Government, acknowledging that State preference policies had fragmented Australian industry, supports the GPA[3] with respect to commodity and small-scale domestic purchases. However, it sees major purchases of computing systems as a different matter. The perception that there is a 'free lunch' attached to IT purchasing derives from the size of the transactions involved, the footloose nature of firms in the IT industries and hence the capacity to attract activity to a State as part of the award of a contract.

Clearly some States are disenchanted with the PFD approach. The Queensland Government (Sub. 46), observing that most Partners are based in Sydney or Melbourne, felt that an 'equitable' distribution of activities amongst the States should be an objective. South Australia, which has attracted only a small share of investment through the PFD program, attributed the outcome to insufficient incentives to attract companies away from the concentrations of IT activity in New South Wales and Victoria. It is outsourcing its IT infrastructure in order to 'leverage significant investment from a major multinational player' (South Australian Government, Sub. 26, pp. 3-7).

[3] State/Territory strategies for government procurement and industry development are outlined in Appendix C. The GPA is discussed in Appendix D.

The BIE (1994a) has expressed concern that State/Territory strategies may conflict with the PFD and FTA programs. It reported:

> ... State/Territory governments [are] engaging in competition to attract particular IT&T firms to their jurisdictions and/or seeking to extend the industry development commitments of Partner companies by in effect adding another tier of commitments ... details of the 'incentive packages' offered to particular firms are usually unknown. (p. 154)

The AIIA confirmed that some Partners have been asked for additional, local value added components in Queensland, Victoria, South Australia and Western Australia (Transcript, p. 665). Computer Power Group has also observed a 're-emergence of States bidding for business and seeking work being done in their area rather than fulfilling what might be an overall Commonwealth strategy'. (Transcript, p. 697)

There is a risk that the national approach will be compromised where the States attempt to:

- extract industry development commitments over and above those required under the PFD approach; and
- offer substantial incentives to attract 'footloose' overseas companies seeking a presence in Australia *and* firms already located in other States.

Some States are using an approach similar to the Commonwealth's 'two-envelope' tendering (see Section 5.5.2), to extract industry development from firms, including Partners, in exchange for access to the government market. Commitments are also sought for regional development — the outsourcing related to VicRoads and the Victorian Public Transport Corporation required a data centre to be located in Ballarat.

Other measures favour local firms in tender evaluation, creating pressure for out-of-State firms to produce locally to compete for contracts.

Incentives to attract investment to a State typically include concessions on loans or taxes, and the provision of infrastructure. The incentives may be in conjunction with the imposition of industry development commitments on the firm, partly to offset the costs of those commitments. Where industry development commitments are incorporated into a specific contract, their impact on cost is usually not quantified in the contract price.

The benefits of a national approach to government procurement are increasingly at risk from State/Territory government policies. There is greater resort to incentive packages, preferential arrangements, and various forms of leverage to promote development at the local level.

5.4.1 Impact of compromising the national approach

Use of leverage and inter-governmental competition for investment at the State level can impede the efficient structuring of firms' activities in Australia. It can also undermine the PFD program's key objectives of facilitating industry clusters and attracting strategic investment to Australia.

From an individual State's perspective, agglomeration benefits can be enhanced by obliging firms to locate in that State, thereby helping to create clusters of related enterprises (in the State). This approach is evident in the South Australian Government's view that its policies will not cause fragmentation:

> ... the South Australian Government has developed IT industry development strategies first, and then determined the opportunities for utilising Government purchasing to support industry development. This approach ensures that support for industry development by the South Australian Government is coordinated and strategically coherent, and overcomes the issue of industry fragmentation ... (Sub. 65, p. 2)

Whilst coordinated within the State, the approach does not avoid fragmentation at a national level. If firms would have located elsewhere in the absence of industry development obligations, agglomeration benefits are potentially reduced in the location that the firms would otherwise have chosen.

The South Australian Government accepted that its strategy will be imitated by other States (Transcript, p. 558). This implies fragmentation because firms will be obliged to duplicate their investments in several States to avoid losing access to those markets. It contended that duplication is not a problem because IT is 'not a scale industry' (Transcript, p. 562).

While scale may not be as crucial for some IT service activities as in, say, production of motor vehicles, it is nonetheless important. This is confirmed by industry participants. IBM Australia said:

> ... we are seeing a trend towards ... parochialism in State preferencing in IT procurement ... that is potentially a very damaging thing in terms of the industry development in Australia, both from the point of view of the fragmentation, spreading the investment dollar too thinly ... and also in terms of the signal that that gives, certainly to international companies ... (Transcript, p. 848)

AT&T Global Information Solutions said:

> ... you can't please all the States; and if you try to then you fragment your activities in such a way that you probably get uneconomic pockets of activities, and risk losing the whole activity to an overseas competitor. (Transcript, p. 336)

The AIIA submitted that the problem is increasing:

> ... the situation has deteriorated further since [late 1994], with a number of key States, such as Queensland, clearly indicating that they will be introducing quite distinctive arrangements. ... this merely fragments investment by the industry, reducing the

> potential scales of operations and hence any economic benefit to the nation. (Sub. 79, p. 2)

Where an overseas firm opts to locate in Australia, this can benefit the nation. But, if States offer competing incentive packages to attract the firm to a particular State, the benefit to Australia can be competed away. The costs of inducement increase as other States are provoked into bidding.

This is particularly germane to, but extends beyond, the IT industries. Referring to the forthcoming investment by American Express, the South Australian Government said:

> ... my staff are heavily involved right now in preparing a detailed submission as to what we will offer, what we will do for them, why they should come to South Australia based on our strengths ... Western Australia is doing it, Queensland is doing it, New South Wales is doing it and Victoria, and we're all head-on in that competition. ... once all the States get told these things are up for grabs, then you watch the States engage in very very heavy competition to get them, both overt and subvert. (Transcript, p. 580)

Bidding wars can extend to inducing firms already in one State/Territory to relocate to another, giving rise to further inducements to *retain* existing investments. Selective incentives to lure activity from an inter-State location, can have anti-competitive consequences — 'attracted' firms are often afforded tax breaks and concessions not available to their direct competitors. The ATIA expressed concern that firms already located in a State have to pay higher taxes etc to pay for the packages used to attract new entrants (Transcript, p. 404).

Apparent successes by States in inducing industry development should not be viewed in isolation from their consequences within the State, in other States, and nationally.

There is a serious danger that current approaches by the States to lever additional industry development from firms, and induce firms to (re)locate will return Australia to the fragmented approach which the national approach of the GPA sought to eliminate. Such 'beggar-thy-neighbour' measures duplicate costs, fragment industries thereby reducing competitiveness, distort industry structures and handicap the development of linkages in the regions that, from a national perspective, are most suited to an industry's development. The apparent benefits from the use of leverage and/or offering incentives may be offset by the (generally unknown) costs. Also, the risk of lock-in effects or 'leverage reversal' arises whereby some firms are able to extract on-going assistance or preferred treatment as a *quid pro quo* for maintaining their industry development commitments.

5.4.2 Recognition of the need for change

The downside to the measures being used by States is recognised by both firms and governments:

> ... at the end of the day if States wish to pursue the line of pouring lots of their money behind attracting companies, for good or for bad, then that's the cross they have to bear ... (South Australian Government, Transcript, p. 584)

> ... distortion of market forces through bidding for locationally mobile investment and use of contract leverage to derive industry development outcomes is not a valid or worthwhile approach ... (DCTWA, Sub. 108, p. 6)

The Tasmanian Government supported the national approach embodied in the GPA to help 'avoid the problems of fragmented development which can arise from current government purchasing arrangements', but sought scope for local initiatives to promote IT industries (Sub. 118, p. 1). Several States said that improved information flows between the Commonwealth and the States on PFD opportunities would reduce disenchantment with the program.

The BIE (1994a) suggested an inter-government agreement to preclude the use of State incentive packages and leverage. As an alternative, it suggested making the nature of incentives and the guidelines underlying their use more transparent, and limiting their use. The New South Wales Government said it would support 'guidelines developed by governments in conjunction with the industry' (Sub. 111, p. 2). The New Zealand High Commission (Sub. 73) views commitment to the GPA as 'an integral part' of the Australia-New Zealand Closer Economic Relations Trade Agreement.

The AIIA considered that the Commonwealth should strike an agreement with the States to reinforce the abandonment of State preferences (Transcript, p. 654). It drew attention to the Commonwealth's two-envelope tendering as an inappropriate example for the States/Territories:

> ... the Commonwealth, through introducing the Two-Envelope Tendering/Industry Impact Statement approach, is itself endeavouring to have a go at the market over and beyond what was envisaged in original PFD arrangements. (Transcript, pp. 654-655)

AT&T Global Information Systems (Sub. 28) suggested that States should position themselves as providers of specific skills and capabilities rather than use purchasing to lever investment, but doubted that interstate competition could be stopped.

According to DAS (Sub. 105), responsibility for the GPA resides with the National Supply Group (NSG). The group has interlocking membership with the Standing Committee on Industry and Procurement (SCIP).

The South Australian Government saw little potential for a more 'equitable' distribution of industry development through such bodies:

> ... the States now are very hell-bent, whether subtly or overtly, in tipping the balance in their favour on major capital equipment purchases where you can leverage major economic development ... I think it flies in the face of reality to think that we are going to have some body, whether it is comprised of Federal bureaucrats or State bureaucrats and Federal bureaucrats, that are going to arbitrarily sit down and work out where an EDS might go, based on population distribution. (Transcript, p. 556)

The Commission concurs with the view that it is infeasible to 'direct the traffic', nor is it desirable. Nevertheless, there is scope to reduce the damaging effects of State government procurement and industry attraction, while maintaining the beneficial aspects of competitive federalism.

5.4.3 Commission assessment

Recent shifts in policies at the State/Territory level are at odds with a national approach to government procurement and put at risk the development of competitive Australian industries. The 'sharing around' of IT activities implied in these policies can bring fragmentation of firms and activities and a loss of the 'agglomerative economies/critical mass' that might otherwise warrant the coupling of government procurement and industry development.

National economic growth is not helped where the States outbid one another to attract a multinational already committed to locate in Australia. Nor is it helped where States add yet another tier to the commitments entered into by PFD partners. Additional costs have to be met by the government market, through higher tender prices or measures that governments use to influence firms' locational decisions — soft loans or concessions on taxes. There is no 'free lunch'. The community and other companies are likely to pay through higher taxes. While the success of the favoured activities may be readily observed, the costs to other firms and the community are dispersed and not so readily observed.

The forces driving the procurement/industry development policies of the States are not hard to discern. The rivalries between governments are reinforced by a perception that the benefits of the PFD program are not 'equitably' shared amongst jurisdictions. Added to this is a perception that IT is 'different' and unlikely to be damaged by the over-zealous use of government procurement to promote industry (and regional) development.

In the Commission's view, the IT procurement and investment attraction policies of governments *are* fragmenting these industries and, given the

importance of IT, will progressively impede growth elsewhere in the economy. The benefits of a national approach should not be ignored.

The States, along with the Commonwealth, accepted the worth of a national approach when signing the GPA. They nevertheless continue to engage in bidding wars to attract investment and to use purchasing as a 'lever' to extract local investment.

In the Commissions' view, the downsides of State procurement and investment attraction policies can be minimised. The matters requiring attention concern information flows; non-discrimination; transparency; and recognition of the costs and incidence of selective assistance. The first two are inherent in, and could be reaffirmed through, the GPA. The others extend beyond that agreement.

In any consideration of these matters, governments would need to take account of the concerns of New Zealand — a party to the GPA.

Information flows

The PFD program is based on a national approach to government procurement and industry development. The approach will be reinforced by improving information flows between Partners, the Commonwealth and the States/Territories. The Commonwealth Government should aim to keep the States/Territories apprised of firms seeking to locate in Australia under Commonwealth initiatives such as the Regional Headquarters program.

Non-discrimination

If governments pursue policies that discriminate against suppliers in other States and Territories the risk of the 'value for money' criterion becoming subordinate to industry development objectives is increased. The States should endeavour to treat all tenderers within Australia and New Zealand on an equal footing.

While it is unlikely that a national preference margin can be used by any one State to provide preferment to firms in that State, other measures can. For example, Queensland gives a weighting to the local 'industry development component' in all IT tenders over $250 000 (refer Appendix C).

Transparency

National welfare is put at risk where the full costs of State based policies linking government procurement to industry development or location attraction are not known. For example, where States engage in bidding wars to attract investment, it is important that the costs of doing so are appreciated by the governments concerned and the community. At present, the costs do not appear

to be fully calculated, nor are they made public. The process used by the South Australian Government when outsourcing its IT requirements was not designed to identify any premiums incorporated into tenders to cover the costs of industry development commitments (Transcript, pp. 654-655). The Victorian Department of Business and Employment also noted that the costs from outsourcing VicRoads to IBM operations in Ballarat are confidential.

Even if a government deems that such information is commercial-in-confidence and should not be publicly available, it is nonetheless important that these costs are calculated and made known to policy makers within the jurisdiction.

Recognising the costs of selective assistance

Competition among the States for mobile capital on the basis of their general tax regimes, expenditure levels and administrative performance can contribute to national economic growth. Moreover, the structure of Australian industry can be enhanced where States promote their region as an investment location and 'matchmake' alliances between local firms and the multinationals.

However, inducements are frequently used by governments to attract footloose firms. From a State's perspective, assistance targeted at 'newcomers' is probably more cost effective than generalised assistance to all firms. But, it is important to recognise that the former can be to the detriment of existing firms and, should a rival State match the incentives, a perverse series of cross-border moves could, where firms are sufficiently footloose, be set in train.

Costs to all parties will be high when firms already located in Australia are targeted.

Fiscal responsibility

It is appropriate that a State should reap the benefits of a judicious investment attraction strategy. It should also bear responsibility for an injudicious strategy, perhaps involving large selective subsidies.

If a State seeks, for example, to have a low tax environment (perhaps offering fewer services) to attract industry and the costs and benefits of such an approach are internalised to that jurisdiction there can be no quarrel. Likewise, if a State embarks on a strategy involving leverage or the offering of incentives, resulting ultimately in net losses, taxpayers in other jurisdictions should not be penalised. This matter goes to the wider question of the workings of intergovernmental financial relations.

Reducing the costs

Whilst the NSG or SCIP could seek to have the spirit of the GPA re-endorsed by governments, they may not be the appropriate bodies to address the problems of investment attraction (which can extend beyond procurement). It is only as these problems are addressed that the IT industries will be encouraged to develop in ways which enhance rather than detract from their international competitiveness.

Recommendation 2

The Commonwealth, State and Territory Governments should recommit to a national approach, along the lines of the Government Procurement Agreement, in the use of government purchasing for industry development. The Council of Australian Governments (COAG) should seek agreement on ways to avoid damage from industry development obligations and measures intended to attract activity to particular locations. In so doing, COAG should be mindful that:

- adequate information flows (between the Commonwealth and the States/Territories) on opportunities for industry development are vital for the success of a national approach;
- procurement measures that discriminate against firms in other States/Territories can threaten the viability of a national approach;
- the costs and benefits of industry development commitments and incentive packages should be calculated and made as transparent as possible;
- incentives offered to attract firms can impose costs within the State, in other States and for the nation; and
- costs arising from industry development and investment attraction policies should be borne by the jurisdiction concerned.

5.5 Recent Commonwealth changes

The Commonwealth Government is in the process of strengthening the linkage between government purchasing and industry development. These changes follow from the *Report of the House of Representatives Standing Committee on Industry, Science and Technology* (House of Representatives 1994). The Committee is presently extending its review to government business enterprises (see Appendix B).

In the White Paper on Employment and Growth, *Working Nation*, the Government announced that it was:

> ... restructuring its purchasing framework to use its capacity as a major purchaser of goods and services to promote the development of Australian industry strategically, without compromising on quality or price. (Keating 1994, p. 76)

In December 1994, there was a further announcement that the formulation of the Australia and New Zealand (ANZ) Suppliers Policy will be changed from 'maximising opportunities for ANZ suppliers to compete for government business' to 'maximising opportunities for ANZ industry development' through extension of industry development criteria in purchasing decisions (Commonwealth of Australia 1994, p. 6).

The IT industries are particularly affected by two changes: the ESA and the new arrangements for major acquisitions ('Two Envelope Tendering').

In examining the new arrangements, the Commission has necessarily focussed on the published guidelines, along with participants' comments. Since both schemes are still in their infancy, and their operation is subject to a great deal of administrative discretion, their effects cannot be known with any certainty at this stage. There are, nevertheless, grounds for concern that some aspects of the new arrangements will operate to the detriment of the IT industries and/or efficient government purchasing.

The Commission understands that there is to be a joint review of the effectiveness and efficiency of both arrangements in 1996 by the Ministers for Administrative Services, Finance, and Industry, Science and Technology (DAS, Sub. 105). The findings below point to matters that should be high on the review agenda.

5.5.1 Endorsed Supplier Arrangement

The ESA applies only to IT and major office machine products. It is being introduced progressively as the respective IT CUCs expire.

The ESA has added a step in the procurement process. It prequalifies firms on a range of general government purchasing criteria. But firms must also commit to long-term value adding in Australia and to 'world best practice' before being considered for access to government IT business.

Effectively, firms will not be able to sell IT goods and services to government unless they engage in long-term, strategic value adding in Australia — not necessarily in the products sold to government:

> ... applicants will be expected to undertake activity in product development, investment and local sourcing. Activity in these areas is mandatory for endorsement.
>
> In addition, firms will be required to demonstrate commitment to at least one additional non-mandatory area of activity. The activity could be in the area of R&D, exports,

> networking between local or overseas firms and technology transfer. (DAS (Endorsed Supplier Application Form), p. 12)

Neither the Commonwealth Procurement Circular nor the Endorsed Supplier Application Form prescribe the extent of activity a firm must demonstrate to meet the industry development requirements for Endorsed Supplier status (see Appendix D). The Commission understands that criteria vary from case to case, depending on the firm and the industry development that DIST expects from the respective activities. PFD and FTA Partners are required to apply for Endorsed Supplier status, but will be deemed to have met the industry development criteria by virtue of the more demanding requirements of those programs.

Other endorsement criteria relate to 'world best practice' matters such as reference sites, compliance with government policies, quality, product standards, services and financial viability. Evaluation 'will recognise efforts of SMEs genuinely attempting to implement world best practice' (DAS 1994, p. 4). Endorsed Suppliers will be subject to random audit and will need to have their status renewed every two years. Further details on the requirements for Endorsed Supplier status are presented in Appendix D.

The ESA operates as an extension of the CUC arrangements which apply to many IT products. These entail lists of suppliers from which government buyers must choose wherever possible. Attaining Endorsed Supplier status is a prerequisite for competing for admission to CUC panels, but does not guarantee sales to government. For projects not covered by CUCs (including major acquisitions), buyers must give first opportunity to Endorsed Suppliers, subject to 'open and effective competition'. Firms with no intention of selling to government can seek endorsement for any perceived marketing advantages it offers.

The rationale for the ESA is 'to further encourage world best practice and a commitment to long-term value-added activities in Australia from suppliers' (Commonwealth of Australia 1994, p. 1). The Government also hopes that firms will be able to use the credentials afforded by their Endorsed Supplier status to break into new markets overseas (Keating 1994).

The industry development requirement is said to arise from the Government's needs as a purchaser:

> The Government expects Endorsed Suppliers to demonstrate long-term commercially sound activities and a commitment to value adding in Australia. This will ensure that suppliers will be operating in Australia in the long term and available to service their products and deliver 'whole-of-life' benefits. (DAS (Endorsed Supplier Application Form), p. 12)

Endorsed Supplier status 'will not guarantee performance of the supplier or of their products or services in particular circumstances' (DAS 1994, p. 3).

In summary, the ESA seeks to:

- Prequalify prospective IT tenderers.
- Impose a discipline on those IT firms supplying to government to pursue 'world best practice'.
- Impose formal industry development commitments on all IT firms wishing to sell to government.
- Endorse appropriately qualified IT firms with a view to helping them sell in overseas markets.

Each of these is considered in turn.

Prequalification

Participants in general favoured the use of prequalification, both because it allows a single assessment of the capabilities of a firm (eg financial viability, quality, customer service and support, management expertise) and because it prevents such matters from 'clouding' the tender process.

DAS submitted that prequalification is a normal, prudent commercial practice which has been undertaken by all governments 'long before the introduction of the ESA' and that the number of times agencies require supplier pre-qualification 'amply justifies a consolidated Commonwealth approach to streamline the process' (Sub. 105, p. 4).

However, the ESA goes beyond prequalification for the purchasing needs of government (see below). There is a risk that the upfront costs imposed by prequalification will deter firms from entering the market, reducing the range of products available to government and possibly retarding the prospects of some SMEs with innovative products.

World best practice

The ESA requires government suppliers to commit to 'world best practice' criteria in terms of quality, standards, and service. DAS submitted that the objective of the ESA in terms of quality is 'to establish the supplier's commitment to the quality process, ie the ethic of continuous improvement, as demonstrated either through a quality system or through a relevant program of some kind' (Sub. 105, p. 9). DAS said:

> The Commonwealth Government does not wish to have unnecessary costs imposed on its suppliers and is actively working with the relevant quality organisations to encourage alternative, appropriate means of assessing quality to minimise the costs for small business. (Sub. 105, p. 6)

Endorsed Suppliers who win places on CUCs will *not* be ranked according to the quality assurance standard they have achieved. But individual agencies 'will have to consider whether they require quality certification in accordance with the Quality Assurance Policy for particular purchases' (DAS, Sub. 105, p. 7).

The South Australian Government submitted that the ESA is causing 'catalytic action to occur within the companies as they move towards ... entering the international competitive race' (Transcript, p. 582).

However, many participants perceive the quality requirements of the ESA as the main hurdle in seeking Endorsed Supplier status. The New South Wales Government submitted:

> ... some of the conditions of the ESA make it difficult for small Australian firms to gain endorsement ... some aspects of 'best practice' ... are not within the financial means of many small firms. (Sub. 111, p. 1)

A number of participants pointed to the cost — in money and management effort — of gaining quality accreditation, relative to the likely benefits. To some extent, this may reflect confusion as to the extent to which quality systems must be in place for endorsement. If formal certification is required, the costs can be high. The Kean Report (Kean 1995) presented figures suggesting that the average cost to implement ISO 9000 and gain certification is 'around $55 000 for small organisations' (p. 135).

Making formal quality systems mandatory can forgo the opportunity for government buyers to trade off the benefits of quality assurance against those of an innovative solution.

Some small firms may already have the business plans required by the ESA. But for others this requirement will be onerous. Computer Power Group submitted:

> A smaller organisation wouldn't have the resources, neither would the proprietor have the time to put into such a plan. ... Quite often the proprietor has it in his head but needs assistance from someone to put it all together.[4] (Transcript, p. 690)

As with quality accreditation, firms are likely to be well placed to assess the value to them of business plans, having regard to cost effectiveness and the competing demands on their resources.

[4] The Commission understands that by using the National Industry Extension Service scheme, such a business plan would typically cost around $20 000, of which the firm would pay half.

Industry development

The guidelines imply that value adding in Australia is essential for whole-of-life support of products. But this is questionable. A firm should have the opportunity to demonstrate a commitment to providing whole-of-life support for the products offered without being required to undertake value adding activities to the level and type demanded for Endorsed Supplier status.

The Chamber of Manufacturers of New South Wales (Sub. 94), along with the Australian Capital Territory Chief Minister's Department (Sub. 101) argued that the industry development requirements of the ESA address a bias by purchasing officers against Australian products. The question of risk aversion by government purchasing officers was addressed by the Commission in its inquiry into the *National Procurement Development Program* (IC 1992). A finding in that inquiry was that risk aversion is easily alleged but difficult to substantiate. It appears to be a condition that many have taken for granted without adequate validation of its existence or causes. It is easy to misconstrue sound risk management as undue risk aversion. Judgments about the nature and consequences of risk attaching to buying from a particular supplier require knowledge of the operational, development and cost pressures faced by the managers responsible for such decisions.

IBM Australia contended that the ESA sets only a 'minimum standard of contribution for market access' and that the requirements for qualification are 'not arduous' — the industry development category being 'nothing more than what might be expected from a supplier making a meaningful contribution'. IBM argued for the criteria to be more stringent, seeing the ESA's extension of industry development requirements to all firms as important for shoring up the PFD program. (Sub. 82, pp. 1-2)

For many firms the industry development requirements of the ESA have already been met or could be met quite easily. For other firms, the requirement to contribute to industry development will influence the way in which they structure their operations. They may need to invest further in areas such as production, marketing and R&D, and alter where their products are developed and their inputs sourced.

Firms only engaged in distribution are likely to be significantly affected by the ESA. Where they source their products from Endorsed Suppliers, they can still sell to government provided their supplier chooses to name them as distributors for purposes of particular tenders and CUCs. However, distributors for firms which are not Endorsed Suppliers will be excluded from the government market — unless they can themselves obtain Endorsed Supplier status by engaging in local value adding services (eg technical support and software enhancements).

The AIIA reported 'a bit of nervousness' stemming from the degree of administrative discretion with no clear process for dealing with disagreements or disputes. The withholding of Endorsed Supplier status from overseas firms which are not in the FTA program — including firms with sales below $10 million — is a case in point, having caught a number of firms by surprise. Apart from facing a higher level of industry development commitment than expected, the time taken to develop an FTA agreement has temporarily excluded them from the market. (Sub. 79, p. 4; Transcript, pp. 659-661)

The New Zealand High Commission stated its concern that the ESA should be applied 'on a fair and equitable basis with sufficient transparency for New Zealand firms and ensuring that it also respects and meets treaty obligations under CER and the Government Procurement Agreement' (Transcript, p. 712).

Endorsing potential exporters

The AIIA reported a perception that Endorsed Supplier status will be of benefit to firms selling in overseas markets (Transcript, p. 661). The Chamber of Manufacturers of New South Wales submitted:

> It is the view of the international trade counsellors at the Chamber that Endorsed Supplier status would confer an initial marketing advantage on Australian firms in many Asian markets, especially as attaining Endorsed Supplier status requires firms to meet criteria such as financial viability and commitments to quality and product standards. (Sub. 94, p. 6)

The New Zealand High Commission considered that for New Zealand firms, being endorsed in a much larger market like Australia could give 'a fillip too on a much wider international stage' (Transcript, p. 714).

It remains to be seen what weight Endorsed Supplier status will carry in overseas markets for a firm that has not actually succeeded in selling to the Australian Government. Some participants emphasised the importance of 'reference sites' for aspiring exporters.

Costs of the endorsement process

For firms that have already been through the admission process for the PFD/FTA program, the ESA process is likely to be straightforward. IBM Australia, a PFD Partner, described it as 'an iterative one and a short one ... really quite painless' (Transcript, p. 859).

However, for other firms, the cost can be significant. The DCTWA submitted that the ESA has 'added to the cost of getting on panels' (Sub. 108, p. 2).

Computer Power Group estimated the cost of getting endorsement as 'probably exceeding $50 000'. The process was 'far more difficult, far longer and far

more analytical' than expected. However, for Computer Power Group, the process was complicated by the firm's structure of 18 trading entities. (Transcript, p. 687)

Computer Power Group considered that there would be 'a high element of fixed cost ... which would be of concern to an SME'. For a 10 employee firm, it suggested the cost would be around $25 000 — assuming the company already met the standards required by the ESA and had all the attendant documentation and proof statements required. It now saw a business opportunity in assisting other firms in seeking endorsement. (Transcript, pp. 688-690)

The New Zealand High Commission raised concerns over the additional administrative impediments that New Zealand firms will face in seeking Endorsed Supplier status (Transcript, p. 712).

Commission assessment

The overriding objective of Commonwealth Government purchasing policy to date has been to support government programs by obtaining value for money in the acquisition of goods and services. Recent policy changes, such as the ESA, risk compromising the value for money objective to industry development objectives.

DAS has found that the benefits from prequalifying suppliers exceeds the costs. It emphasised that prequalification predates the ESA.

The Commission accepts that it is sound commercial practice, which benefits both suppliers and purchasers, to prequalify suppliers. However, the ESA goes beyond normal commercial prequalification. The Commission considers that compulsory prequalification should be confined to meeting the government's needs as a purchaser. Compulsory prequalification should not extend to unrelated matters. The pursuit of industry development objectives should be the subject of separate arrangements.

Government requirements for prequalification as an IT *supplier should be confined to the commercial needs of purchasing agencies and should not extend to the pursuit of industry development objectives.*

The ESA adds a step in the procurement process, introducing new costs to firms. Some will need to undertake industry development. Others will need to develop quality systems and business plans. All will need to incur the cost of the applications process, which can be substantial for those firms that do not already have the necessary documentation. Some of these costs would arise in the course of any prequalification process, but the ESA goes beyond the Government's purchasing needs.

The requirements that firms must meet under the ESA extend well beyond the obligations which could reasonably be expected of a firm prequalifying as a supplier to government. They are unduly onerous and act as a barrier to small firms seeking access to the government market.

The ESA excludes some types of distributors from the government market. It will prevent a firm that does not have significant local value adding from importing the best, or least cost product in the world for sale to government.

The industry development criteria of the ESA can act as a barrier to imports of IT products.

The way in which the ESA is being administered discriminates against overseas firms by requiring them to enter through the FTA program, which demands greater industry development commitments. This FTA commitment is required prior to significant sales being made to government and in advance of attempting to achieve the intermediate stage of admission to CUCs. This is a departure from the original PFD/FTA approach, whereby firms were invited to participate on the basis of the success they had already enjoyed in the government market.

The ESA is administered in ways that oblige overseas firms, regardless of size, to enter the FTA program.

Some Australian and overseas firms may desire the opportunity to demonstrate their 'corporate citizenship' and 'world best practice' credentials without committing to the level required by the FTA program. To accommodate such firms there may be scope for a voluntary endorsed supplier arrangement, supplementary to compulsory prequalification to meet the needs of government purchasing. Any such arrangements should not discriminate between overseas and Australian firms.

Recommendation 3

An independent review of the Endorsed Supplier Arrangement should be undertaken in 1996. The review should have regard to:

- the desirability of keeping prequalification as simple and inexpensive as possible;
- the potential for the Endorsed Supplier Arrangement to act as a barrier to the entry of small firms to the government market;
- the potential for the industry development requirements to act as a barrier to imports of IT products; and
- the discriminatory treatment of overseas firms.

5.5.2 Major acquisitions

The new policy for major acquisitions diverges from the PFD approach by seeking industry development commitments related to specific contracts. It extends the use of government purchasing for industry development, both within and beyond the IT industries. The arrangements can require participants in other industry development programs (the ESA, PFD, and FTA programs, and the Systems Integration Panel (SIP)) to make additional contract-specific industry development commitments.

The arrangements apply to those acquisitions over $10 million which are not covered by CUCs. Their objective is to ensure that 'opportunities for industry development' are 'explored thoroughly' with respect to major acquisitions (DIST 1995b, p. 2). DIST will have a very influential role under the arrangements insofar as it provides advice on the nature of the industry and the possible industry development outcomes.

The arrangements are given effect through the complementary arrangements for Industry Impact Statements (IIS) and the Two Envelope Tendering System. The purchasing agency prepares an IIS identifying the industry development opportunities arising from the contract, which tenderers are expected to address in an industry development proposal (the second envelope).

Industry Impact Statements

Agencies are required to prepare an IIS 'identifying potential industry development opportunities which could be addressed by prospective bidders' (DIST 1995b, p. 3). This is done prior to the issue of the Request For Tender and is included in the tender documents.

In summary, the IIS:

- assesses the strategic importance of the contract in terms of developing industry development capability in areas where industry (in Australia and New Zealand) has the capacity to enhance its international market position;
- indicates the industry development opportunities 'inherent' in the proposed purchasing contract;
- identifies any '*particular* industry development opportunities' or 'particularly innovative/leading edge potential solution' connected with the acquisition;
- addresses opportunities available in the contract for local firms; and
- includes a statement of involvement of SMEs. (DIST 1995b, pp. 9-10, emphasis in original)

Agencies can seek the assistance of DIST in preparing the IIS. Assistance can also be sought from sources such as the Industrial Supplies Office network to help identify ANZ-based industry capabilities.

Two Envelope Tendering System

Tenderers are required to submit two envelopes. The first envelope details how the firm's tender meets the product specifications (eg technical, financial, contractual requirements), along with the offer price. The other envelope contains the industry development proposal associated with the tender. The second envelope does not amend the offer price. The Two Envelope Tendering System 'ensures that industry development considerations are clearly identified and not subsumed within a complex tender document' (DIST 1995b, p. 2). The industry development proposal should relate to the opportunities identified in the IIS, supplemented by any other industry development opportunities the bidder has identified.

The processes 'allow bidders to identify and address ANZ industry development already being undertaken by firms which have invested in commercially sound business activities, including those which have achieved Endorsed Supplier status' (DIST 1995b, p. 4). In the IT industries, firms usually only need to state that they have complied with their commitments under the various industry development programs (ESA, PFD, FTA).

Nevertheless, in some circumstances all firms — including those with long-term industry development programs — can be expected to submit industry development proposals:

> In instances where a purchase is very large or strategic in nature, particularly where a 'partnering' relationship between the Government and the supplier is likely to evolve, the government may actively encourage suppliers to identify specific industry development opportunities arising from the acquisition. In these instances, while the investments of companies with existing long term agreements will be recognised, the Government may seek advice from potential suppliers on how they would respond to the specific opportunities identified through the IIS process. (DIST 1995b, p. 7)

The Commission understands that, in addition to investments, such opportunities could relate to the exploitation of market openings and intellectual property.

Tender evaluation

The guidelines state that assessment of bids will normally be made on the basis of value for money and that the Government expects that it generally will not pay a premium for 'acceptable industry development outcomes'. In the 'rare instance' where an agency believes that a trade off between industry

development and value for money objectives is necessary, such as where 'significant industry development outcomes' would not be achieved by adherence to value for money considerations, the agency is to refer the decision to Ministers for consideration. (DIST 1995b, p. 2)

The IIS provides the basis for assessing the industry development component of bids. In addition to contract-specific industry development opportunities, prospective suppliers are also assessed in terms of 'world best practice' issues such as standards, quality and service over the life of the acquisition. A 'commitment to long-term commercially sound Australian activities' is said to be 'one indicator' that a supplier meets the purchasing requirements of commitment to world best practice and value for money (DIST 1995b, p. 1).

Issues which 'could form all or a part of the industry development criteria' for evaluating bids include:

- commitment to long-term and commercially sound Australian activities;
- commitment to world best practice in terms of standards, quality and service over the life of the acquisition;
- impact on local suppliers;
- promotion of and participation in R&D;
- promotion of and participation in exporting; and
- promotion and delivery of leading edge value added goods and services. (DIST 1995b, pp. 11-12)

Strategic activities already being undertaken by firms as part of their long-term commitment to value added activity in Australia are to be taken into account in the evaluation of the industry development proposal.

Agencies must invite DIST to participate in the evaluation of the industry development envelope. They may also invite DAS and the Department of Finance. There is no requirement for the two envelopes to be examined by separate committees.

Endorsed Supplier status is not a formal requirement for major IT acquisitions, but non-Endorsed Suppliers will only be considered if an acceptable outcome cannot be produced through competition between Endorsed Suppliers (DAS, Sub. 105).

Participants' views

Participants, in general, did not support the tying of industry development commitments to specific contracts. This reflected their preference for the broader approach to leverage taken by the PFD program, which allows firms

considerable flexibility in developing an industry development program. The AIIA said:

> ... if you bring [industry development] down to the individual contract level, who actually specifies what makes sense in relation to this contract? (Transcript, p. 433)

The AIIA also argued that industry policy will become fragmented if it is allowed to happen 'here and here and over here, depending on the views of the various purchasers'. It said that industry policy should take a 'holistic view' and not be 'determined at the street level'. (Transcript, p. 433)

A contrasting view was presented by CRATMA, which was concerned that the $10 million threshold will mean that some SMEs with innovative niche technology would miss out on opportunities to supply to prime contractors. (Transcript, p. 519).

Participants expressed concern over the situation where firms relying on their long-term program of activities (eg as Endorsed Suppliers) are competing with new players. The AIIA remarked that a greenfields bidder can make a 'more attractive situational offer' than somebody who is already committed (Transcript, p. 435). IBM Australia expressed concern that the arrangements would favour the 'new toy' (Transcript, p. 485).

The AIIA reported a 'fair measure of scepticism' over assurances that the policy for major acquisitions will not become a 'ratcheting mechanism', saying a company might be seen as 'commercially negligent if it refused to put some additional bait on the hook, because that will be being done by somebody else ... those are the kinds of risks that we see inherent in this contract by contract approach'. (Transcript, pp. 664-665)

The New Zealand High Commission stated that it had concerns about how the arrangements will be applied in practice and was having discussions with DIST and DAS 'to clarify and to try to ensure that there is greater transparency ... to ensure that New Zealand companies and suppliers are given, in the real sense, equal treatment' (Transcript, p. 711).

Computer Power Group reported that the new process has deterred it from prime contracting, because of the risks it saw in the 'open ended' guidelines (Transcript, p. 693).

The AIIA saw ramifications for the policy at the State/Territory level:

> ... there is the Partnership for Development scheme and the Commonwealth is itself now asking for one-off industry development arrangements in the context of particular tenders and that is being used to some degree as a justification by the States for saying, 'If the Commonwealth is about to embark on these arrangements then we at the State level cannot afford not to.' (Transcript, p. 655)

Commission assessment

Industry Impact Statements guide industry development undertakings in ways that promote activity related to the specific contract. In some cases, by focussing on 'particular' opportunities arising from the contract, the IIS can seek to influence the industry structure and development in quite specific ways. It can constrain the approach taken by tenderers to solving the IT needs of the customer, since identified activities may be required to form an integral part of the solution. It may compromise value for money by requiring tenderers to incorporate particular industry development opportunities identified by the IIS into their proposed solutions.

The objective of seeking to exploit the industry development opportunities arising within the contract is at odds with the PFD approach, both by directing industry development into specific activities and by adding to the previously agreed programs of Partners.

The guidelines state that 'in many instances, Endorsed Suppliers may be considered to have addressed and met the industry development opportunities'. However, the potential exists for acquisitions to increasingly be deemed 'large or strategic in nature' and thus require Endorsed Suppliers and Partners to submit contract-specific industry development proposals. Requirements for contract-specific industry development may impact unevenly on Partners, as some tenderers' preferred solutions may not be amenable to using Australian resources in ways identified by the IIS.

The preparation of bids will be more complex (and therefore costly) and uncertain Whilst the guidelines are couched in terms of achieving 'acceptable' industry development outcomes, the scope for different approaches to the industry development opportunities will make it hard for a firm to be sure that its offering will be acceptable. This may cause firms to err on the safe side, and supply detailed documentation, in order to ensure a compliant tender. Further, the benchmark for acceptability may drift upwards in the evaluation phase. This could occur if DIST (which must be involved in the evaluation of the industry development envelope) is attracted to industry development opportunities not raised in the IIS but identified and accommodated by a tenderer.

There is an incentive for tenderers to include, in the second envelope, industry development offerings over and above those needed to satisfy the IIS, in order to compete on the basis of industry development. Firms which have made industry development commitments under the more general programs (eg PFD, FTA, SIP and ESA) are likely to be at a disadvantage when competing with new players who offer industry development activities that are 'new' and specifically address the 'opportunities' the IIS seeks to see taken up. Whilst most major overseas IT firms are already in the PFD/FTA program, those firms also

compete for contracts with 'non-IT' firms that are specialists in areas which now use IT. Partners are concerned that, faced with this situation, they would be compelled to also offer something new and thereby accumulate a succession of industry development commitments. Similar concerns would arise for a tenderer relying on new or existing industry development activities in New Zealand.

The guidelines expect that price premiums will generally not be necessary to achieve 'acceptable industry development outcomes'. But, this is difficult to test since all firms are similarly handicapped. Further, where firms adopt different approaches, it may be difficult to distinguish a premium paid for industry development from a premium paid for higher performance.

For purchasing agencies, incorporating industry development into the acquisition complicates and lengthens the procurement process. Additional steps and consultations are involved both before tenders are sought and when they are being evaluated. The length of the procurement process — and the complications posed by industry development arrangements — was raised by participants as a factor in the costs of tendering (see Section 5.1). If industry development offerings are evaluated on more than a 'satisfactory/unsatisfactory' basis (eg if they are used as a tie-breaker), the purchasing agency may need to make judgements on the value of industry development offerings. Individual agencies are responsible for monitoring the contractor's compliance with industry development commitments.

Recommendation 4

Governments should not seek specific industry development commitments in the context of individual tenders.

6 RESEARCH AND DEVELOPMENT

Research and development (R&D) is a major activity for many firms in the information technology (IT) industries. In a sector often characterised by short lead times and brief 'windows of opportunity' in which to successfully market products, a firm's commitment to R&D will often determine its survival. Measures adopted by governments to encourage R&D are a significant source of assistance for many firms.

The Commission has recently completed an inquiry into Research and Development. The main findings and recommendations, in relation to support for business R&D, are discussed in this chapter.

Commonwealth Government support for business R&D is provided through the Industry Innovation Program which is administered by the Industry Research and Development (IR&D) Board.

The IIP itself contains three programs:

- the 150 per cent Tax Concession for Research and Development;
- Competitive Grants for Research and Development; and
- Concessional Loans for Commercialisation of Technological Innovation.

R&D performance targets also form part of the overall strategy associated with the Partnerships for Development and Fixed Term Arrangement programs (see Appendix D).

Most State Governments operate R&D grant schemes which fund some projects that fail to attract Commonwealth assistance. The Queensland Government, for example, provides support for industrial R&D through the Queensland Grants for Industrial Research and Development program. Since its inception in 1990, the program has provided $6.7 million for 47 projects. The IT industries have received $1.6 million for 10 projects, mostly involving the development of niche industrial applications software.

The Commission recently completed an inquiry into Research and Development. The main findings and recommendations are discussed where relevant in the following sections. *Inter alia*, the Commission (IC 1995) noted that:

> When all forms of assistance are accounted for, business R&D appears to be more highly supported in Australia than in most other countries. (p. 27)

6.1 R&D and the IT industries

Firms in the IT industries invest heavily in R&D. According to the Australian Information Industry Association (AIIA):

> In the computer hardware and software industries, substantial investment in R&D (typically 10 per cent of revenue) is necessary for commercial success. Together with pharmaceuticals, they are the world's most R&D intensive industries. (Sub. 27, p. 34)

The AIIA provided information on R&D intensities (R&D as a percentage of sales revenue) in the IT industries in the United States of America:

> Typical R&D intensities drawn from the US (where detailed data are available) are:
>
> - computer software and services — 13.5 per cent;
> - computer communications equipment — 10.9 per cent
> - computer systems — 7.9 per cent;
> - disk and tape drives — 7 per cent; and
> - systems design — 11.6 per cent. (Sub. 27, pp. 34-35)

These data are consistent with participants' views that, owing to short product lead times and lifetimes, R&D is critical in the IT industries. Indeed, the Bureau of Industry Economics (BIE 1990) found that, whereas R&D expenditure amounted to 9 per cent of turnover in the bountiable sector of the IT industries, the proportion in non-IT manufacturing was less than 1 per cent.

Firms in the IT industries make a large financial commitment to R&D relative to firms engaged in other activities in the economy.

Issues raised by participants in relation to R&D included:

- the 150 per cent tax concession;
  - maintaining the value of the concession;
  - constraints on eligibility; and
  - syndication provisions;
- access to R&D grants; and
- the computer bounty;
  - bounty/tax concession overlap;
  - the bounty period; and
  - administration.

This chapter examines issues relating to the Tax Concession and Competitive Grants Schemes. Issues linking R&D and the computer bounty are dealt with in Chapter 7.

6.2 The 150 per cent tax concession

The Tax Concession Scheme was introduced in July 1985 and is administered jointly by the IR&D Board and the Australian Taxation Office. The concession does not target particular industries or technologies. Operating through the tax system, it is only of value to firms which have taxable profits, or which can enter R&D syndicates (Section 6.2.3).

The concession is claimed as a single line item on a firm's income tax return, and allows it to deduct 150 per cent of its expenditure on R&D from its taxable income. Assuming that 100 per cent of expenditure would otherwise be deductible, although perhaps like investment expenditures, spread over several years, the deduction of 150 per cent provides, from 1 July 1995, an after-tax subsidy of 18 per cent for every dollar spent on R&D.

Participants were supportive of the Tax Concession Scheme. Many bounty recipients said the tax concession is their major form of assistance. Colour Vision Systems said:

> Over five years ... the tax concession has represented an average of 6.8% of annual turnover. ... Over the [same period] the computer bounty has represented an average of 1.45% of turnover. Accordingly, while it has been beneficial to the company, it is nowhere near as important as the IR&D Taxation Concession. (Sub. 2, pp. 4-5)

Nevertheless the AIIA said there are still problems with claiming for R&D on software upgrades:

> ... largely because of differences in interpretation about what constitutes 'innovation and technical risk'. ...
>
> The [IR&D Board's] view seems to be based on an opinion that because the basic functionality of the original application is retained, there is no innovation or risk. (Sub. 27, p. 36)

6.2.1 Maintaining the value of the concession

Changes in tax rates affect the level of support provided through the concession. When the tax concession was introduced on 1 July 1985, the company tax rate was 46 per cent and the after-tax cost of R&D was 31 cents in the dollar. Since 1 July 1995, the tax rate has been 36 per cent and the after-tax cost of R&D is 46 cents in the dollar. Several participants (eg the ATIA) suggested the concession rate should be adjusted to provide a subsidy to R&D of 23.5 per cent, thereby providing the same level of assistance as the tax concession provided in 1985.

These comments were forwarded to the Commission's inquiry into R&D, where arguments for and against raising the concession rate to 'compensate' for the

reduction in company tax rates were considered. In its report, the Commission (IC 1995) said that:

> Many participants argued that the level of the concession should be increased to restore the value of the incentive that existed prior to the reduction in the company tax rate, or to match apparently higher concessions overseas. The BIE has argued, however, that increasing the rate would have doubtful welfare implications because of the costs associated with raising the revenue to support projects that would have proceeded anyway and the possibility of lower spillovers from more marginal projects. The Commission also considers that the 200 per cent tax concessions available in Singapore and Malaysia are unlikely in practice — because of more selective application and lower company tax rates — to be more generous than Australia's 150 per cent concession.
>
> The Commission also agrees with the judgment of some participants that the effectiveness of the tax concession in inducing R&D may have been weakened by the uncertainty surrounding its continuity and level.
>
> The Commission does not support changing the tax concession, either to restore the effective value that applied in earlier years, or to match rates that apply in other countries. (p. 29)

6.2.2 Constraints on eligibility

In order to claim the tax concession, a firm must be earning taxable profits, must be incorporated in Australia, a public trading trust, or a member of a partnership of eligible companies. It must also spend at least $20 000 on R&D in the year of assessment.

Not all R&D is eligible for the concession. Projects must be based on a 'core' activity that involves either innovation (novelty) or technical risk. Activities must generally be carried out in Australia, have adequate Australian content, and the results of the R&D must be exploited for the benefit of the Australian economy. The scheme was extended in May 1994 to cover some R&D activities undertaken overseas, but they may account for no more than 10 per cent of the total cost of the project.

Many firms in the IT industries are ineligible for the 150 per cent tax concession because of their company structure; insufficient profitability; or inability to meet the expenditure thresholds:

> ... only trading companies are eligible for the 150 per cent concession. This excludes trustee company structures used by many SMEs [small and medium sized enterprises] to meet other government requirements, notably in relation to superannuation, or to facilitate employee profit sharing. (AIIA, Sub. 27, p. 36)
>
> When we're talking about a small company just getting going it doesn't make any profit in its first 3 or 4 years so a 150 per cent tax deduction is really not worth a lot. (MN Information Technology Group, Transcript, p. 9)

> The 150% tax concession on R&D is only available to registered research organisations which because of our size we cannot become. (ACADS-BSG, Sub. 18, p. 4)

These matters were also considered in the Commission's R&D inquiry. In its report, the Commission recommended a scheme to make assistance for business R&D more widely available (see Section 6.5).

In its submission, Telstra (formerly Telecom Australia) said that under subsection 73B(2A) of the *Income Tax Assessment Act* 1936, software development costs are eligible for the tax concession only when the software is developed for sale, rent, license, hire or lease to two or more non-associates of the company. Therefore, it does not apply to software developed by Telstra to provide services through its telecommunications networks:

> In circumstances where fees are paid by users of the service, eg phone charges or charges to resellers (such as Optus, Vodaphone and AAP), such fees should be sufficient to satisfy the above requirement. (Sub. 89, p. 2)

Telstra raised other issues related to the administration of the scheme, which lie outside the scope of this inquiry.

6.2.3 R&D syndication

In November 1987, joint registration (Syndicated R&D) provisions were introduced in the Tax Concession Scheme. According to the IR&D Board (1990):

> Syndicated R&D provides the opportunity for projects, which are too big or too risky for any one company, to be undertaken by a group of companies. Syndication also provides a mechanism to attract funds for R&D investment. (p. 48)

The BIE (1994b) evaluated the syndication provisions of the scheme in 1994 and found:

> ... syndicated R&D is fundamentally a mechanism for the transfer of tax losses from R&D researchers who cannot take advantage of them to financial investors who can. This trade in tax losses is, however, conducted in a very complex way and it loses all transparency in the process. (p. 43)

The provisions are used in the following manner. A research firm with tax deductions which it cannot use sells 'core technology' to a syndicate, in which a company with tax profits has a significant interest. The sale of core technology gives the research firm a taxable income against which it can use its tax deductions, and gives the company with tax profits a tax deduction equal to the value of the core technology sold.

Originally, only projects involving more than $1 million in R&D could be syndicated. In May 1994, this threshold was reduced to $500 000. A simplified syndicate structure was also implemented to facilitate access by SMEs.

The BIE found that the syndication provisions were seen as a 'last resort' source of finance by research firms.

This view was confirmed in this inquiry by NetComm:

> ... in both settings that I have been in [syndication] was done as an absolute last resort, recognising fully that [for the firm] they were probably the most expensive forms of finance you could take. (Transcript, p. 374)

The Commission examined the syndication provisions of the tax concession in its inquiry into R&D. In its report, the Commission (IC 1995) said:

> Syndication appears to have a high inducement rate of new R&D. At the same time, it is a complex mechanism and has large transactions costs. Nevertheless, as the BIE evaluation has shown, it can generate net benefits by encouraging R&D that might not otherwise proceed.
>
> Currently, syndication can be used to convert tax losses from all sources into funding for R&D projects. Except for the presence of various 'brakes' on its operation — the need for approval from the IR&D Board, and the transactions costs — it is likely that syndication would provide excessive incentives for R&D.
>
> The Commission recommends that syndication not be used for tax losses incurred in activities other than R&D; nor should it be used by public or private tax exempt entities. (p. 33)

6.3 Access to R&D grants

The Competitive Grants for R&D Scheme was created in May 1994 from five existing R&D grant schemes. Grants are provided on a competitive basis for:

- market driven R&D in dynamic firms needing assistance but unable to gain full financial benefit from the 150 per cent tax concession for R&D;
- collaborative R&D activities that are high risk but could provide extensive benefit to Australia;
- trial and demonstration activities between technology developers and potential customers; and
- collaborative R&D activity between industry and research institutions (IR&D Board 1994a).

Unlike the tax concession, which applies generally, competitive grants provide selective assistance to specific research projects. Applications for grants are made to the IR&D Board and are considered against a set of eligibility criteria. These criteria are shown in Box 6.1.

Box 6.1: **Competitive Grants for R&D Scheme**

Committees of the IR&D Board will only consider projects that meet all of the eligibility criteria listed from 1 to 6 below and either 7 or 8 or 9.

1. The project involves research and development, or product development (including the development of prototypes) or trial or demonstration or related market research; and
2. The project is directed to the development of internationally competitive goods, systems or services; and
3. The results of your project will be exploited for the benefit of Australia; and
4. The project will not proceed satisfactorily without grant support; and
5. The grant will not exceed 50% of eligible project expenditure; and
6. The project will be completed within three years;

and either

7. The applicant, or a company that controls the applicant, is unable to obtain full financial benefit under the 150% tax concession for Research and Development to undertake the project while in receipt of a Competitive Grant for Research and Development;

or

8. The project involves a significant proportion of activities (trials, demonstration and marketing) that are outside the scope of eligible activities under the 150% tax concession for Research and Development;

or

9. The project involves a graduate working on a specific company based research and development project which results in the formation of new and appropriate linkages between a company and a tertiary/research institution.

Source: IR&D Board (1994a).

According to the IR&D Board (1994a):

> Because funds available for the grants are limited, the IR&D Board restricts support to the projects with the best chance of commercial success. (p. 6)

The Competitive Grants Scheme has not been operating for long and most participants' comments related to the five previous R&D grant schemes. However, their comments reflect the problems that firms (particularly SMEs) in a high technology industry have in dealing with grant schemes.

Some participants were deterred by the amount of paperwork involved:

> We have tried to have work in the SPICE project[1] recognised under the R&D [grants] program. We found that it may be possible, but the amount of bureaucracy that we have to fight through and the sorts of rulings we have to go through have been such that it hasn't been worth our while to put the effort in that's necessary to establish it. (Australian Software Quality Research Institute, Transcript, p. 157)

> Most of the Government [R&D] assistance schemes, most of which we have considered, are either not applicable to us as a small company for various reasons or

[1] See Section 8.5.2 for more information on the SPICE project.

> present us with so much effort and paperwork to make application for funding a waste of time. (ACADS-BSG, Sub. 18, p. 4)

Others have had difficulties convincing the IR&D Board that their proposals satisfy its criteria. MN Information Technology Group said:

> ... it's very hard for a small company to put up a good argument on how it's going to commercialise this piece of software it has produced in a way that would impress the IR&D Board. (Transcript, p. 10)

One of the reasons for introducing an R&D grants scheme was to provide assistance for small firms which do not qualify for the 150 per cent tax concession. However, the Canberra Region Advanced Technology Manufacturing Association said:

> The smaller company seems to be disadvantaged regarding access to R&D grants as the IR&D Board is less interested in smaller proposals (say less than $0.5m) so there seems to be a 'gap' in terms of government R&D support programs. (Sub. 30, p. 9)

The Commission examined the operation of the previous separate R&D grant schemes and the new consolidated scheme in its report on *Research and Development* (IC 1995). Features which gave cause for concern were:

- The [IR&D] Board has very wide discretion in choosing which projects to support. The recent absorption of the previous five schemes into a single scheme with multiple criteria has increased the Board's flexibility and reduced the transparency of the scheme.
- There is considerable potential under current arrangements for support to become more focussed on picking likely successful firms and industries than on addressing market failure in R&D.
- Assistance has tended to be concentrated on a relatively small number of firms, some of which have received several grants. The majority of applicants with proposals involving eligible R&D have received no grant assistance. (p. 31)

Comparing the tax concession and the Competitive Grants Scheme, the Commission found:

- The costs of running the grants scheme, relative to disbursements, may be at least ten times higher than for the tax concessions. Participants have argued that their compliance costs are considerably higher as well.
- The rate of support for firms under the grants scheme — 50 per cent of project costs — is high relative to the tax concession. Because of imperfect 'clawback' arrangements under the tax concession, companies in tax loss receiving grant funding are also entitled to tax deductions in respect of the R&D when they become profitable. In total, this provides a higher rate of support than under the tax concession.
- Estimates of the proportion of projects induced by the previous schemes have been significantly higher than for the tax concession (although they are also more likely to involve response bias). They nevertheless indicate that across the largest three

> former grant schemes, at least 40 per cent of projects would have gone ahead without a grant. (p. 31)

The Commission found that:

> ... while the competitive grant schemes may have yielded net benefits in the past, their administrative processes have a number of drawbacks. (p. 32)

6.4 Options for generalising R&D support

A significant group of firms (companies not earning taxable profits) cannot benefit from the Tax Concession Scheme. While some receive assistance from the Competitive Grants Scheme and the syndication arrangements, many others, particularly SMEs, receive no assistance for R&D. In order to overcome this anomaly, the Commission proposed, in its report on *Research and Development* (IC 1995), a new approach to supporting business R&D:

> ... on equity, efficiency and administrative grounds, it would be desirable to provide more generally available support to tax loss companies. In the absence of information on social returns by project, it would also be desirable for the rate of support to be more consistent across companies performing R&D. (p. 32)

The Commission recommended that:

> ... the 150 per cent tax concession be maintained. A generally available non-taxable grant should be introduced in place of competitive grants for tax loss companies, at a rate equal to the nominal value of a tax deduction of 50 per cent of the cost of undertaking R&D (18 cents in the dollar for a 36 per cent company tax rate). The grant could be payable in advance through the IR&D Board. (p. 33)

Existing beneficiaries of the tax concession would not be worse off and many firms currently ineligible for assistance (ie companies not earning taxable profits) would receive support for R&D.

However, the recommendation would retain a link between the level of assistance offered to support R&D and the company tax rate. Hence, any future changes in company tax rates would affect the level of assistance provided both to firms earning taxable profits and those not earning taxable profits.

The Australian Telecommunications Industry Association (ATIA) supported the replacement of the competitive grants scheme with a generally available non-taxable grant for firms not earning taxable profits, adding that:

> ... the value of the subsidy for tax loss companies should be the same as for companies in tax profit. (Sub. 62, Attachment 2, p. 5)

The Commission's 1995 report on Research and Development proposed that firms not earning taxable profits should have access to a non-taxable subsidy of 18 per cent. These firms would then receive assistance equivalent to that

arising from the concessional component of the 150 per cent deduction for profitable companies. This change would remove an anomaly in the major form of assistance available to firms in the IT industries.

Recommendation 5

Firms not earning taxable profits should have access to R&D assistance in the form of a non-taxable subsidy.

6.5 Concessional Loans for Commercialisation of Technological Innovation

In May 1994, the Commonwealth Government announced that it will provide $48 million over four years to assist SMEs in the high technology industries which are seeking to commercialise new products and services. This money will be used to provide concessional loans to eligible firms which satisfy the IR&D Board's criteria (see Box 6.2).

Box 6.2: Concessional Loans for Commercialisation of Technological Innovation

Committees of the IR&D Board will only consider projects that meet **all** of the eligibility criteria listed from 1 to 7 below.

1. The project involves early commercialisation of technological innovations of goods, systems or services and is limited to the following activities, including related market research:
   - product/process design;
   - trial production runs including tooling up costs;
   - regulations and standards compliance;
   - protection of core intellectual property;
   - trial and demonstration activities; and
   - product documentation.
2. The applicant company/group employs less than 100 persons.
3. The project is directed to the commercialisation of internationally competitive goods, systems or services.
4. The results of the project will be exploited for the benefit of Australia.
5. Each loan will not exceed 50% of eligible project costs.
6. The project would not proceed satisfactorily without the loan support.
7. Applicants have been unable to obtain sufficient funding for the project from financial institutions.

Source: IR&D Board (1994b).

Loans will be for a maximum period of six years, with repayments starting 42 months after the loan is taken out. Interest will be calculated daily, and the current rate of interest has been set at 40 per cent of the Commonwealth Bank Loan Reference Rate.

As with the Competitive Grants Scheme, the IR&D Board (1994b) will 'restrict support to those projects with a good chance of commercial success' (p. 7).

The ATIA supported the introduction of the loans scheme, but suggested that the scheme be administered through the taxation system. It added that the tax credit and refund should provide the same level of assistance as the tax concession for R&D provided in 1985.

MN Information Technology Group also supported the introduction of the loan scheme, but was concerned that smaller firms may be discriminated against because of 'their size and track record'.

In its report on *Research and Development* (IC 1995), the Commission expressed reservations about subsidising the cost of commercialisation:

> Unlike R&D, the benefits from commercialisation activities are predominantly captured by the firm concerned. Spillovers are much less likely than at earlier stages of the innovation process, so that this rationale for government intervention does not apply. ...
>
> Government support for commercialisation might also be justified by deficiencies in the market for venture capital, if they systematically operated to deny finance to profitable opportunities. The Commission's earlier inquiry into the *Availability of Capital* [IC 1991a] heard a number of complaints from small innovative companies about the difficulty of getting finance. However it also heard from many in the finance sector that there was a shortage of good prospects, when risk and the abilities of the existing management were taken into account. The Commission found little evidence of impediments to the supply of venture capital that would warrant government subsidy. That view has been reinforced by the Commission's consultations and discussions in this inquiry. (p. 35)

The Commission recommended that the scheme be reviewed in four years.

6.6 Computer bounty

Expenditure on R&D, where it can be related to the production of bountiable computer equipment, is eligible for assistance under the computer bounty provided that the equipment to which the R&D relates is produced in Australia within the current bounty period (due to end on 31 December 1995).

Participants supported retention of the bounty as a means of assisting R&D. The major advantages to many firms, particularly SMEs, were said to be the ability to receive assistance for small amounts of R&D (to qualify for the

150 per cent tax concession, a firm must undertake $20 000 of R&D), and the speed with which assistance for R&D is provided. Firms can lodge a claim for bounty as soon as they have completed their R&D and the payment is usually made in a matter of weeks. There is also considerably less paperwork associated with preparing and lodging a claim for bounty than with preparing and lodging a claim for a competitive grant. Issues linking R&D and the computer bounty are discussed in Chapter 7.

7 TARIFF AND BOUNTY ARRANGEMENTS

A computer bounty, paid at 8 per cent of factory cost, is available to domestic producers of eligible hardware. The scheme commenced in 1984 and is scheduled to expire in December 1995. In 1993-94, total bounty payments were nearly $78 million.

This chapter examines the contribution of the bounty to industry development; administration issues; interaction of the bounty with tariffs; and arguments for and against retention of the bounty.

7.1 Key features of the computer bounty

The *Bounty (Computer) Act 1984* specifies which goods are eligible for bounty, defining them by the tariff items that would apply to like imports. Information on the bounty is provided in Appendix E. Bountiable goods include:

- certain assembled machines or units: microcomputers, minicomputers, mainframes and personal computers (PCs);
- certain assembled computer-based machines, parts and accessories: machines with electronic microcircuits enabling them to work with data;
- computer equipment, and computer equipment incorporated in machines to which a zero tariff applies;
- printed circuit boards (PCBs), microcircuits and modems and multiplexers;
- certain systems software for bountiable hardware; and
- computer-based equipment declared by the Minister to be bountiable.

The computer bounty is essentially paid to producers of microprocessor-based electronic equipment. Apart from 'computers', it is paid on certain production of: avionics equipment; electronic control systems; components for motor vehicles and consumer durables; scientific and medical equipment; electronic gaming machines; and defence equipment.

7.2 The bounty within the assistance framework

The computer bounty stems from an Industries Assistance Commission (IAC 1984a) report into computers which proposed a package of measures including minimum rates for most computer hardware; duty free treatment of software; and a reduction in duties on recording media and electronic

components. The IAC also recommended the introduction of a 25 per cent value added bounty on computer hardware and parts as a *quid pro quo* for the loss of tariff assistance.

The Government accepted the package and highlighted that 'the new assistance arrangements will result in access to these important productivity aids at close to world prices' (Brown 1984). The decision benefited all users of information technology (IT) while compensating IT hardware firms for tariff-inflated input prices in the light of the decision to remove duties on imported IT hardware products. Consequently, the assistance to such firms was preserved.

In announcing the bounty, the Minister said:

> Industry competitiveness generally should be enhanced through the availability at world prices of most products covered by the [IAC] report. At the same time local computer manufacturers should not be disadvantaged because of duties on many of their inputs. (Button 1984)

This 'compensation' rationale was reiterated by the Australian Information Industry Association (AIIA) which stated that 'the original basis for the bounty was to compensate local manufacturers for duties on their inputs and this remains the case while ever the duties persist' (Sub. 27, p. 27).

The Department of Industry, Science and Technology (DIST 1994b), also considers the bounty as a measure which ensures that these 'manufacturers do not suffer an unnecessary disadvantage compared to other industries, due to the tariff-free treatment of bountiable items' (p. 22).

However, over the last decade the force of the 'compensation' rationale has been eroded. Tariffs were significantly higher when the bounty was introduced — rates of 20 to 35 per cent applied to certain components. Today rates are around 8 per cent, falling to 5 per cent in July 1996. In 1984 the absence of a bounty would have meant significant differences in the assistance afforded IT hardware and other activities. With the intervening tariff reductions, any differences would be of little consequence today.

Indeed, few computer components are dutiable — sub-assemblies, disk drives and memory, microprocessors and the like enter duty free. In relation to telecommunications equipment, some of which is also eligible for bounty, nearly two-thirds of imports (Tariff heading 8517) entered duty free in 1993-94.

The bounty now covers some activities that were not subject to the 1984 decision. For example, PCBs were included in 1991 ostensibly to assist that activity. Some communications equipment such as modems and multiplexers have also been included and Ministerial determinations have resulted in a range of other goods being declared bountiable (Appendix E). Moreover, changes in industry policy have meant that many schemes that gave preferment to particular

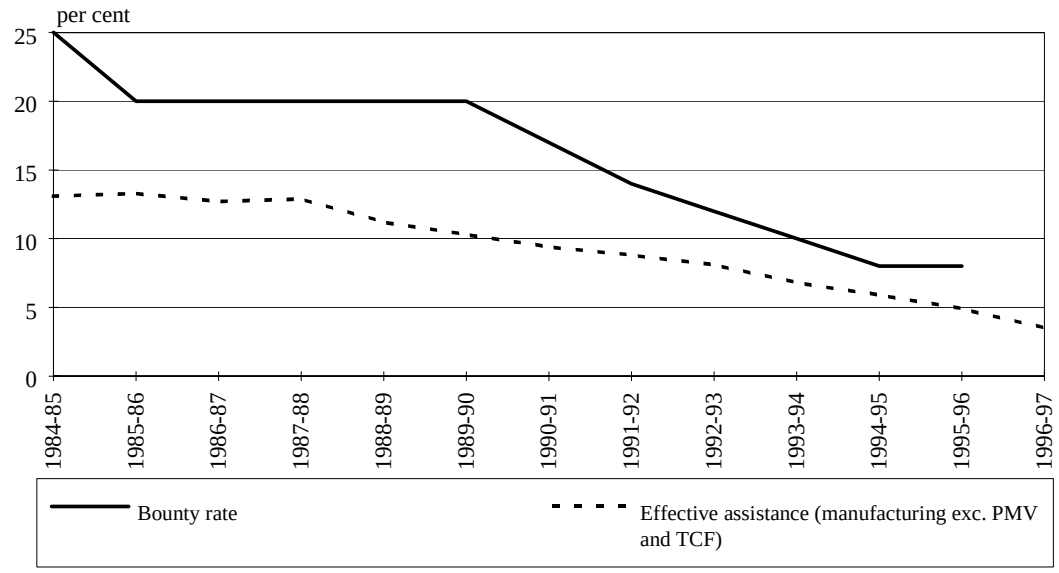
activities have given way to generally available assistance schemes (R&D incentives, export programs, assistance for business planning, programs to facilitate access to finance).

These changes have occurred against a backdrop in which the composition of the IT sector has changed significantly since 1984. There has been substantial growth in the non-hardware side of the IT industries, especially software and services activities, which lie outside of the bounty's coverage.

The force of the argument underpinning the compensation rationale for the computer bounty has been substantially eroded by general reductions in tariffs, changes in the focus of industry policy and by developments in the IT industries, which now bear little resemblance to the IT industries of 1984.

The relationship between the rate of bounty and *effective* assistance to manufacturing (which accounts for the protective effect of tariffs on final goods and their tax effect on inputs) is illustrated in Figure 7.1. The calculation of effective assistance excludes the passenger motor vehicles and textiles, clothing and footwear 'plan' activities to which special tariff arrangements apply.

Figure 7.1: **Bounty rate and effective assistance for manufacturing**



Sources: Commission estimates; *Bounty (Computer) Act 1984*.

At 8 per cent of value added, the bounty is broadly equivalent to the effective assistance that would be afforded non-plan manufacturing through a 5 per cent general tariff, assuming that bountiable activities suffer tariff penalties on their inputs. However, as noted above this is not necessarily the case. For some

bountiable activities the nominal rate on inputs could be close to zero, in which case the bounty could provide assistance above that afforded the average for non-plan manufacturing activities (Appendix E).

The bounty and tariff assistance afforded the information technology and telecommunications (IT&T) industries is outlined in Table 7.1. The spread of assistance reflects historical influences and the impact of changing technologies on dated definitions. The convergence of existing, and the emergence of new, technologies has created problems for the treatment of many goods falling within a dated tariff system. This was foreshadowed by the IAC (1984b) which predicted that it would become impracticable:

> ... to distinguish between telecommunications equipment and related goods for the purposes of levying different rates of tariff or paying different rates of bounty. (p. 67)

Production of computer hardware, components and sub-assemblies *readily identifiable* as parts for computers is assisted by the bounty and imports enter free of duty. Production of other inputs into computers, such as power supplies, cables and connectors is assisted by tariffs. Telecommunications equipment manufacture is assisted by an 8 per cent duty phasing down to 5 per cent from July 1996. Production of PCBs, an input into computers and communications equipment, is assisted by bounty. Systems software associated with bountiable items is eligible for bounty, while other systems and applications software is unassisted. The computer services sector receives no assistance.

Table 7.1: **Bounty and tariff assistance to the IT&T industries**

Manufacturing			*Software*			*Services*
Computers	*Telecommunications*	*Components*	*Eligible systems software*	*Other systems software*	*Applications software*	
Bounty	Tariff	Bounty/tariff	Bounty	Nil	Nil	Nil

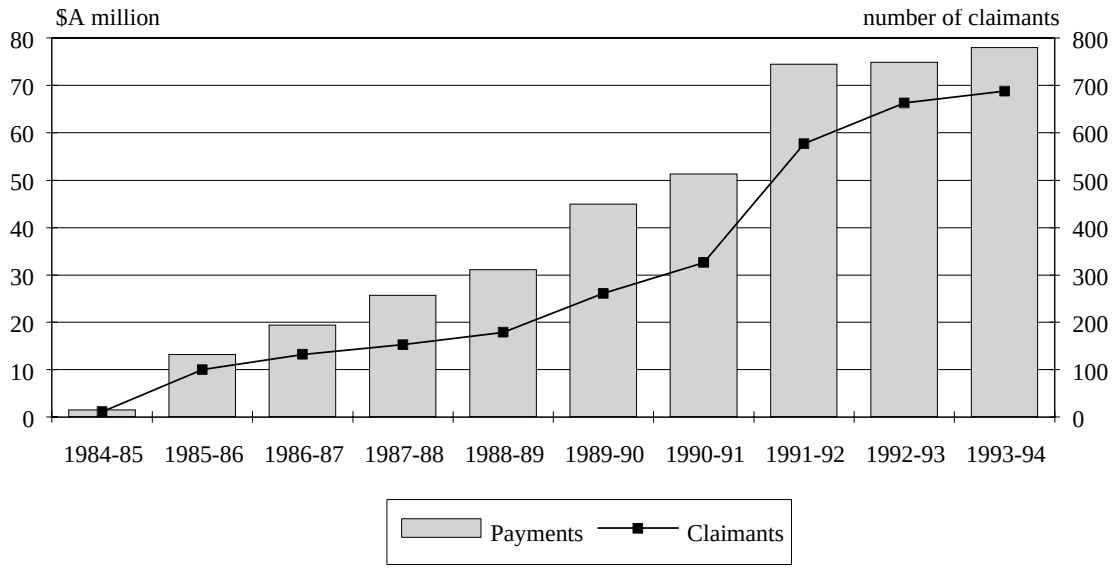
Related and converging technologies are afforded different forms and levels of assistance. Some software is bountiable, most is not, and the tariff treatment of components varies. There is also a bias against services and solutions and applications technologies.

The assistance regime may have been appropriate when telecommunication and computer-based activities were clearly separate, and software and computer services (IT solutions, systems integration) were in their infancy. Today, however, this situation seems anomalous.

7.3 Trends in bounty payments

Since the inception of the bounty, claimants and total payments have increased markedly, despite a reduction in the bounty's rate from 25 per cent of value added in 1984 to 8 per cent today. In 1993-94, there were 688 claimants, 2870 claims, and total payments of $78 million (Figure 7.2).

Figure 7.2: **Bounty claimants and payments, 1984-85 to 1993-94**



Sources: Customs, Bounty Acts — Returns for Parliament (various issues).

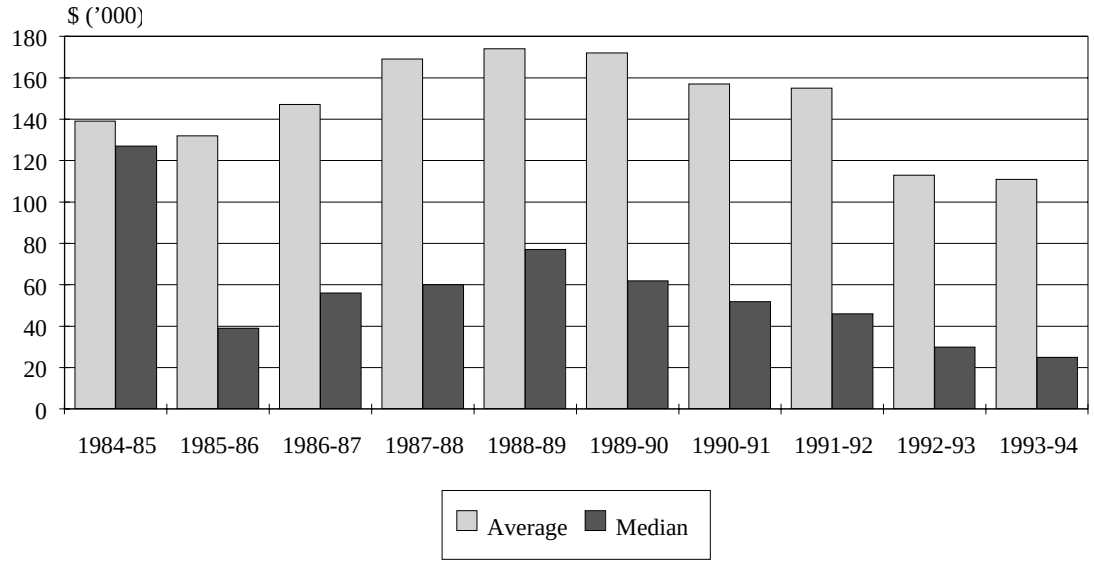
While total payments have progressively increased, average and median[1] payments peaked in the late 1980s (Figure 7.3). Customs suggested that the decline in median payments over the last three years (Appendix E) may reflect:

> ... the recent entry of claimants performing low value added assembly work such as upgrades of personal computers. In such cases where the manufacturing value added is small, the bounty payment is typically lower ... (Sub. 40, p. 15)

In 1993-94, the average payment was $111 000 and the median payment around $25 000. However, some firms receive payments in excess of $1 million (Table 7.2). Apart from computers (IBM Australia) and communications equipment (Ericsson Australia), the table includes defence products (AWA Defence Industries), electronic components for motor vehicles (Robert Bosch), medical equipment (Telectronics) and gaming machines (Ainsworth).

[1] The median value (y) is where half of all payments are greater than y and half are less.

Figure 7.3: **Average and median bounty payments, 1984-85 to 1993-94**



Sources: Commission estimates; BIE (1990); Customs (Sub. 40, Attachment J).

The firms listed in Table 7.2 received $27 million in 1991-92 (36 per cent of total payments); $20 million in 1992-93 (27 per cent); and $31 million in 1993-94 (40 per cent). In 1993-94, the remaining 676 claimants received $47 million — over half received less than $25 000 (Appendix E).

In 1985-86, the second year of the bounty, there were 100 claimants (up from 11 in the first year). Only 28 of these firms claimed bounty in 1993-94 — an attrition rate of over 70 per cent. Not all of this is attributable to firm failures, some may have changed name or been subsumed by other firms, and some firms may opt in and out of the bounty from time to time. However, once eligible for bounty, a firm will continue to claim as long as expected returns exceed compliance costs. Total bounty paid in 1993-94 to firms that had claimed in 1985-86 was around $17.4 million (22 per cent of total payments in 1993-94).

Of the 663 firms claiming bounty in 1992-93, 157 (about 24 per cent) failed to claim the following year. Of the claimants in 1993-94, 182 firms (27 per cent) had not made claims in 1992-93.

The bounty has brought financial benefits to firms, but the distribution of payments is uneven — a few firms receive large payments, most receive small payments. Only a small number of firms have been continuously supported.

Table 7.2: **Bounty payments over $1 million, 1991-92 to 1993-94[a]**

1991-92		*1992-93*		*1993-94*	
Claimant	*$m*	*Claimant*	*$m*	*Claimant*	*$m*
AWA Defence Industries	2.9	AWA Defence Industries	4.5	IBM Australia[b]	7.1
IBM Australia	2.8	Exicom Australia	2.4	Telectronics Pty Ltd[b]	6.7
British Aerospace Aust	2.5	Alcatel Australia	2.3	Honeywell Ltd	2.4
Alcatel Australia	2.5	AWA Microelectronics	1.9	DEC (Australia)	2.3
AWA Limited	2.2	Robert Bosch (Aust)	1.8	Exicom Australia	2.2
AWA Microelectronics	2.2	DEC (Australia)	1.5	AWA Defence Industries	2.2
Robert Bosch (Aust)	2.0	AWA Limited	1.4	Alcatel Australia	1.9
LM Ericsson Pty Ltd	1.8	Ericsson Australia	1.1	Bailey Controls Australia	1.4
Ericsson Australia	1.5	Scitec Communications	1.2	AWA Microelectronics	1.2
JTEC Pty Ltd	1.5	Leeds & Northrup Australia	1.1	Ainsworth Nominees	1.2
Scitec Communications	1.4	QPSX Communications Ltd	1.0	Ericsson Australia	1.1
NEC Australia Pty Ltd	1.3			QPSX Communications Ltd	1.0
Australian Computer Manufacturers	1.2				
GEC Plessey	1.1				

a Where a company has a number of registered premises, these have been amalgamated.

b Payments to IBM Australia and Telectronics in 1993-94 reflect backdated claims for R&D following resolution by Customs of some definitional issues.

Sources: Customs, Bounty Acts — Returns for Parliament (various issues).

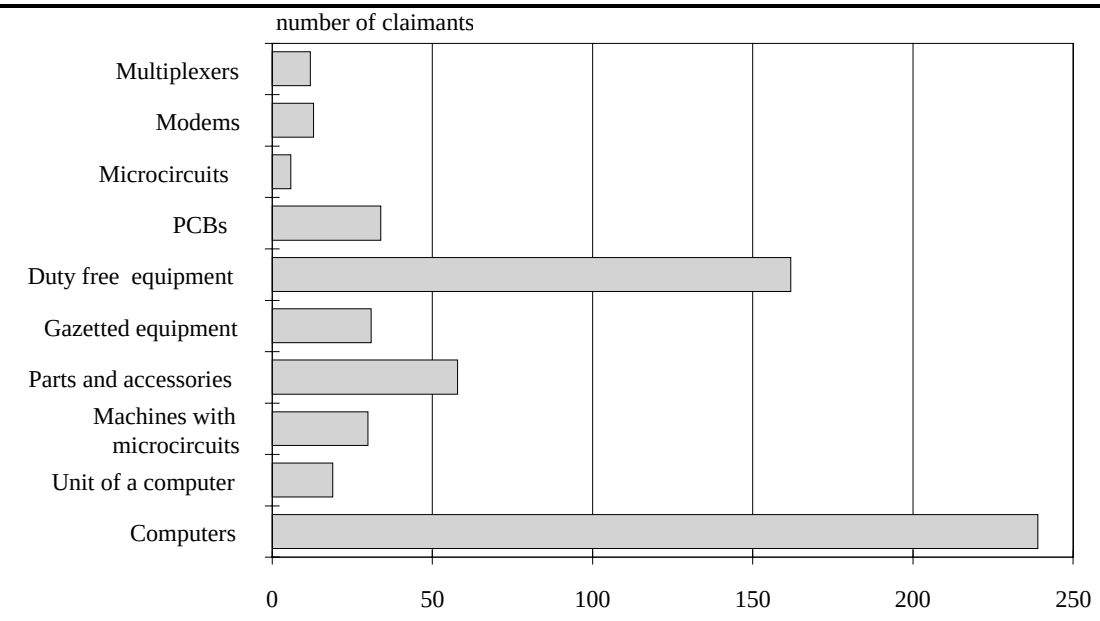
7.4 Bountiable activity

Many bounty recipients are only incidentally involved with ‘computers’. Figure 7.4 identifies categories of bountiable equipment by the major activity of claimants (firms can claim under several criteria). Customs provided data on the disbursement of bounty funds by headings specified in the Act. It analysed 604 claimants and found the major activity (239 claimants or 39 per cent) to be associated with automatic data processing machines. This activity covers ‘screwdriver’ plants through to sophisticated board loading and assembly.

About 6 per cent of claimants in 1992-93 were engaged in the production of PCBs, the bulk of which is used in telecommunications. Two per cent of claimants were involved in bountiable modem production, 2 per cent in multiplexer production and 1 per cent in microcircuits.

Bounty is also paid to firms involved in sub-contract manufacturing, such as Australian Electronic Manufacturing Services (AEMS) (Sub. 71), PC Assemblies (Sub. 83) and CNS Precision Assemblies (Sub. 67). They qualify

Figure 7.4: **Bountiable activity, 1992-93**



Source: Customs (Sub. 40, Attachment J).

for bounty on value added activities such as board loading and assembly of bountiable products, but sub-contract manufacturing (and PCB production) has a low R&D intensity and consequently rarely qualifies for the bounty's R&D provisions.

Another bountiable activity obscured by the aggregated data is production of microprocessors for use in other appliances and industries. Firms such as Newtronics (Sub. 59) and Robert Bosch Australia (Sub. 8) produce microprocessor controllers for applications such as consumer goods (washing machines and vacuum cleaners) and automotive applications.

Figure 7.4 reflects low domestic component manufacture. Omnitech Engineering (which sought duty free entry for all electronic components) said that Australia does not produce any basic electronic component (Sub. 9, p. 2). Hypertec noted that the PC market in Australia is around 1 million units per annum and that these PCs contain around 150 million semiconductors, yet 'no semiconductors are made in Australia' (Sub. 16, p. 4).

While there is little domestic production of readily identifiable computer parts such as semiconductors, integrated circuits and resistors, some firms produce cables, connectors and power units used in computer, electronics and telecommunications applications. The Australian Printed Circuit Manufacturers' Association (APCMA) indicated that:

> Companies such as, say, Utilux and AMP make a range of connectors ... the other highest value added components made in Australia are by AWA Microelectronics at Homebush and Philips at Hendon in South Australia. (Transcript, p. 246)

IBM Australia noted that 'IT components remain uncompetitive in both price and quality and, as a result, product manufacturers need to import the majority of IT components' (Sub. 17, p. 6).

Apart from systems software related to bountiable equipment, the bounty is paid solely on the production of hardware, which accounts for less than 20 per cent of revenues from total Australian IT production. Bounty is not paid on software development, systems design and integration, and IT services activities. These activities, which are identified as strengths for Australia, account for over 80 per cent of Australian IT production (Chapter 2).

7.5 Use of the bounty

All firms that received the bounty during 1992-93 were advised of the inquiry. Those that tendered submissions sought continuation of the bounty. Others put their views through various associations. The AIIA surveyed its members to identify key issues for the inquiry. Of the 23 firms nominating the bounty as a major concern, 88 per cent were concerned about its termination and 53 per cent with eligibility issues (Sub. 42).

The Australian Telecommunications Industry Association (ATIA), which also surveyed its members, supported the retention of the bounty beyond 1995. That survey identified principal uses of the bounty as: providing funds to undertake research and development (R&D); encouraging Australian manufacturing; and providing funds for investment.

Participants raised the importance of the bounty for cash flow, profitability and the provision of working capital. NetComm (Sub. 23) said that the bounty was equivalent to 31 per cent of its operating profit. Bounty Claim Consultants (Sub. 13) suggested that the bounty provides finance 'without the dangers of venture capitalism'. Bruce Patten & Associates (Sub. 45) stressed the usefulness of bounty funds for small and medium sized enterprises (SMEs). Other examples include:

> For a cash poor startup company, bounty has made a significant impact on MRad's ability to establish itself as an international competitor. (MRad, Sub. 14, p. 4)

> The computer bounty has enabled this company to fund the appointment of a general manager ... (Colour Vision Systems, Sub. 2, p. 5)

> The bounty has assisted us with our cashflow to enable us to be more effective with our stockholding requirements. (Lodin Computer Supplies, Sub. 10, p. 2)

> The computer bounty is a key element in our ability to remain competitive in such a cut-throat business. (Future Computers, Sub. 78, p. 1)
>
> [bounty] ... has enabled Staldone Computers to explore and sell to some new overseas markets in South East Asia, particularly in Fiji and Tonga. (Staldone Computers, Sub. 53, p. 1)
>
> Bounty has allowed the company to keep pace with overseas technologies by way of equipment update ... and allowing the company the additional funds to add a quality system into our procedures. (PC Assemblies, Sub. 83, p. 1)
>
> Newtronics has used ... bounty payments to purchase 'state of the art' development equipment, ... employ specialised electronic engineers, ... [and] assist the company to undertake collaborative development programs ... (Newtronics, Sub. 59, p. 8)
>
> [bounty] ... has been the sole reason why we are still in the manufacturing business today. (Applied Electro Systems, Sub. 90, p. 1)

The ATIA said the bounty has encouraged the development of the electronics industry through greater R&D, has been of particular use to SMEs and in several cases 'has been instrumental in maintaining company viability' (Sub. 32, p. 21). It submitted brief 'case studies' on Alcatel Australia, AEMS, JTEC and NetComm which show that these firms expended funds on capital investment and R&D.

Bruce Patten & Associates described how the bounty had benefited a medical equipment manufacturer with annual sales of $400 000:

> As a direct result of receiving only $25 000 bounty payment in 1992 the product quality and manufacturing methods were improved resulting in a sales increase to $1.2 million within a year. (Transcript, p. 782)

The examples indicate that firms use bounty monies effectively and that in the absence of the bounty they may invest less or undertake less R&D. Some participants went further and suggested that without bounty, these activities (and others such as exporting and employment) would cease.

The APCMA referred to the impact of the extension of the bounty to the PCB industry:

> ... in the two years prior to the introduction of the bounty total capital expenditure of the 'independent' printed circuit manufacturers averaged on an annual basis $1 million. The introduction of the bounty in July 1991 allowed the industry to lift its average investment by 150 per cent to nearly $2.5 million. (Sub. 19, p. 7)

The issue is whether the investment would have occurred in the absence of the bounty — given that capital investment in the industry occurs in '$500 000 and $1 million packages' (APCMA, Sub. 19, p. 7). To remain competitive the industry needs to keep up with advances in PCB manufacture. It is also relevant that the increased investment (reported by the APCMA) after the introduction of

the bounty coincided with the closure of two world-scale plants in Australia and the purchase of equipment from these plants by the remaining PCB manufacturers.

A survey of APCMA members' future capital expenditure requirements, forecast annual expenditure of over $5.5 million for the period 1994-95 to 1997-98, predicated on 15 per cent annual average increase in demand.

The APCMA claimed that:

> The general movement is away from in-house facilities because there is a recognition that it's a specific trade where a lot of expertise and ongoing investment is required to keep up with it. So all around the world we are seeing people ... closing plants down and relying on contract manufacture such as ourselves to give them the flexibility and the innovation and the technology that they need ... (Transcript, p. 251)

To the extent that the projected demand and industry composition are correct, this suggests a healthy outlook for the industry, rather than one requiring support to sustain investment. Moreover, the current $2.5 million per annum invested by the independent PCB houses (excluding Ericsson and firms not part of the APCMA) represents less than 3 per cent of the value of domestic PCB manufacturing output of $90 million for 1994-95. This issue is discussed further in Section 7.11.

The APCMA did not provide data linking investment and the computer bounty received by its members. Investment by one of its members (Morris Productions) has significantly exceeded bounty receipts in all years, yet following the draft report, the company said its forecast investment (30 per cent of the industry total) will not proceed without bounty support (Sub. 88).

AEMS (Sub. 71) said that sub-contract manufacturing is growing and that it has invested heavily in capital equipment. Bounty payments contribute about 40 per cent of that expenditure.

Telspec (Sub. 15) attributed its purchases of capital equipment and changes in its operation (from a single to a two-shift per day operation) to the bounty. The bounty and the R&D tax concession were linked to the company's increased R&D and an 'untimed increase in employment'. Telspec claimed:

> The total employment of the company has increased by over 750 per cent since 1987. The projections for 1995 are that the number of staff employed by Telspec will exceed 180 from a base in 1987 of just 15. There has been an increase of over 140 per cent since 1991 when Telspec began receiving computer bounty payments. The significance of the bounty to Telspec is amply demonstrated by the above. (Sub. 15, p. 8)

The 140 per cent growth in employment since Telspec began receiving bounty relates to the four years 1991 to 1994. In the four years prior to receipt of the bounty (1987 to 1990), the increase in employment exceeded 200 per cent. The

company plans to increase employment in 1995 by 50 even though the bounty is scheduled to terminate. Its employment has increased steadily since 1987, suggesting that Telspec is successful in its own right. Clearly, the bounty has been beneficial, but other factors have had an overriding effect.

In responding to the draft report, Telspec said that the bounty, the R&D tax concession and other government programs have all benefited the company, but that it 'is in no position to assert that any one policy — or any other exogenous factors — have had an "over-riding effect"' (Sub. 85, p. 8). That Telspec showed growth prior to and since the receipt of the bounty shows that its success cannot be solely attributed to the bounty. As Box 7.1 indicates, firms can access several schemes simultaneously and this is one reason why it is difficult to isolate the effect of any one measure.

Box 7.1: **A menu of assistance schemes**

The Commonwealth Government has many schemes to encourage firms to research, develop, commercialise and export IT products (Appendix D). Many participants in this inquiry receive funds from both the computer bounty and the 150 per cent tax concession, and it is possible for firms to access additional schemes from a broad menu that includes: National Industry Extension Service (NIES), Partnerships for Development, Export Market Development Grants (EMDG), International Trade Enhancement Scheme, Competitive Grants for Research and Development, Concessional Loans for Commercialisation of Technological Innovation, Access to Export Finance, Export Access Program and the Export Market Planning program. Most State governments also offer grants and loans to firms, particularly in the IT sector.

Many participants in this inquiry have used several schemes. For example, Intellect Australia said that it had obtained funding through a State-based NIES program, the Grants for Industry Research and Development program, the computer bounty, the tax concession and the EMDG scheme. This highlights the difficulties of disentangling and isolating the impact of the computer bounty from other forms of assistance.

While many small firms and tax loss companies see the bounty as the prime form of R&D assistance, large firms tend to see the tax concession as more important (Chapter 6).

The bounty is just one of a series of measures supporting firms. This inquiry has highlighted the difficulties in assessing any one measure when claimed outcomes are also affected by other assistance measures.

7.5.1 Research and development

Part of the bounty is specifically aimed at R&D and is payable in respect of 'systematic, investigative or experimental activity' (refer Section 3A of the Act in Appendix E). The object of the R&D must be to manufacture (within the bounty period), bountiable equipment containing new or improved materials, or incorporating new or improved processes, or applying new or improved systems

design or systems engineering. Banksia Technology (Sub. 61) said that the bounty underwrites about 20 per cent of its R&D.

Many firms in an early growth phase lack the profits to exploit the tax concession and therefore see the bounty as providing their only R&D support. The bounty is also paid with minimum delay, whereas the tax concession is not enjoyed until tax becomes due. Furthermore, the tax concession has a threshold expenditure on R&D of $20 000 within the claim period.

Table 7.3 shows that over 65 per cent of recipients claim some R&D and, for 30 per cent of claimants, R&D comprises more than half of their claim. Australia-wide, about $30 million or nearly 40 per cent of bounty paid in 1992-93 was for R&D (IC 1994b). These data are consistent with participants' views that R&D is critical in the IT industries.

Table 7.3: **Bountiable research and development, 1992-93[a]**

	No.	*Per cent*	*$*
Claimants where data available	198	100.0	
Claimants claiming bounty in respect of R&D	130	65.7	
Bounty payment on R&D as a proportion of total bounty payment		42.0	
Claimants where bounty paid in respect of R&D was greater than 50 per cent of total bounty payment	60	30.3	
Average bounty payment on R&D from 1992-93 Return of Factory Cost			77 558
Average bounty payment from 1992-93 Return of Factory Cost			184 963

a Sample includes claimants from NSW and the ACT comprising nearly 60 per cent of total payments. Where a company has a number of registered premises, these have been amalgamated.

Source: Customs (Sub. 40, Attachment J).

As bounty payments are deemed to be taxable income, firms that pay tax lose 36 per cent. Firms not earning taxable profits retain the full amount of bounty but cannot access the tax concession.[2]

Some companies obtain assistance through both mechanisms. Bruce Patten & Associates said:

> At present the bounty can be paid to large (profitable) companies which can also seek benefit not only from the 150% R&D tax concession, but also from other avenues, including related incentive grants. (Sub. 45, p. 4)

[2] To be eligible for the tax concession a firm must be incorporated in Australia, a public trading trust or a member of a partnership of eligible companies. These matters are discussed in Chapter 6.

For profit making firms, the tax concession provides an after tax return of 18 per cent for each dollar spent on R&D (a company paying 36 per cent tax receives an extra deduction of 50 per cent on R&D). In addition the bounty provides an after tax return of 5.12 per cent. Thus, firms that qualify for both the bounty and the tax concession receive an after tax return of about 23 per cent on each dollar invested in R&D. Firms not earning taxable profits retain the full 8 per cent benefit from the bounty.

As the computer bounty is payable in respect of R&D expenditures, some bounty recipients can receive a higher level of support for R&D than other firms in the IT industries or within the economy generally.

7.5.2 Industry development

Many participants see the bounty as an industry development measure and not 'compensation'. Wormald Technology said that it:

> ... is firmly of the view that the Bounty has a significant industry development role, which is far more relevant in a practical sense to industry than any tariff substitute role.
>
> Bounty as an important industry policy tool ... should be brought up to date. (Sub. 100, p. 5)

An industry development approach is evident in the views of participants who sought to reshape the bounty to meet certain aims. Some sought to quarantine bounty payments to indigenous companies (Bruce Patten & Associates, Sub. 68; Radbe Consulting, Sub. 76; and Layson, Sub. 60). Hypertec (Sub. 16) questioned the payment of bounty to multinational corporations. There was a view that paying bounty to multinationals runs counter to the Partnerships for Development program which seeks to exert leverage on multinationals.

NetComm (Sub. 23) argued for a cap on payments of $1 million per annum per claimant. The Canberra Region Advanced Technology Manufacturing Association (Sub. 30) likewise favoured a cap on payments. Others proposed a floor on claims. Bruce Patten & Associates suggested:

> ... a reasonable limit should be put on the minimum value of a claim lodged. The absence of a level at present is considered to be unrealistic and conducive to inevitable increases in the volume of claims processed. (Sub. 45, p. 11)

It added that there is a 'need to shift the focus of the bounty more towards manufacturers rather than PC assemblers' (Sub. 45, p. 4). Abberfield Technology (Sub. 69) considered that the scheme should devote more funds to R&D and less to circuit board production and loading.

Systems integrators and software firms regarded the selective support afforded hardware as discriminatory, and the South Australian Government questioned

'the rationale for continued protection of domestic production of computer hardware and systems software' (Sub. 26, p. 5).

Customs' view is that payments have increasingly gone to the wrong activities:

> It is difficult, given the elaborate provisions which cover all stages of the assembly of computer equipment, to exclude any value added incorporated in computer equipment. This has led to bounty payments to persons engaged in assembly operations or so called 'screw driver' operations such as the upgrading of personal computers or the remanufacturing of printer toner cartridges. There has been an increasing trend for such claimants. Customs questions whether in terms of industry policy it was intended that the provisions of the Act would cover these activities.
>
> Customs considers that the eligibility criteria should be reviewed to ensure that bounty is targeted to meet industry policy objectives. (Sub. 40, p. 13)

Wormald Technology also considered that the bounty is not assisting the 'right' activities and requested that a broad range of communications equipment be declared bountiable and support refocussed toward software and applications:

> If the computer bounty was created to support the Australian computer industry, and not just the manufacturers of basic computational devices, then that is what it should be managed for, not to simply provide funds to those who succeed in fitting their products into somewhat dated product/hardware classifications. (Sub. 22, p. 26)

It further questioned the desirability of confining support to hardware:

> ... the development of a computer industry in Australia is not going to be on the back of hardware and operating system developments, but ... on the development of 'hybrid' computing environments and applications software. ...
>
> The Australian computer industry is developing the most important constituent of any computer or computer system, the core software and the ability to successfully integrate that software with the proprietary operating system. This is the area of potential growth and greatest value added in the Australian computer industry, and one which offers very large potential markets, both locally as well as internationally. (Sub. 22, pp. 25-27)

Radbe Consulting requested that bounty encompass the total product of design and manufacturing companies, including related software (Transcript, p. 844).

Some participants sought to broaden domestic activity in world-scale electronic commodity manufacture. Hypertec argued that the government should foster the development of semiconductor technology. It said that 'a serious investment in the semiconductor industry probably requires someone ... to commit $2 billion', but that this will not arise unless governments facilitate the process (Transcript, p. 310). The Commission draws attention to a previous attempt to facilitate component production (Box 7.2).

The APCMA said a high value added electronics industry requires an integrated structure incorporating design, PCB and component manufacture, and sub-

Box 7.2: **PCB manufacture and the bounty**

In submissions, discussions and during the public hearings, participants with an interest in the PCB industry (APCMA, Precision Circuits, Morris Productions and Email Printed Circuits) stressed that Australia's competitive advantage is in low volume, high quality boards (typically runs of 50 to 200) and in innovative design — 'jobbing shops' manufacturing to clients' individual requirements. Precision Circuits (Sub. 12) noted that its facility is geared to fast turnaround 'get you out of trouble' batches and standard batches of multi-layer boards for locally based multinationals. International 'world-scale' plants (runs of up to 10 000 boards) were said to be less competitive at these low volumes because it involves stop-start assembly line reconfiguration.

The APCMA said that the closure of two large-scale plants in the early 1990s arose from their inability to compete, owing to high overheads stemming from low throughput on capital intensive equipment. According to the APCMA:

> Investment in the two plants was in part encouraged by the publication by the Department of Industry, Technology and Regional Development of the 'Grey Book' estimating future demand for PCBs. The book was based on projections by potential major users, primarily the computer industry, which unfortunately were in practice never achieved. The consequent over capacity in the industry caused considerable disruption to the industry and an erosion of profit margins as the recession commenced. It was not until the computer bounty was extended to the industry that significant re-investment occurred and confidence returned to the industry. (Sub. 19, p. 3)

The Commission understands that many major users of PCBs who had indicated they would change to local sources failed to do so when domestic productive capacity became available.

assembly through to final production — 'lose one link and the whole structure is threatened' (Sub. 102, p. 1). It added that should the bounty lapse, an *Australian Electronics Interconnection Circuit Technology Investment Program* should be created 'in recognition of the key enabling technology role of the PCB industry' (Sub. 102, p. 3). Presumably, the program would also assist in the establishment of a domestic component industry, though the lack of local activity has not as yet threatened the viability of Australia's IT industries.

Rather than establishing a case for selective assistance to IT activities in general, most proposals were driven by the interests of particular groups — those who would benefit from changes in bounty arrangements aimed at excluding small or large claims; excluding payments to non-indigenous companies; excluding low value added assembly; including software and intellectual property; or restricting payments to computing and telecommunications applications.

The Government's *Working Nation* statement in May 1994 pointed out that the benefits of tariff reform 'are beginning to flow as industries have met the challenge of international competition and greatly improved their productivity' (Keating 1994, p. 44). The statement further noted:

> The present objective of industry policy, adapted to the new environment facing firms, is to accelerate the internationalisation of the Australian economy by focusing on the

> factors critical to success in the global marketplace. This encompasses innovation, uptake of new technology, business improvement, and exporting. It means ensuring that there are no unreasonable impediments preventing firms from obtaining finance or access to government contracts. *The emphasis is not on industries, but on competitive enterprises in any sector of the economy. In short, Government programs are designed to help build competitive firms.* (p. 57, emphasis added)

The types of measures that address innovation, business improvement and exporting are outlined in Box 7.1. They include R&D incentives, the National Industry Extension Services (NIES) program and the several export assistance programs. Box 7.3 lists further *Working Nation* initiatives designed specifically to assist SMEs, particularly in relation to access to finance.

Box 7.3: **Working Nation initiatives to assist SMEs**

- a joint Australian Industrial Property Organisation/NIES information program on intellectual property to assist SMEs make better use of the patent and design system:
- improved SME access to CSIRO technology and expertise ($10 million over three years);
- research into SMEs to enhance knowledge of firm performance, ownership and growth so that programs can be tailored to SMEs;
- improved SME access to finance by: assisting banks to understand SMEs and to standardise their loan application and approval processes; improving training for accountants, business advisers and bankers to enhance their knowledge of the special needs of SMEs and facilitate dialogue between banks and small business; and direct assistance to SMEs to obtain export advice on and preparation of applications for export finance facilities;
- a support scheme to encourage small high technology firms to commercialise innovations ($48 million over 4 years):
- a wider diffusion of best-practice management skills by implementing a $102 million major outreach program through the AusIndustry network to target potential SME exporters;
- a pilot non-executive directors scheme to provide strategic advice to fast growing small firms;
- a major advertising campaign to promote the role of the Commonwealth Development Bank in lending to small business;
- pooled development funds to be more attractive to institutional investors to enhance their effectiveness as a vehicle for providing venture and development capital to SMEs;
- support for the Business Equity Information Service to match potential investors with small firms requiring equity finance;
- address SME's lack of capacity to fulfil export contracts due to capital shortfalls by commissioning DIST [Department of Industry, Science and Technology] and DEET [Department of Employment, Education and Training] to encourage small business employment and training;
- enhance opportunities for Commonwealth purchases from SMEs by a range of initiatives including improving the operation of the common use contract system and the availability of better information and practical assistance — through supplier development programs;
- provide additional funding of $6 million to NIES to expand delivery of enterprise development services to SMEs. Outlays for this initiative are expected to increase to $26 million in 1995-96.

Source: Keating (1994).

In response to the draft report, Newtronics (Sub. 59) and Telspec (Sub 85) disagreed with the Commission's interpretation of the shift in industry policy. Newtronics said:

> There is no basis to the argument put by the Commission ... that this company is not operating in a manufacturing area which is sought or preferred by the Federal government. Newtronics is encouraging: the development and utilisation of expertise in many areas of software and hardware applications; the increasing incorporation of micro electronic components in a variety of manufactured goods; the growth in exports of high value added Australian manufactured goods. (Sub. 59, p. 5)

While recognising that many IT firms are R&D intensive, develop new applications and products, and earn export revenue, these considerations are not unique to bounty recipients or the IT&T industries. For instance, a firm in any other industry may capitalise on research, develop innovative products and applications and earn significant revenue through value added exports and technology transfer. Such a firm would not receive bounty assistance.

Most participants' suggestions for modifications to the computer bounty would make it more selective than the present scheme. Measures that give preferment to selected activities are difficult to justify and are unlikely to provide net community benefits. Indeed, the government has signalled its intention to place emphasis on generally available forms of assistance (eg R&D and export programs).

7.6 Bounty administration

Bountiable factory costs include: R&D; system design; factory overheads; testing and packing; interest on materials, work in progress, R&D (not application software), factory, plant and equipment; and depreciation. Factory cost excludes activity such as parts and materials bought in; service charges; sales tax on completed products; application software; and profit (Appendix E).

Owing to the subjective nature of factory costs, many claims require adjustment. According to Customs, in 1992-93 around 13 per cent of all bounty claims were too low and almost 42 per cent were too high — over half of all *Return of Factory Costs* forms required adjustment. Wormald Technology (Sub. 100) considered it misleading to suggest that the bounty is complex. Its own experience has been that changes made through Customs' audit process are mostly of a minor nature.

Customs noted that:

> The value added nature of the bounty also allows for apparently less efficient companies to claim at a higher cost per unit. There is some evidence of varying hourly rates between claimants for similar work. The nature of the bounty does not encourage

> those companies to reduce factory expenses. Customs considers that future legislation should provide for efficiency standards with the possibility of fixing acceptable ranges of value added for particular types of manufacturing operations. (Sub. 40, p. 13)

With a bounty paid on factory cost, less efficient firms are compensated, in part, for higher factory costs. Some participants sought to legislate standard times for assembly work or require firms to keep stringent time records (see for example, Bruce Patten & Associates, Transcript, p. 788). Radbe Consulting (Sub. 76) sought tougher substantiation requirements (hours or components per unit of board loaded) and tighter criteria for value added.

For an industry subject to rapid technological change in processes and products, rules based on standard times (and their derivation) and volumes would bring their own distortions — for example, 'hours per square metre of board loaded' would provide different incentives to 'components loaded per hour'. The former rule would take no account of the density of components on the board and neither rule would accommodate various levels of complexity of the board loading operations. Other suggested 'improvements' to the scheme likewise carry the risks of unintended side effects. For example, a cap on bounty payments would provide an incentive for firms to split their operations.

Operating software

With convergence of technologies and technological advancements in IT products and services, attempts to define what constitutes hardware, software, software embodied in hardware and systems and applications software is an ongoing problem.

For bounty purposes, factory cost excludes development and production costs of software except operating software and software for testing hardware in Australia. The Act specifies that operating software has the same meaning as operating system software in Australian Standard (AS) 1189 of the Standards Association of Australia (Appendix E) which is defined as:

> *Software* that controls the *execution* of *programs* and that may provide services such as *resource allocation*, *scheduling*, *input/output* control, and *data* management.
>
> NOTE: Although operating systems are predominantly software, partial or complete *hardware* implementations are possible.

The italicised terms are defined in other entries or parts of AS 1189 and regard must be had to these secondary definitions.

Several participants raised difficulties with this definition. Central to the debate is whether certain software is operating system software or software performing other functions. This distinction has little relevance outside of the assistance framework. Customs notes:

> There has been wide agreement that AS 1189 is an unworkable definition and inappropriate given contemporary developments in the area of operating software. (Sub. 40, p. 14)

Customs is formulating new guidelines to clarify AS 1189 through consultations with peak industry groups such as the AIIA, the Australian Electrical and Electronic Manufacturers' Association (AEEMA) and the Metal Trades Industry Association. The AIIA expressed satisfaction with recent interpretation of operating software. Wormald Technology sought the inclusion of all software developed by companies involved in hardware manufacture and assembly but excluding 'commercial off-the-shelf' products. Other participants referred to past problems but said that the situation is currently workable.

While progress has been made, Customs said that a new definition of operating software is required to reflect current industry understanding of the term and to keep pace with changing technology.

Customs also raised a need for more stringent substantiation requirements for operating software claims. It said Customs officers have difficulty assessing the reliability of the information received and recommended that there be a legislative requirement for information of a technical nature to be certified by qualified technical personnel.

Interpretation of the rules and definitions governing the bounty have been amended and refined over many years, but problems remain and emerge. The system is complicated and the criteria for defining factory costs and systems software for example are deficient. Definitional disputes and associated administration problems will be compounded as computing, telecommunications and broadcasting technologies develop and converge.

7.6.1 Administration and compliance costs of the bounty

The budgetary cost of the bounty has increased in each year despite a significant reduction in the rate of bounty paid as a proportion of factory costs. The bounty is currently running at around $80 million per annum.

According to Customs, the administration costs of the computer bounty are probably in the region of 1.5 per cent of total bounty payments (about $1.2 million per annum), although this has not been formally quantified. To this must be added the costs to the government of raising the revenue to pay for the bounty.

Private sector compliance costs appear high. Many participants spoke of the considerable diversion of managerial resources devoted to meeting claim criteria. A significant consultant industry has grown to assist bounty claimants.

In addition, the bounty has encouraged rent-seeking behaviour — for example, it provides an incentive for firms to focus on the allocation of the costs of activities such as R&D and software development between bountiable and non-bountiable activities. It has diverted resources (including those of consultants) to the finding of loopholes, port-shopping or the challenging of definitions. These costs are over and above the budgetary, administration, participation and compliance costs of the bounty.

7.7 The computer bounty and the GATT

IBM Australia (Sub. 17, p.7 and Transcript, p. 482) raised the possibility that the bounty may need to be reviewed in the light of developments in the General Agreement on Tariffs and Trade (GATT) and the World Trade Organisation (WTO) — the latter came into effect on 1 January 1995.

Relevant aspects of the Agreement on Subsidies and Countervailing Measures are:

- subsidy schemes contingent upon export performance or on the use of domestic over imported goods are prohibited;
- other non-specific subsidies to industry are not prohibited but may be actionable. Where other countries claim that a subsidy seriously prejudices their industry and that claim is upheld, the subsidising country is obliged to terminate or change the subsidy arrangements; and
- assistance to R&D is permitted and is non-actionable provided that it meets certain conditions.

Robert Bosch (Australia) submitted, in relation to the bounty, that:

> The main benefit to the company remains the scheme's contribution towards lowering product costs. This enables the company to lower the selling price of products on both the domestic and export markets. (Sub. 8, p. 3)

In 1993-94, 45 per cent of total computer bounty payments (around $36 million) was paid on production which was subsequently exported (Appendix D).

It appears that the R&D element of the bounty conforms to the requirements of non-actionable R&D assistance. About 40 per cent of total bounty is paid on R&D, but it also covers items such as factory overheads, interest costs and depreciation. Whether this non-R&D element of the computer bounty might be actionable has not been tested. In any event, it may be difficult to establish that the bounty is responsible for the 'serious prejudice' which is deemed to exist if the subsidy exceeds 5 per cent of the value of the product. Even if this were established, serious prejudice does not arise if the subsidising country can show

that the subsidy does not displace imports or other exports in third markets or seriously undercut or suppress prices.

The ATIA said it had obtained advice that the bounty was GATT/WTO compliant (Transcript. p. 642). Wormald Technology said that 'against the current international trade environment and practices of other countries such unilateral concerns seem irrelevant' (Sub. 100, p. 3).

7.8 The bounty-tariff nexus and its consequences

7.8.1 The impact of convergence of technologies on definitions

Converging technologies have created definitional problems with various groups calling for certain goods to be classified as either computing (bountiable) or telecommunications (dutiable) equipment. For example, CSSC Australia (Sub. 51) attaches connectors to coaxial cables that were originally eligible for the computer bounty. An Administrative Appeals Tribunal case resulted in the mainframe cable being reclassified and ineligible for bounty.

The ATIA commented on confusion over the classification of electronic equipment, 'mainly arising from rapid changes in technology and the increasing perception of convergence between the communications and data processing technologies' (Sub. 32, p. 13).

The AIIA said that the movement of data is handled by computer networking equipment such as routers, bridges, hubs and data switches and that these products are used to link metropolitan and wide area networks. According to the Association these products are only used in conjunction with computers and computer networks. It reports that a 1991 decision by Customs to reclassify some networking equipment from tariff classification 84.71/73 to 85.17, imposed a duty on those goods (Sub. 27, p. 29).

This is the intent of the ATIA's proposal that:

> any equipment having a principal or secondary function of facilitating data (and/or voice, and/or video) transfer over private or public switched telecommunications networks is telegraphic apparatus classifiable to tariff 8517.4. (Sub. 32, p. 14)

Under this approach much computer networking equipment would be reclassified as telecommunications equipment. DIST submitted that:

> ... the ATIA's proposed definition would affect the duty rate applying to other equipment and the bounty eligibility of this equipment. (Sub. 97, p. 2)

Customs is currently considering whether computer networking equipment such as bridges, routers, hubs and other networking devices should be reclassified as communications equipment (unless imported within a whole computer system).

Customs considers that these devices are incapable of manipulating data in the manner of automatic data processing equipment, are not freely programmable and perform specific communication functions. The AIIA contends that computer networking equipment (eg routers, hubs and bridges, as well as adaptors, link adaptors, network cards and processors) are designed specifically and exclusively for data communications and are an integral part of a distributed automatic data processing system.

The essence of the problem is that Customs is trying to administer archaic tariff definitions in the face of technology convergence and the emergence of new products. This problem is aggravated because assistance differs between telecommunications and computer equipment.

The AIIA favours the removal of all tariffs on IT&T products and components (Sub. 27, p. 30), noting that anomalies and classification problems between computer equipment and telecommunications 'can only be permanently resolved by removal of tariff' (Sub. 27, p. v). That said, the AIIA requested:

> ... continuation of the computer bounty ... until such time as tariffs on computer components are reduced to zero. (Sub. 27, p. 28)

A Consultative Committee, established in 1991, drawn from Customs and the computer and communications industries to advise on the demarcation between the two industries, was abandoned when it became obvious that no agreement was possible. Customs is now faced with an ever increasing array of equipment that could be classified as either communications (dutiable) or computing (bountiable) equipment:

> Effectively the two technologies are becoming increasingly merged and the administration would be simplified if the two forms of technology could be assisted the same way, either by bounty or the tariff. (Sub. 40, pp. 11-12)

Administrative Appeals Tribunal cases have further complicated definitional issues. Customs reported cases in which a switch and a cable were classified as 'computer accessories' rather than 'switches' and 'cables with connectors'. However, Australia is a signatory to the Harmonised Tariff, and the Customs Cooperation Council (CCC) ruled that such goods are not recognised internationally as 'computer accessories'. Customs acted on this advice and added Legal Notes to the Australian tariff. Customs said that the case, the referral to the CCC and subsequent amendment requiring Parliamentary passage, was time consuming and increased uncertainty about network equipment.

A further issue emerges where bountiable goods are used as components of final goods which are protected by tariffs. Some telecommunications firms such as Ericsson Australia undertake bountiable production for inputs (PCBs) into tariff-assisted finished goods. Whether the inputs are sourced in-house or from another bounty recipient is largely irrelevant but, clearly, a firm receiving bounty on inputs and tariff on outputs could have high effective assistance.

Wormald Technology said that reliance on a dated tariff framework has reached the point where some decisions are inconsistent with the intent of the bounty:

> The policy's objective was identified as being to provide financial aid to the computer industry, however in some instances, this objective was lost in an environment of technical analysis as to whether the item under consideration fitted the criteria of one tariff or another, not really whether it was in fact a computer. (Sub. 22, p. 22)

Definitional issues have caused and will continue to cause problems as long as closely related activities face different assistance. If computers and telecommunications equipment were treated similarly, it would be irrelevant that, for instance, there is no international agreement on classification of local area network products.

Given the convergence of technologies and the development of new computer and telecommunications equipment, demarcation problems will not be resolved through administrative changes to classifications and definitions. The classification disputes are a direct result of the assistance environment.

7.8.2 Treatment of components and finished goods

IBM Australia considered that the current situation, where completed products can be imported duty free but some components are subject to duty, makes domestic manufacture and assembly less attractive than importing the finished good (Transcript, p. 481). IBM requested the elimination of tariffs on components, subject to maintenance of the computer bounty until this occurred.

As an alternative strategy for duty relief on its inputs, IBM had previously sought and received an Item 43 Policy By-law for the entry of electronic components. Item 43 covers goods imported in split consignments and is designed to remove an anomaly whereby complete goods imported in split consignments are duty-rated at the rate applicable to the various components. Item 43 allows the imported goods to be dutiable at the rate applicable to a complete functional unit.

At the time, AEEMA wrote to the Minister on behalf of domestic component manufacturers, expressing concern about 'the lack of transparency in

administration and apparent ad hoc decision making on granting By-law applications' (Sub. 33, p. 3).

Nevertheless, the government provided for IBM to receive, through the By-law, a retrospective refund of duties paid on components during 1987 to 1993 (IBM Australia, Sub. 17). It has been reported that IBM expected savings of between $0.5 million to $1 million per annum.[3] CSSC Australia (Sub. 51) said that the refunds to IBM were 'some millions of dollars'. IBM argued that there is no logical reason why the Ministerial determination should have expired in 1993 as the situation had not changed. However, it noted that:

> ... the current minister believes that it was an inappropriate determination and for that reason they would not renew it beyond 31 December 93. (Transcript, p. 479)

This view is supported by the Minister's response to the initial concerns raised by AEEMA. The Minister stated that:

> You will be aware that IBM claimed to have acted in good faith and to have made significant investments at Wangaratta on the basis of the original decision to approve an Item 43 Determination. The approval honours a commitment made by the Government in its original decision to allow IBM relief from customs duty on imported computer parts. (Sub. 33, p. 1)

AEEMA had based its objection on a similar argument — that the local component industry had committed to significant investment on the basis of a stable and predictable program of tariff reductions.

Customs also identified as a problem the duty free status of computers, components and sub-assemblies whereas duty is payable on parts. It added that 'this has the potential to encourage assembly operations and discourage more complex manufacturing' (Sub. 40, p. 4).

The assistance environment contributes to pressures for ad hoc adjustments to alleviate the cost of dutiable inputs.

7.8.3 Incentives to avoid duty

This inquiry has reinforced concerns first raised by the IAC (1984b) that a differential assistance regime can create incentives to try to 'beat the system':

> ... different assistance on functionally and visually similar items would create incentives to present goods in a way which minimises the payment of duties. (p. 67)

The Commission was provided with anecdotal evidence that Customs' interpretation of what constitutes computer or telecommunications products has varied according to the port of entry ('port shopping'). The variations reflect

[3] 'IBM wins tariff cuts on imports', *Australian Financial Review*, 11 April 1994, p. 39.

the difficulties in assigning visually and functionally similar products to different tariff items, and the influence of tariff consultants seeking favourable interpretations for their clients. The Commission understands that there is now a more uniform approach to questions of classification.

The distortions that can follow classification problems were illustrated by the APCMA. It stated that prior to the extension of the computer bounty to PCBs, the protective effect of the tariff was being eroded by imports of PCBs with a single component attached. The presence of the component changed the classification from a PCB to a computer sub-assembly, and hence the duty status to free. The component could then be removed before use (Transcript, p. 257). The 1991 decision to give duty free status to PCBs and to make domestic manufacture eligible for the bounty greatly benefited the telecommunications industry which is the major domestic user of PCBs (the APCMA is a division within the ATIA).

Under the tariff rates prevailing at that time, such rent-seeking behaviour is understandable. Even with lower tariffs, the potential for this type of behaviour remains. For example, CSSC Australia (Sub. 51) pointed out that mainframe cables are dutiable but can be imported duty free with computers.

Differential treatment of closely related and merging technologies encourages non-productive activity aimed at duty avoidance.

7.9 Resource allocation issues

Bounty recipients compete for resources with other activities that receive tariff assistance, albeit at low levels. It is difficult to ascertain the incentive effects of the bounty in relation to closely related activities (such as certain telecommunications equipment) presently assisted by tariffs. This is because many bounty recipients are subject to residual tariffs on some of their inputs but others are not, and the assessment is clouded by factors such as telecommunications industry plans and partnership schemes.

Within the IT industries, the bounty favours the production of hardware and certain systems software over other software and the provision of IT services. To the extent that resources (for example, capital and labour) used by these activities could also be used in non-bountiable activities, bountiable activities are better able to attract those resources. While competition for skilled labour may not be an issue when comparing hardware assembly with many other activities in the economy, it can be relevant within the IT industries where, for example, the skills of software engineers are in demand in both bountiable or non-bountiable software production.

The bounty has also attracted resources to bountiable activities (for example, 'screwdriver' operations) that might otherwise be unviable. Certainly, the bounty has held resources in PCB production — it is unlikely that the number of PCB firms currently in operation would be sustainable without support.

In its 1990 review, the BIE noted that distortions also occur against non-bountiable substitutes based on alternative technology. For instance, mechanical controllers are at a disadvantage relative to microprocessor based controllers.

As a significant proportion of inputs into bountiable production can be imported duty free, the effective assistance arising through the bounty can, for some activities, exceed the average for non-plan manufacturing. Were it possible to tailor the bounty to provide the exact assistance required to offset the tariff penalty on inputs for each activity, the bounty would still provide advantages over tariff assisted firms because bounty assistance will be fully used whereas a tariff need not — a firm seeking market share may not adopt the tariff inflated price. Conversely, a bounty recipient will always seek the subsidy (where expected returns exceed compliance costs). Bounty is paid on exported product — another advantage for a bounty assisted firm over a tariff assisted firm.

7.10 Assessment of the bounty

The removal of the tariff on computer equipment in 1984 enhanced Australia's competitive position as user industries were no longer required to pay tariff-inflated prices for productivity-enhancing technologies. The bounty compensated firms for the high (input) tariffs at that time and the loss of tariff protection on their output. This rationale has been substantially eroded by general reductions in tariffs and in the Commission's view no longer sustains continuation of the bounty. The issue now is whether or not there are other grounds to retain, in either current or modified form, a computer bounty which is scheduled to lapse in December 1995.

It can be argued that the computer bounty addresses market failures. However, many of the perceived and prospective sources of market failure and/or impediments to industry performance that could be used to justify such activity-specific assistance are addressed through existing industry policy initiatives. For instance, there are measures designed to:

- support R&D through a 150 per cent tax concession and grants for firms not making taxable profits[4];

[4] There is a case for making the latter more widely available — should the Government accept the Commission's report on *Research and Development* (IC 1995), R&D support

- facilitate access to capital, particularly for SMEs (Box 7.3);
- encourage equipment purchases such as depreciation and investment provisions (Chapter 11);
- assist firms to enter export markets such as the Export Market Development Grants, International Trade Enhancement, Access to Export Finance, and Export Market Planning, schemes (Appendix D);
- provide duty relief on inputs such as the Tariff Export Concession, and duty drawback schemes (Appendix D);
- provide information such as the AusIndustry initiative (Appendix D); and
- assist firms to undertake business plans (Appendix D).

Given that all industries have access to these measures, there is no strong rationale for an 'industry development' bounty that gives preferment to the microprocessor-based equipment industries — especially one that is only available to about 20 per cent of domestic IT production.

Indeed, there is a substantial case for allowing the bounty to lapse. There are many administrative problems with the bounty. Although its rules and definitions have been refined over many years, the system is complicated and the criteria for defining factory costs and systems software, for example, are deficient. Reshaping the bounty to target a different mix of hardware and or software could resolve some of the existing administrative problems but it would create many others (in addition to giving preferment to a small section of Australian industry in ways not consistent with current industry policy). Definitional disputes and associated administration problems will be compounded as computing, telecommunications and broadcasting technologies develop and converge.

Given the extension of the bounty to additional activities, the differential tariff treatment of their inputs, and the interaction of a range of assistance measures, it is difficult to quantify the net resource allocation effects of the bounty. But, overall, withdrawal of the bounty would have a small but favourable impact on resource allocation.

On the other hand, retention of a bounty and tariff regime impacting on similar products would continue to encourage groups to lobby to have goods declared as dutiable or bountiable. That the tariff-bounty arrangements provide a fertile environment for rent-seeking behaviour has been amply demonstrated by experience — for example, groups seeking to override assistance arrangements through administrative fiat.

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will be extended to some firms that have, to date, only received such support through the bounty.

The budgetary cost of the bounty has increased each year and is currently running at around $80 million per annum. The administration costs of the scheme are estimated to be around $1.2 million per annum. To this must be added the costs to the government of raising the revenue to pay for the bounty, private sector compliance costs, and costs in terms of resources diverted to the finding of loopholes, port-shopping or the challenging of definitions.

Recommendation 6

The computer bounty should lapse.

In arriving at its judgement that the computer bounty should lapse, the Commission has had regard to the implications of that decision on current beneficiaries of the computer bounty (Section 7.11).

At the time of the release of the draft report, the Commission wrote to the Minister proposing that an early announcement be made to extend the computer bounty for six months to 30 June 1996 (see Appendix F). If the extension is not approved, the bounty will lapse on 31 December 1995

7.11 Implications of the Commission's recommendation

Withdrawal of nearly $80 million of bounty presently paid to a range of microprocessor-based activities will inevitably threaten the viability of some firms. In the rapidly developing and changing IT industries, restructuring is an ongoing process but the removal of the bounty (a once only shock) will give it added impetus.

The statistical evidence indicates that many firms claim for R&D through the bounty (Table 7.3). Withdrawal of the bounty will mean that current bounty recipients will no longer potentially have the dual support of R&D through the bounty and the tax concession.

Firms not making taxable profits are generally not in a position to benefit from the 150 per cent tax concession, but if recommendations in the Commission's report on *Research and Development* (IC 1995) are implemented, these firms will benefit from a subsidy of 18 per cent on R&D (which may be payable in advance) (Chapter 6). Thus, some firms that lose the 8 per cent subsidy to R&D (through the bounty), could have access to an 18 per cent subsidy.

JED Microprocessors, a company with turnover of around $1 million, for example, submitted that:

> In 1993-94 the bounty was about $64 000, which has been extremely helpful in keeping the company going. We don't get much benefit from the 150 per cent tax deduction currently, as there has not been much profit to tax! The proposed [18 per cent] subsidy would help, if it comes about. (Sub. 104, p. 3)

Firms undertaking less than $20 000 of R&D are ineligible for the current tax concession and would not qualify for the 18 per cent subsidy proposed by the Commission. However, the bounty presently pays only $1600 on an R&D claim of $20 000.

Much of the computer hardware sector is R&D intensive and export-oriented and consequently benefits from the support accorded generally to R&D and exports. The BIE (1990) found that, whereas R&D expenditure amounted to 9 per cent of turnover in the bountiable sector, the proportion elsewhere in manufacturing was less than 1 per cent. In addition, it reported that the export propensity for the sector was in the 40 to 50 per cent range — more than double that of manufacturing as a whole. The support received by the IT industries through R&D and the many export assistance programs is consistent with the government's desire to foster the development of R&D intensive and export-oriented activities generally, and indicates that the sector is well placed to benefit from these programs.

Wormald Technology (Sub. 100) suggested that withdrawal of the bounty may need to be contingent upon the government's acceptance of the Commission's recommendations on R&D. It is the Commission's view that the bounty should lapse even if the proposed changes to R&D support are not accepted, in which case firms currently receiving bounty on R&D would be treated in the same manner as other firms in the economy. There would be no dual support and firms not making taxable profits would need to apply for R&D grants or use the R&D syndication provisions.

For activities such as PCB production and sub-contract manufacturing, where R&D intensities are low, changes arising from the Commission's R&D recommendations would provide a limited offset to bounty withdrawal.

Assemblers and manufacturers, for which the overwhelming majority of sub-assemblies and components enter duty free, do not suffer a significant tariff penalty on their inputs. However, IBM Australia reiterated its view that:

> While a tariff regime exists for components but not on completed systems a disincentive is already in place for local manufacture. (Sub. 82, p. 2)

IBM can obtain relief through duty drawback mechanisms on its significant proportion of exported product. Nonetheless, it is true that many firms operating in the Australian economy will continue to be penalised while residual tariffs remain.

The removal of bounty may threaten the viability of some assembly operations which are producing in a highly competitive market with narrow margins. The impact on multinational assembly operations may be tied more to considerations relating to 'Partnership' programs, government purchasing arrangements and State government leverage.

Allowing the bounty to lapse will adversely affect manufacturers of bountiable components, but there is little domestic activity in this area other than PCB manufacture. These firms enjoy natural protection from overseas competition owing to their ability to respond to orders quickly and to produce small stop-start runs that would be uneconomic for large-scale plants located abroad. However, Morris Productions noted that:

> Since 1991, the industry's 'competitive advantage' has in fact been steadily reducing due to the use of electronic data transfer by international short run PCB manufacturers. (Sub. 88, p. 2)

Precision Circuits (Sub. 98) and the APCMA (Sub. 102) argued that the natural protection is a result of expenditure on equipment and the development of a successful competitive strategy. Morris Productions added that the APCMA's forecast annual investment expenditure of over $5.5 million by PCB manufacturers for the period 1994-95 to 1997-98 (predicated on 15 per cent annual average increase in demand) would not be achieved in the absence of bounty:

> An increase from the present $2.5 million to $5.5 million will be impossible without bounty support. (Sub. 88, p. 2)

The APCMA claimed that 'had the bounty not been extended in 1991, levels of investment would have remained constant (ie no increase)' (Sub. 102, p. 1). The submission further noted that:

> In order to maintain growth and continue to improve competitiveness, the industry must increase investment ... Continuing investment is essential for keeping pace with the technological demands of end-customers ...
>
> ... the cost disadvantages of producing small batch sizes could be reduced by re-designing the production process using computer controlled, flexible, modular equipment ... Specialist companies equipped in this way could attract work from overseas where small orders are inefficiently produced. The competitive strengths of the industry in meeting short-run fast delivery requirements offers potential for exploitation in off-shore markets. (Sub. 102, p. 2)

Capital investment in the PCB industry may slow (rather than cease) without bounty support, *other things being equal*. On the other hand, PCB firms argue that they must continue investment in order to remain competitive. There are around 20 PCB manufacturers (receiving bounty payments of around

$4.5 million in 1993-94) currently operating on the small domestic market. At least two are for sale.

Discussions with PCB manufacturers suggest that some envisage further rationalisation in the industry as a result of bounty withdrawal. This could benefit the stronger firms through increased market share. Multinational companies may cease in-house production of PCBs in line with a world-wide trend reported by the APCMA.

Sub-contract manufacturers may also face some slow down in their investment programs without the bounty. However, sub-contract manufacturing appears to be growing world-wide and Australian firms seem well placed to benefit from the outsourcing of work from firms specialising in design and applications — especially given the cost of capital equipment.

Other bountiable activities will also be affected. In relation to modem manufacturing, Banksia Technology considered that the 'loss of bounty would put at least one of the less competitive Australian manufacturers out of business' (Sub. 61, p. 1). Similarly, the price of microprocessor-based controllers, and the goods that use them (washing machines, car security systems), may be affected. As the bounty can be paid on exported product, companies such as Robert Bosch Australia may have to absorb the loss of subsidy.

Allowing the bounty to lapse would have little impact on the computer software and services sectors, other than equalising assistance across the activities under reference. However, Wormald Technology, using itself as an example, said that the software and services sectors would be indirectly affected by withdrawal of the bounty:

> ... while bounty is not directly available for the applications software and services side of the business, the ability to obtain bounty for integrated hardware and operating software activities positively impacts upon the other software and services activities. (Sub. 100, p. 8)

This is an example of the benefit of a cash subsidy *per se*. The bulk of software and services activities do not qualify for bounty.

Claims about bounty being crucial for the survival of firms can be contrasted with the experience of firms that operated for many years before becoming aware of the bounty. For them, the bounty has been a windfall. Profound Computers carried out computer assembly work for several years prior to claiming for bounty:

> ... we were not ... advised that such an Act was in existence and such a rebate was possible until someone from a chartered accountant firm ... advised us. (Transcript, p. 18).

Similarly, Agridry Rimik said:

> Unfortunately we were not aware of the Computer Bounty until comparatively recent times. This is unfortunate, because in past years and particularly during our initial establishment years, bounty payments would have been even more important than they are now. (Sub. 58, p. 1)

Some participants indicated that without bounty they would suffer negative assistance. The Commission agrees — PCB producers for instance face tariff-inflated prices for chemical inputs. Boomerang Imaging Supplies said:

> If [the bounty] is discontinued we will have the net effect of negative assistance, as a number of the components used in the manufacture of toner cartridges are subject to duty whilst imported toner cartridges are imported exempt from duty. (Sub. 74, p. 1)

This situation is a legacy of the remaining tariffs penalising domestic activity. Negative assistance is a fact of life for the majority of Australian enterprises (including the services and mining sectors). This problem is reducing in line with general reductions in protection — 'non-plan' manufacturing tariffs will fall to 5 per cent from 1996, and the majority of imports enter duty free.

7.11.1 Assistance scenarios

Whilst recommending that the computer bounty should lapse, the Commission has considered some other assistance scenarios in Table 7.4 (the current situation is depicted in Table 7.1).

Table 7.4: **Assistance scenarios**

Scenario	*Computers*	*TE*[a]	*Components*	*Software*	*Services*
A Bounty lapses	nil	tariff	nil/tariff	nil	nil
B Bounty lapses and computer tariff reinstated	tariff	tariff	tariff	nil	nil
C Bounty lapses and tariff on TE and components removed	nil	nil	nil	nil	nil

a Telecommunications equipment.

Scenario A in Table 7.4 shows the assistance environment should the bounty lapse and no other changes are made. Scenario B, by replacing the computer bounty with a tariff, addresses concerns about neutral treatment between telecommunications and computer equipment manufacture. Scenario C goes further and would bring the assistance for telecommunications and computer

equipment and components into line with software and services, thereby providing the same assistance across the entire spectrum of IT&T activities.

A: Bounty lapses

Under this scenario, the bounty expires, computers remain on a zero tariff and the tariff on communications equipment falls to 5 per cent in July 1996. Activities within the IT sector (hardware, software and services) are afforded equal treatment, but the differential tariff treatment between telecommunications and computer equipment manufacture remains — although the anomaly is not as stark as the status quo (a bounty against a tariff).

A zero tariff for computer equipment can be accommodated within the Government's 'broad brush' decision to maintain tariffs at 5 per cent beyond 1996. For example, the Government is bound by the Uruguay Round Agreements to reduce tariffs below 5 per cent for 6 tariff lines of medical equipment and one line of light beer. It has also decided to reduce duties on certain manufactured tobacco products and tobacco leaf to zero.

B: Bounty lapses and a tariff on computers is reinstated

Re-introduction of tariffs for computing and bountiable components on the expiration of the bounty may offset concerns about negative effective assistance (for some bounty recipients). This scenario maintains the relativities between bountiable and dutiable activities and preserves the competitive position of the domestic computer industry *vis-à-vis* imports, although the favoured treatment afforded systems software for bountiable production over other software would be removed.

While re-introduction of a tariff would remove a small anomaly in assistance with respect to telecommunications equipment, it would provide assistance more selectively than the bounty as it would apply only to imports competing with hardware manufacture (and not exports) and not to any software or services. It would also inflate the prices of this important input to user industries and impose costs throughout the economy. The tariff option was not suggested by any participants.

C: Bounty lapses, tariffs on telecommunications and components are removed

This scenario, favoured by the AIIA as a long-run solution, would ensure parity across the full spectrum of computing, telecommunications, software and computer services. The loss of bounty and tariffs would affect bountiable activities, telecommunications equipment manufacturers and some domestic component manufacturers.

However, the terms of reference for this inquiry constrain the Commission from making recommendations on telecommunications tariffs. Indeed, it would be inappropriate to do so without first reviewing that industry. This rules out the scenario C, at least until such time as the Commission completes a separate inquiry into telecommunications equipment (foreshadowed for 1995).

Preferred approach

The preferred approach (Scenario A) is for the bounty to expire, leaving computers on a zero tariff. The differential tariff treatment between telecommunications and computer-related equipment remains, though its extent will be reduced when duties on telecommunications equipment fall to 5 per cent from July 1996.

Reinstating a tariff on computer equipment (Scenario B) would raise the costs of users of computers and thereby damage the international competitiveness of many Australian firms.

A further reform would be to allow the bounty to lapse while also removing the tariffs applying to telecommunications and components (Scenario C), as favoured by the AIIA. However, the Commission, for the reasons indicated above, can not recommend on telecommunications tariffs at this time.

Further progress in removing anomalies between assistance to telecommunications and computing equipment will depend on the results of the Commission's expected inquiry into telecommunications equipment, systems and services, and the Government's response to the findings of that inquiry.

Recommendation 7

On cessation of the bounty, the tariff rates applying to bountiable items should remain at zero.

8 STANDARDS AND CONFORMANCE

Categories of standards which affect the information technology (IT) industries include: technical specifications, regulations which specify methods of testing, and quality standards. Participants raised a number of issues relating to standards setting and conformance testing in Australia. Matters of concern included:

- *a lack of uniformity between standards adopted in Australia and international standards;*
- *the cost of assessing conformance with Australia's mandatory technical telecommunications standards;*
- *the enforcement of technical standards;*
- *the need for quality assurance; and*
- *mandatory quality assurance standards.*

8.1 Introduction

Standards may be developed by international or domestic standards bodies, by industry, or by other organisations. Standards drafted as voluntary codes of conduct may be made mandatory through government legislation or regulation.

In 1988, the Commonwealth Government introduced the Vendor Qualification Scheme under the aegis of its Information Industries Strategy. The aim of the Scheme was to:

> ... improve the competitiveness of Australia's information technology and telecommunications industry by encouraging firms to gain internationally-recognised certifications for their products and quality systems. (Department of Industry, Science and Technology, Sub. 97, p. 2)

Three programs were introduced under the Scheme:

- the Vendor Development Program;
- the Infrastructure Development Program; and
- the Education and Training Program.

Under the Vendor Development Program, eligible firms receive a 50 per cent subsidy of the costs incurred in obtaining certification to international product or process standards. The Infrastructure Development Program provides grants to test-houses, primarily to purchase equipment used in testing products to relevant international standards. Under the Education and Training Program,

the Commonwealth Government sought to provide, through the Australian Information Industry Association (AIIA) and the Australian Electronics Development Centre, information to firms in the local IT and telecommunications industries on what standards firms have to meet in order to supply export markets, and the benefits to the firms of complying with such standards.

A fourth program, the Software Standards Development Program was introduced under the scheme in 1991. The Program funds two bodies (the Australian Software Quality Research Institute (ASQRI) (Griffith University), and the Australian Software Metrics Association) to participate in the development of international software standards to improve the quality of Australian software (see Sections 8.5.2 and 8.5.3).

In September 1993, the Bureau of Industry Economics (BIE) was asked to evaluate the VQS. The BIE released its report in February 1995 (BIE 1995). It recommended that the VQS terminate (Box 8.1).

Box 8.1: **BIE evaluation of the VQS: summary of recommendations**

1. The Vendor Qualification Scheme not continue beyond its expiry date of 30 June 1994;
2. AusIndustry examine the merits of providing partial reimbursement to encourage small innovative firms to gain appropriate internationally-recognised certification of their 'quality-systems'. If implemented, this assistance should only be made available to firms that graduate from the existing Total Quality Management program;
3. The Government continue to support the development of mutual recognition agreements in the areas of standards-setting and certification-testing. This recommendation applies to all areas in which standards are widely used;
4. The Government continue to support the development of software standards;
5. Funding be provided to overcome information gaps associated with emerging standards issues, provided that such funding is not used to provide one-off subsidies to firms gaining certification of their products;
6. The Government continue to provide financial support for the collation and dissemination of information on information technology and telecommunications standards;
7. Future subsidies used to develop testing infrastructure be provided as partial reimbursement for expenditure made, unless it can be shown that the infrastructure is a public good; and
8. These recommendations be reviewed when the Government's response to the current Review of Australia's Technical Infrastructure is completed.

Source: BIE (1995).

In its White Paper, *Working Nation* (Keating 1994), the Commonwealth Government announced a Committee of Inquiry into standards-setting procedures in Australia, and Australia's testing, certification and accreditation

infrastructure (the Kean Committee). The Committee released its report in March 1995, making over 60 recommendations addressing most aspects of Australia's standards and conformance infrastructure (Kean 1995).

In *Working Nation*, the Commonwealth Government also announced:

- the creation of the Information Technology Standards Program, with funding of $7.1 million over four years. The aim of the program is to:

  > ... improve the ability of firms to satisfy market entry requirements for standards and certification by fostering an internationally recognised testing and education structure for emerging standards and by the development of mutual recognition agreements. It will also seed the development of a software technology information network and develop a domestic infrastructure for software product certification. (Keating 1994, p. 64)

- the introduction on 1 January 1996 of a framework of regulations for electro-magnetic compatibility. The framework seeks to minimise electromagnetic interference between electrical/electronic products. The framework regulations are being developed by Standards Australia and the Spectrum Management Agency (SMA) — a Commonwealth Government authority responsible for regulating the use of the radio frequency spectrum — to manage electromagnetic interference between products. The framework will be compatible with those being introduced in the European Community, and should enable continuing market access for electrical and electronic goods.

In 1994, the Council of Australian Governments agreed to develop a comprehensive impact assessment framework for the setting of national standards.

8.2 Setting technical standards in the IT industries

There are a number of features of the IT industries which make it particularly difficult to set technical standards for IT products. Technological change in the industries is rapid, and the time taken to draft a standard may exceed a product's shelf-life. There are many parties who wish to be involved in setting standards for the IT industries, reflecting the extent to which IT products are used throughout the economy. Achieving consensus is difficult and time-consuming. Standards must also be flexible enough to cope with future developments in technology.

The boundaries of the IT and telecommunications industries are also becoming increasingly unclear. Until recently, a major distinction between the two industries was the reliance of one (IT) on digital technology and the other (telecommunications) on analogue technology. The telecommunications

industry is switching to digital technology, and some products developed by the IT industries are now capable of interfacing with Australia's telecommunications network, and hence are falling foul of its technical regulations. These regulations are written and enforced by the Australian Telecommunications Authority (AUSTEL). Of particular concern to the IT industries is the impact such regulations will have as an increasing number of IT products (eg personal computers) become capable of direct connection to Australia's telecommunications network. In its response to the draft report, IBM Australia said its ThinkPad MWAVE telephony feature:

> ... provides telephone, answering machine, fax and data capabilities in a multimedia notebook size personal computer. (Sub. 82, p. 4)

8.2.1 Standards Australia

Standards Australia is a non-profit, independent organisation incorporated by royal charter. It publishes and markets all forms of standards, from design codes and technical specifications through to quality management system standards. Standards Australia is Australia's member of the International Organisation for Standardisation (ISO) and the International Electrotechnical Commission (IEC). Its policy is:

> ... to adopt international standards as Australian standards with any deviation in this policy being strictly in accordance with the provisions of the World Trade Organisation/General Agreement on Tariffs and Trade Technical Barriers to Trade Code. (Sub. 95, p. 2)

In a subsequent submission, Standards Australia said:

> The principle used by Standards Australia is to keep pace with international standards development not lead them. (Sub. 110, p. 2)

Few participants in this inquiry expressed problems with Standards Australia or with the way it sets standards (the Australian Telecommunications Industry Association (ATIA) and the Australian Printed Circuit Manufacturers' Association (APCMA) being the exceptions). The Kean Committee, however, found that many participants in its inquiry were critical of Standards Australia's performance and accountability (Kean 1995). It made 18 recommendations concerning the structure and operations of Standards Australia. The Kean Committee said that Standards Australia adopts few international standards, a view contested by Standards Australia.

The ATIA (Sub. 32) said general standards bodies (like Standards Australia) had 'limited competence' in setting technical standards for specific sectors, such as the telecommunications industry. The ATIA praised the work of AUSTEL,

the body primarily responsible for preparing technical standards for the telecommunications industry, saying it:

> ... had performed well in responding promptly in developing or modifying standards. (Sub. 32, p. 25)

The APCMA (Sub. 19) referred to earlier concerns in relation to Australian technical standards for printed circuit boards. Standards Australia had favoured standards produced by the IEC, rather than those of the United States Institute of Printed Circuits (IPC). The APCMA noted:

> Following considerable efforts the Association has now been successful in having IPC standards adopted. (Sub. 19, p. 10)

Standards Australia said:

> ... while the IPC standards are major national standards and are regarded as 'de facto' international standards, Standards Australia's policy is to favour international standards (eg IEC standards). However, there are areas where international standards are non-existent, incomplete or not widely accepted. It was the latter point that led to the acceptance of the IPC standards in preference to the IEC standards. (Sub. 95, p. 2)

8.2.2 Australian Telecommunications Authority

AUSTEL is a Commonwealth Government regulatory authority empowered under Part 12 of the *Telecommunications Act 1991* to determine technical standards for Australia's telecommunications networks, customer cabling to those networks, and customer equipment which can be connected to those networks. AUSTEL also leads Australia's delegation to International Telecommunications Union - Telecommunication Standardisation Sector meetings.

When drafting standards for customer equipment, AUSTEL said it is required, under Section 243 of the Telecommunications Act, to:

> ... ensure compliance with recognised international standards concerning the interfacing of customer equipment or customer cabling to telecommunications networks. (Sub. 77, p. 1)

AUSTEL said, as a result, the majority of its standards are based on:

> ... either international standards or accepted regional standards (eg from the European Telecommunications Standards Institute). (Sub. 77, p. 1)

AUSTEL is guided by a Standards Advisory Committee when writing standards. Members of the Committee include the telecommunications carriers, the Australian Council of Trade Unions, telecommunications user groups and industry associations (the AIIA and the ATIA).

At the initial public hearings, the ATIA said:

> AUSTEL has a very sound process of transparency and with its standards advisory committee ... something like 30 parties are involved in making decisions. ... matters have been brought up to the full committee meeting and that has allowed a full discussion so at the end of the day you can't just say it has been an AUSTEL decision. It has been a decision made by the community of the telecommunications industry. (Transcript, p. 416)

In its original submission, the ATIA proposed that:

> ... a separate and specific standards forum called the Telecommunications Standards Forum be established for the telecommunications industry:
>
> - to be made up of manufacturers, carriers, content providers, users, AUSTEL and the SMA to consider and develop standards and compliance arrangements for the telecommunications industry — including where appropriate the acceptance of international standards. (Sub. 32, p. 25)

Given the degree to which technologies in the IT and telecommunications industries are converging, a forum that excluded the former would be inappropriate.

The IT industries should be represented on any advisory body established to consider standards for equipment to be connected to Australia's telecommunications network.

A review of post-1997 telecommunications policy, under the direction of the Minister for Communications and the Arts, is to be completed in time for the Government to prepare and introduce new legislation for the telecommunications sector before 1 July 1997. Among the issues being canvassed are:

> ... the future role of AUSTEL as a specialist industry regulatory agency, including the continued need for, and appropriate forms of, technical and economic regulation including having regard for:
>
> (i) the need for harmonisation of technical standards;
>
> (ii) arrangements for setting standards, certification and approval in other industry sectors; and
>
> (iii) the scope for industry self-regulation. (DCA 1994b, p. 95)

8.2.3 Participants' comments

Participants suggested that, wherever possible, standards adopted in Australia should mirror international standards and that standards should not be mandatory except in limited circumstances. The AIIA said:

> ... the application of mandatory requirements [should] be kept to an absolute minimum and apply only where health and safety issues are involved. (Sub. 27, p. 25)

AUSTEL said there had been a long-running dispute relating to safety standards between the AIIA and Telstra (formerly Telecom Australia):

> Telstra contends that the nature of long circuits employed in the telecommunications network in Australia calls for some departure from the international standard on safety in order to cope with the greater statistical evidence of voltage surges eg lightening strikes, and their potential to endanger users or people working on the network. (Sub. 77, p. 1)

Such departures increase the cost of complying with the domestic standard relative to the prevailing international standard.

IBM Australia said:

> The international community has done much research into the effects of voltage surges worldwide, and recommends a very simple scheme of overvoltage protection: for the low-voltage countries [100 to 120v, eg USA, Canada, Japan], the insulation is designed to protect against overvoltages up to 1500v, and for high-voltage countries [220 to 240v, eg much of Europe, New Zealand, Australia, United Kingdom], the insulation is designed to protect against overvoltages of up to 2500v. (Sub. 103, p. 1)

IBM claimed that Australia appears to have done little or no research on the effects of overvoltages.

AUSTEL said it has proposed solutions to this dispute in its response to the post-1997 telecommunications policy review, and that other issues relating to safety are being resolved through the introduction of digital networks, which require lower (and hence less hazardous) voltages.

Where they differ from those adopted elsewhere, standards adopted in Australia can act as barriers to international trade. They may require firms to produce different products for the Australian and world markets. This can be to Australia's detriment because Australia is a small market for many IT and telecommunications products. Hence local producers and importers seeking to satisfy local demand may have limited opportunities to benefit from economies of scale. In some cases, Australia will not gain access to products designed for world markets because the potential sales in Australia do not justify the additional costs of modifying products to comply with Australia's standards. IBM Australia said this had occurred with several products it had intended to import into Australia (see below). Likewise, the cost of importing and exporting products is increased where those products must undergo testing to different national, regional and/or international standards.

These costs must be traded off against a legitimate need for standards adopted in Australia to differ from international standards.

Where possible, standards adopted in Australia should be aligned with relevant international standards, and should not be mandatory unless a clear social benefit can be demonstrated.

An allied issue is the adoption of standards in Australia before they have gained international acceptance. IBM Australia, in its response to the draft report said:

> Australia's early adoption of its own ISDN [integrated services digital network] standard has now left it isolated from other international and major country standards. ... The solution is to adopt an international standard such as Euro-ISDN. For instance, New Zealand has adopted the CCITT[1] 'Blue book' ISDN standard and now enjoys a rapid rollout of [new] products into the market. (Sub. 82, p. 4)

The effect is to penalise importers who must configure products to meet the standard adopted in Australia. Local manufacturers who supply the domestic market benefit from reduced competition from imports. But at the same time, it can make it more difficult for the same local manufacturers to export. By adopting standards which are aligned with those of our major trading partners, Australia can encourage a more outward-looking attitude among its local producers.

In a subsequent submission, IBM Australia noted:

> At an ATUG [Australian Telecommunications Users Group] meeting in Sydney ... 2 June 1995, John Rolland of Telstra announced plans for a new ISDN for Australia, which will basically be a copy of the ETSI (European) ISDN. The plan for this new network is to replace the existing Australian version of ISDN with one that's used elsewhere. By January 1996, Telstra will provide network attachment trials for suppliers, and by mid-1996 they will make the new ISDN available on most of their existing digital telephone exchanges — about 5,500 of them, via software and minimal hardware changes. Telstra plans that equipment approved in Europe will be able to be plugged into this new network without modification. (Sub. 103, p. 6)

Hence this issue appears to have been resolved. But it highlights the problems that can occur when standards are adopted in Australia ahead of, rather than in union with, other countries — a practice not adopted by Standards Australia.

Several participants (AIIA, APCMA, ASQRI, Montgomery) supported Commonwealth Government schemes to assist Australian industry to participate in international standards-setting forums. The APCMA said:

> ... increasingly you have to participate in the overseas bodies because as we move towards international standards, you can no longer drive the development of standards from within Australia. (Transcript, p. 269)

The Commonwealth Government provides some assistance, through Standards Australia, for Australian industry to participate in international standards

[1] *Comite Consultatif International Telegraphique et Telephonique* Now known as the *International Telecommunications Union-Telecommunication Standardisation Sector*.

development forums at the ISO and the IEC. The Kean Committee (Kean 1995) noted:

> Standards Australia and the Commonwealth together now fund about 50 per cent of the out of pocket costs of Australian participation in approved international technical committee work. Standards Australia budgeted $300 000 for each of the years 1993-94 and 1994-95 for assistance to Australian experts in attending ISO and IEC meetings; nearly half of that amount was sourced from the Commonwealth's grant-in-aid. (p. 180)

Participants in the Kean Inquiry said that while the assistance provided was appreciated:

> decisions regarding participation in international processes are still being taken too much on an *ad hoc* basis, and without adequate input from the relevant technical committees. (p. 181)

The Kean Committee encouraged the Commonwealth Government to ensure that this funding is directed towards encouraging 'appropriate participation by industry at the technical levels of ISO and IEC committees' (p. 181).

8.3 Assessing conformance with AUSTEL regulations

The AIIA, AT&T Global Information Solutions and IBM Australia contended that AUSTEL unnecessarily mandates technical standards, and does not accept relevant self-assessment or third party certification. IBM Australia said:

> AUSTEL reserves the right to look for conformance to [its mandatory] standards beyond what is directly connected to a public network — they go through to computer devices and then devices that are connected to those computer devices. (Transcript, p. 468)

> AUSTEL's mandatory standards role should be limited to those areas where it has been demonstrated that the normal commercial (voluntary) standards conformance process has not worked for the industry and that there would be a reasonable cost/benefit ratio for the Australian economy by introducing mandatory requirements in particular cases. (Sub. 17, p. 3)

The AIIA said:

> Apart from the key areas of health and safety where tight regulations are clearly desirable it is AIIA's view that a supplier's self declaration that its products meet designated levels of compliance with standards should be all regulators and the marketplace require. If suppliers do not have their own in-house testing facilities they should be able to demonstrate compliance by obtaining a report from an accredited third party test house of their own choice. (Sub. 27, p. 25)

According to the AIIA, the speed at which technology is moving is an added complication because the window of opportunity for a product may have closed before AUSTEL has given its approval. It concluded:

> The self-regulation and compliance practices adopted in other countries are appropriate for Australia, and should be the first choice approach. (Sub. 27, p. iv)

This problem does not apply to AUSTEL in isolation. Referring to the speed with which technology is moving in the IT industries, Wormald Technology said:

> ... we have an interest in being involved in some areas of standard setting but in many cases the products are being superseded long before the standards are set. (Transcript, p. 301)

The ATIA said:

> We believe AUSTEL has done a good job, particularly in setting standards. There are some concerns with the compliance process that AUSTEL has followed. That has been recognised by AUSTEL and they're looking at addressing that and that might in fact be a movement towards self-attestation. (Transcript, p. 415)

AUSTEL has outlined to the Commission its testing and conformance processes. AUSTEL authorises test houses to test equipment to Australia's telecommunications standards, requiring them to be accredited by the National Association of Testing Authorities, Australia's peak laboratory accreditation body, or by a similar overseas body with which the Association has a memorandum of understanding. According to AUSTEL, only by remaining within such a framework can confidence in the accreditation process be maintained:

> Accreditation is not an onerous process for a competent testing facility. It involves a visit by two inspectors usually (one from AUSTEL and one from the NATA-like body) for a few days, with the direct cost paid by the proposed test house. Accreditation is then for 3 years. (Sub. 77, p. 3)

Accreditation is not limited to third party test houses, but is open to any firm (eg equipment manufacturers) with appropriate testing facilities.

IBM Australia (Sub. 82) agreed with AUSTEL that the cost of obtaining accreditation for a test house is modest. It added that this cost is only a small component of the total costs faced by a supplier seeking to have a new product approved for sale in Australia (see Box 8.2).

According to IBM Australia (Sub. 103), AUSTEL has only one inspector available to receive and process applications for accreditation. Hence while the cost of an inspection may be modest, there may be considerable delays between when a firm lodges an application to become an accredited test house and when the inspection actually takes place.

AUSTEL's conformance regime is based on type testing. Type testing involves testing an initial sample of a product for conformance to the relevant AUSTEL regulations, supported by the manufacturer's declaration that subsequent products will conform to that 'type'. This is enforced by AUSTEL through sampling products to ensure conformance, or following up on complaints that 'approved equipment' no longer conforms to the technical standards it was tested against.

Testing is conducted only by AUSTEL-accredited test houses. When a sample is tested for compliance with the relevant Australian regulations, the test house issues a test report which becomes the basis on which AUSTEL determines whether it will issue a permit allowing the tested equipment to be connected to Australia's telecommunications network. However, under Section 258(4) of the *Telecommunications Act 1991*:

> In deciding whether it is satisfied as to whether connection of customer equipment to a telecommunications network would comply with technical standards determined under Division 3 [of the Act], AUSTEL may reach a conclusion contrary to any conclusion reached on that matter in a report, by an accredited test house, that accompanied the application for the permit concerned.

In an Occasional Paper on Technical Regulation, AUSTEL (1994) said that in implementing Section 258(4) it:

> ... exercises a discretion to accept test reports which indicate non-compliance against some of the clauses of the technical standards if, in its judgement, these non-compliances do not compromise the objects of technical regulation set down in the legislation. (p. 23)

Under the Telecommunications Act, AUSTEL has thirty days in which to examine the test report and issue, or refuse to issue, a permit. However, this stage of the process can be drawn out where firms fail to lodge a complete application, or where AUSTEL requires subsequent testing of the product for which approval is being sought.

AUSTEL (1994) noted that type testing is:

> ... a blunt instrument with little flexibility for the different types of suppliers. Large suppliers may well have the laboratory facilities and quality assurance techniques in place which may serve as a better approach to approvals. (p. 25)

Some of Australia's major trading partners are modifying their approach to ensuring product conformance with technical standards:

> In particular the European Community has established 3 broad streams for attainment of the approvals mark of which only one stream retains a type examination regime by a conformity assessment body. The other streams supplement this approach either with a manufacturer's declaration based on testing of the product by an acceptable test house, allied to regular market sampling; or link a manufacturer's declaration to the operation

> of an approved quality system for production, final product inspection and testing. (AUSTEL 1994, p. 25)

While generally supportive of such an approach, AUSTEL (1994) was concerned that:

> ... there is a need for clarification of responsibility for the administration of quality assurance schemes, so that a body such as AUSTEL can depend on this infrastructure in the course of its approvals responsibilities. (p. 26)

Confidence in Australian quality management systems (QMS) is critical if bodies like AUSTEL are to adopt more flexible approaches to conformance assessment. The Kean Committee made two recommendations relating to this issue:

> 38 The Australian and New Zealand Governments require JAS-ANZ [Joint Accreditation System of Australia and New Zealand] to assure that criteria are applied more consistently in the accreditation of QMS certifiers, that standards for QMS certification are applied consistently by certification bodies, and that high priority be given to the accreditation program for auditor training.
>
> 39 JAS-ANZ require the Quality Society of Australasia to apply stringent and consistent criteria to the certification of QMS auditors to ensure that variability between auditors is minimal and confidence in the standard of QMS certification is enhanced. (Kean 1995, p. xxiii)

The SMA has adopted a three-tiered conformance requirement for radio communication equipment:

> Level 1: Supplier declaration.
>
> Specified when the consequences of non-conformance are unlikely to cause interference.
>
> Level 2: Supplier declaration plus type testing.
>
> Specified when the consequences of non-conformance has a moderate to high potential to cause interference but is unlikely to be life threatening.
>
> Level 3: Supplier declaration plus type testing plus QMS certification.
>
> Specified when the non-compliance may result in life threatening situations and serious harm to other equipment and processes.
>
> The SMA encourages confidence in the system by conducting audits (both random and in response to complaints). (Kean 1995, p. 162)

The Kean Committee (Kean 1995) supported the approach of the SMA and suggested several principles that regulators should adopt when reviewing conformance arrangements:

- compliance requirements should be balanced against risk;
- testing and certification should be undertaken by third party houses wherever possible;
- options should be available in demonstrating conformance; and

- conformity assessment requirements should not restrict trade. (p. 161)

The appropriate forum to address the issue of conformance requirements for telecommunications equipment is the review of post-1997 telecommunications policy.

8.3.1 Costs of conformance to AUSTEL regulations

IBM Australia provided estimates of the cost of obtaining AUSTEL approval for a modem device and two integrated services digital network (ISDN) terminal adaptors:

> ... we estimate it would take $6-8000 and four months and $60-70 000 and six months, respectively, to attain standards accreditation from AUSTEL. The business forecasts in Australia for these products simply do not justify such costs and we have therefore decided not to announce them in this country. (Sub. 17, p. 4)

On ways of reducing the cost of assessing conformance, IBM said:

> AUSTEL requires all test reports to be from AUSTEL-accredited test laboratories only. IBM has multi-million dollar test facilities in Raleigh, North Carolina USA, La Guade France and Yamato Japan which can test to [AUSTEL] requirements. They meet all USA, European and Japanese requirements. Because they aren't accredited by AUSTEL, the products must be reassessed by an AUSTEL-accredited test lab. (Sub. 37, p. 2)

IBM Australia subsequently provided information on the cost of obtaining AUSTEL approval for a product which can be connected to Australia's existing ISDN (see Box 8.2).

Box 8.2: **The cost of approving *Waverunner***

Waverunner is an ISDN product which IBM is currently seeking to have approved by AUSTEL. The product is being redesigned to comply with Australia's existing unique ISDN standards. This is expected to take around three months.

COMTEST, a wholly owned subsidiary of TELSTRA, is the only testing house accredited by AUSTEL to test customer equipment connected to Australia's existing ISDN. COMTEST has advised IBM that the lead time for laboratory testing is in the order of five months and will cost approximately $15 000 for the first module and $7000 each for subsequent versions. There are currently four versions of *Waverunner* in production, each functionally electrically identical, except for the way in which they connect to different styles of computers.

IBM estimates that the internal personnel expenses to handle the testing process and AUSTEL application will be around $42 000, giving a total of over $70 000. This figure does not include the costs incurred in modifying the product to meet AUSTEL standards, and does not include the costs associated with field testing the product which is the next part of AUSTEL's process for ISDN Basic Rate Access (Microlink).

Source: IBM Australia (Sub. 82, p. 4).

AUSTEL said it does not regulate the fees charged by its accredited test houses. Rather it:

> ... has attempted to provide a discipline ... by introducing as many competing test houses as is possible. (Sub. 77, p. 3)

AUSTEL noted that IBM has lodged an application for its facility in La Guade, France to become an accredited test house for radio-magnetic testing.

With technology convergence, an increasing number of IT products will be connected to Australia's telecommunications networks, and the need to ensure conformance with AUSTEL regulations will rise. It is important that the cost of ensuring this conformance is kept low.

One way of keeping costs low is to encourage competition among testing houses, which AUSTEL has said it is doing. However, the Commission understands that only one test house has obtained AUSTEL accreditation to test compliance to some technical regulations (in particular those relating to customer equipment connected to Australia's existing ISDN).

8.4 International developments

The Australian Government is committed to closer cooperation with other countries on standards and conformance issues. On 1 March 1992, Australia acceded to the World Trade Organisation (WTO) *Agreement on Technical Barriers to Trade* (then known as the General Agreement on Tariffs and Trade (GATT) *Standards Code*). The Agreement:

> ... applies basic GATT principles, including transparency, non-discrimination and national treatment, to reduce the use of standards as non-tariff barriers to trade. (Kean Committee 1995, p. E-6)

Having acceded to the Agreement, the Australian Government and its agencies are required to impose regulations based on international standards where practicable. State, Territory and local governments and their agencies are encouraged to do the same. The Agreement was strengthened during the Uruguay Round of GATT negotiations and requires signatories to:

> ... take all reasonable measures to ensure that [State Territory and local governments and private standards writing bodies] accept and comply with the *Code of Good Practice for the Preparation, Adoption and Application of Standards* which forms an Annex to the WTO Agreement. (Kean 1995, p. 176)

The Australian Government has also pursued issues on bilateral and multilateral levels. In 1988, it entered into a *Memorandum of Understanding on Technical Barriers to Trade* with New Zealand. On 26 October 1990, the Commonwealth, State and Territory Governments and the New Zealand Government entered an

Agreement on Standards Accreditation and Quality, under which each has agreed to:

> ... move towards common product and processing standards and accreditation and certification procedures. (Kean 1995, p. 188)

In March 1994, Australia commenced negotiations with the European Union on a mutual recognition agreement on conformance assessment. According to the Kean Committee (Kean 1995):

> Mutual recognition agreements enable products to be assessed and certified in the country of production to the standards of the importing country. It means that there is no need for further testing, inspection or certification at the point of sale to demonstrate compliance. (p. 186)

Telecommunications terminal equipment is one of the sectors under negotiation. In the ATIA's response to the Commission's draft report (Sub. 62), it said its members are concerned that Australia may not have the testing infrastructure needed to test telecommunications terminal equipment to European standards. That is, Australian equipment sold in Europe will still have to be sent to Europe for testing, and therefore Australian equipment producers will not benefit from the agreement.

Australia has also been involved in standards-related issues in the Asia-Pacific Economic Cooperation forum. Member nations are looking at ways of harmonising standards within the forum through aligning national standards more closely with international standards. They are also looking to form bilateral and multilateral mutual recognition agreements on conformance assessment between member nations. Work to date has concentrated on regulated sectors of the economy (in particular, food and toys).

8.5 Quality assurance standards

Quality assurance standards are an important source of information for those seeking to purchase goods and services. Certification to these standards indicates that the firm concerned has practices and policies in place to minimise the incidence of quality problems. Standards Australia is responsible for developing quality assurance standards in Australia.

Firms in any industry can seek certification to the AS/NZS ISO 9000 series of quality standards. Many firms in the IT industries — small, medium and large — have certified quality management systems in place, or are in the process of achieving certification.

The APCMA, whose 15 members account for around 80 per cent of Australia's production of printed circuit boards, said that 10 of its members have

AS/NZS ISO 9001/9002 certified quality assurance systems in place, and another four will receive certification within the next 12 months.

At the end of 1994, the AIIA undertook a survey of its members to gauge the extent to which they had introduced, or were in the process of introducing, certified quality assurance systems. Of the 175 responses received (60 per cent of AIIA's membership): 24 companies had certified systems in place for the whole of their operations; 34 had obtained certification for some divisions, operations, or regions; and 69 were in the process of obtaining either partial or full certification.

Of those who had been certified:

- 56 per cent said certification had brought financial benefits;
- 32 per cent said they had received non-pecuniary benefits from seeking certification; and
- 11 per cent had been unable to identify any gains from being certified.

According to respondents, the demand for certification came from government bodies (over 80 per cent of respondents), the private sector (around 60 per cent of respondents) and from export markets (also around 60 per cent of respondents).

Some smaller firms in the IT industries have not sought certification, reflecting their perception of the costs and benefits of being certified. ACADS-BSG said it had not sought to implement a certified quality assurance system:

> ... we foresee that it will only involve us in additional expenses and resources both of which we are already stretched to the limit. (Sub. 18, p. 3)

The South Australian Government said:

> ... standards accreditation, certification and auditing can place a considerable burden on small to medium sized enterprises ... arrangements need to be developed to address the particular problems and constraints on those enterprises. (Sub. 26, pp. 4-5)

Implementing a certified quality assurance system can impose a large financial burden on firms. The Kean Committee (Kean 1995) was presented with draft results of a survey showing:

> The average cost to implement ISO 9000 and gain certification was around $55 000 for small organisations, around $155 000 for medium organisations and in excess of $200 000 for large. (p. 135)

The Committee noted that the validity of these figures is questionable because few respondents to the survey reported that they measured the cost of obtaining certification.

In its review of the Vendor Qualification Scheme (VQS), the Bureau of Industry Economics (BIE 1995) said:

> VQS firms ... estimate that implementing a certified quality system [to AS/NZS ISO 9001 — the most comprehensive of the ISO 9000 series standard] costs between $120 000 and $400 000 depending on the size and complexity of the firm involved. (p. 67)

It noted that most estimates were at the higher end of this range.

In its response to the draft report, the Commonwealth Department of Administrative Services (DAS) said:

> One initiative to help business manage the cost of quality certification is the development of a new quality standard which will provide a staged path to certification. Businesses will be able to spread the cost of implementing a quality system yet receive a degree of recognition for implementing each stage. The Commonwealth and State governments are represented on the Standards Australia working party developing the new standard. (Sub. 105, pp. 6-7)

Standards Australia said this new standard 'should be available early in 1996 and will be especially valuable for small business' (Sub. 95, p. 3).

8.5.1 Quality assurance and government

The AIIA requested that State and Commonwealth Governments should not make quality assurance standards a prerequisite for access to government business:

> ... mandatory quality standards impose significant cost and procedural burdens on industry, particularly for small to medium sized companies. (Sub. 27, p. 27)

The AIIA said:

> Standards Australia recognise that certain elements of the [AS/NZS ISO 9000 series of] standards do not apply in certain circumstances. (Transcript, p. 446)

The Association suggested a similar attitude should be encouraged in government and industry. It said that one way to bring home to government departments and agencies the cost of obtaining certification is to require them to be certified, a view supported by Standards Australia (Sub. 110).

The Commission agrees that certification should not become a prerequisite for tendering for government business. However, having a certified quality management system in place helps reduce the buyer's risk, and purchasing officers should take this into account when comparing offers.

The Commonwealth Government announced its policy on quality assurance in May 1992 (DAS 1993). It applies to all purchases of goods and services by Commonwealth departments covered by the *Audit Act 1901* and Department of

Finance regulations and directions. Under the policy, quality assurance requirements should be determined by the buyer on an individual transaction basis, with the level of certification required reflecting the intended role of the good or service to be purchased and the likely consequences of failure and/or non-compliance. Goods and services are assigned to one of six categories of quality assurance:

- Types 1 to 3: where conformance to a standard in the AS/NZS ISO 9000 series will be the most suitable level of quality assurance when specified performance is critical and the consequences of non-compliance or failure are high.
- Type 4: where conformance to a product standard (eg in the manufacture of electrical goods and where health and safety regulations apply) is more important than conformance to the process-oriented AS/NZS ISO 9000 series standards.
- Type 5: as an interim measure, where conformance to a standard is desirable but not absolute, the buyer may accept progress towards certification or partial implementation of a quality system standard as appropriate. (This is expected to be phased out as the majority of suppliers are certified.)
- Type 6: routine or off-the-shelf purchases of low value products with a low cost of non-compliance or failure may be sourced from suppliers who do not have a registered quality system in place. (DAS 1993, pp. 13-15)

In the *Working Nation* White Paper (Keating 1994), the Commonwealth Government introduced an Endorsed Supplier Arrangement for Common Use Contracts. This aimed to:

> ... recognise suppliers who can demonstrate a commitment to world best practice in terms of quality, standards, and service and long term value adding information technology activity in Australia that meets the purchasing needs of Government agencies consistent with value for money. (DAS, Sub. 38, Attachment C, p. 1)

According to DAS, in order to qualify as an endorsed supplier, firms must satisfy at least one of the following criteria relating to quality assurance:

- achievement of appropriate quality system certification to AS/NZS ISO 9000 series or AS/NZ ISO 9001.3 standard;
- progress towards appropriate quality system certification to AS/NZS ISO 9000 series or AS/NZ ISO 9001.3 standard;
- other quality indicators such as total quality or supply chain quality management programs and including meeting relevant recognised international standards;
- participation in an AusIndustry/National Industry Extension Service program or other programs directed towards small and medium enterprises; and

- nomination of a firm timetable for future implementation of an appropriate continuous improvement process (which will be monitored and failure to meet milestones could result in withdrawal of endorsement status). (Sub. 38, Attachment C, pp. 8-9.)

State Governments may also impose quality assurance requirements on suppliers. Most States and Territories adopt the Commonwealth's approach of matching the need for certification to the risk and cost associated with having goods and services fail in use. However all IT vendors to the Queensland Government will be required to have certified quality assurance programs in place by 1 January 1996 (Sub. 46, p. 10).[2] The Queensland Government called for 'a national investigation into QA [quality assurance] requirements for IT&T purchases' (Sub. 112, p. 3).

The DAS approach of matching a firm's level of certification with the Government's need to control risk appears to be sensible and likely to minimise the cost of tendering. The Queensland Government's requirement for all its suppliers to have certified quality assurance systems in place by 1 June 1996 appears likely to increase the cost of government tendering.

The Endorsed Supplier Arrangements and the requirements of State Governments are discussed in Chapter 5.

8.5.2 Software development process standards

In 1988, Standards Australia introduced AS 3563—1988, which set out the requirements for a quality management system for the software development industry. The standard was revised in 1991 (AS 3563.1—1991).

According to Standards Australia (1991):

> [AS 3563.1] is intended to provide a common means for establishing an effective quality management system when related to software, which, together with procedures for the specification, design, implementation and evaluation, allow development of software in a controlled manner. (p. 2)

Use of the standard was expected to result in:

> ... the creation of software in the most cost effective way, having due regard to the whole life cycle of the product, and should instil a high degree of confidence that the software will meet the operational requirements. (p. 2)

AS 3563.1 was adopted unchanged in 1992 by the United States Institute of Electrical and Electronics Engineers Standards Board (an internationally accredited standards body). In 1994, the ISO issued an update of the ISO 9000

[2] Excluding one-off purchases which offer low risks to the purchaser, and other low risk, low value contracts (ie those of less than $1000).

series standards, and AS 3563.1 was incorporated into AS/NZS ISO 9001.3. Standards Australia is progressively replacing AS 3563.1 with a guide to the application of AS/NZS ISO 9001.3 to software development.

The ISO established a Working Group to develop an international standard on software process assessment (known as the software process improvement and capability determination, or SPICE, project) in June 1992. The SPICE project was driven in part by the United Kingdom Ministry of Defence (MOD) which was:

> ... seeking ways of reducing the risks in procuring software-intensive systems through reliable ways of selecting capable contractors. In particular the MOD wishes to examine methods for assessing and evaluating the software engineering capability of potential contractors which would give more insight than its existing mechanisms of compliance with the minimum requirements set out in [existing] quality management standards (eg ISO 9001). (SPICE 1993, p. 1)

The aim of the standard is:

> ... to characterise current practices within an organisation identifying strengths, weaknesses and the risks inherent in the process; to determine to what extent they are effective in achieving process goals; and to determine to what extent they conform to a set of baseline practices. (SPICE 1993, p. 1)

According to ASQRI:

> ... in the SPICE project the standard is being constructed in such a way that it will enable developers through the use of ongoing evaluation of their performance — the performance of their processes — to demonstrate to purchasers the capability of their processes, and to demonstrate to purchasers the extent of improvement in their processes. (Transcript, pp. 154-155)

Australian participation in the SPICE project has been assisted through the Software Standards Development Program (SSDP) of the Commonwealth Government's VQS.

ASQRI sought additional government support to change the attitudes of firms in Australia to quality assurance, and to move towards the acceptance of standards like those being developed through the SPICE project:

> The sort of initiatives that I think would be achievable in terms of government policy would include the development of a purchasing policy for government which places an explicit emphasis on the demonstration of capability, preferably in an active way rather than in the passive way currently in use with certification of quality systems and so forth. (Transcript, p. 157)

In this regard, the Commission notes that the objectives of the Commonwealth Government's quality assurance policy are:

- to promote continuous improvement of the quality of goods and services purchased by the Commonwealth.

- to promote continuous improvement in the competitiveness of Australian goods and services in export and domestic markets (DAS 1993, p. 8).

8.5.3 Software product standards

In 1994, the Commonwealth Government, through the SSDP, commissioned ASQRI and Coopers & Lybrand to evaluate the feasibility and viability of an Australian software product quality evaluation and certification capability. The authors prepared an interim report (ASQRI 1994) which summarised the findings from interviews with representatives of Australian industry and a selection of overseas specialists in software product assessment.

There is currently one international standard which acts as a framework against which software products can be evaluated (ISO/IEC 9126). It identifies a hierarchy of software product quality attributes, including functionality, reliability, useability, efficiency, maintainability, and portability. However, it has been criticised for not providing a practical basis for evaluating software product quality. Five standards bodies are working to develop a series of guides to support the use of this standard.

According to the authors, ISO/IEC 9126 draws heavily on DIN 66 285, a German standard for software products, which defines a set of quality requirements for software products and how compliance to these requirements can be tested. While the infrastructure is in place in Germany to certify products to DIN 66 285, the authors noted:

> ... assessment is voluntary and the industry has virtually ignored this opportunity to certify software. So long as assessment remains voluntary, it is unlikely that there will be any significant movement to take up software quality assessment services in Germany. (ASQRI 1994, p. 38)

Other countries do not have national standards for software products, nor do they appear likely to enforce certification of software products.

The authors found that firms in Australia and overseas believe that software product certification would have some positive impacts (eg as a marketing tool to allow greater product differentiation). However, firms had little understanding of the costs of establishing and operating a certification system, and in practical terms, how such a certification system would operate. Software producers did not want to see product certification become compulsory because they felt it would increase their costs.

The authors concluded that the capability to certify the quality of software products is still developing, and that the market for product certification is 'immature':

> ... given the current market awareness and level of understanding of product evaluation, and its potential benefits, there is a relatively high risk that both software developers and purchasers of software would not be prepared to entertain the use of product certification. (ASQRI 1994, p. 65)

In its review of the VQS, the BIE (1995) concluded:

> It is too early to properly judge the impact of the SSDP. There is, however, a strong theoretical case for developing widely-recognised standards for software. There is also a rationale for Australian involvement in the development process, and a strong rationale for government support for that involvement. For these reasons, the Bureau believes that the SSDP was justified, and is likely (other things being equal) to provide 'a net benefit to the Australian community'. (p. 35)

The BIE recommended that the Commonwealth Government should continue to support the development of quality standards for software products and processes.

The Commission concurs with these sentiments. It is in Australia's interest to participate in international standards-setting forums (like the SPICE project). Without government support, Australian firms may be reluctant to participate.

But as with all quality standards, governments should not mandate software product or process standards unless a clear net benefit can be demonstrated. And product quality standards should be functionally-based rather than being based on particular technologies. The Commission supports the views of the Kean Committee (Kean 1995) that attaining consistent quality does not require a formal quality management system, and that informal quality assurance has its place.

9 ACCESS TO FINANCE

Most inquiry participants referred to problems in raising finance at various stages of their firm's development. Some mentioned specific constraints on their ability to expand and exploit market opportunities. Their concerns largely related to the provision of venture (ie high risk equity) capital rather than debt finance.

In examining these issues, the Commission has looked for evidence that firms in the information technology (IT) industries are disadvantaged in gaining access to finance, and considered whether measures should be introduced to assist these firms.

9.1 Stages of capital requirements

Firms may require capital to begin a business venture, to expand an existing business, and to enter and develop new markets for their products. Software developers may require capital, for example, when seeking to develop, market or launch a new generation or version of a computer program.

Depending on their stage of development, firms may seek debt financing (borrowing against some collateral) or equity finance (a capital injection in exchange for a share in the ownership of the firm). Once large enough, firms may seek equity finance through listing on a stock exchange.

9.1.1 Start-up finance

Many firms in the IT industries rely on debt finance to fund their initial set-up and expansion. Owners mortgage their homes and other assets, and rely on the profits generated by the firm to meet capital and interest repayments. Many small firms also rely on trade credit.

As the need for capital rises, some firms run into difficulties because they cannot generate sufficient funds internally and they do not have the tangible assets or the cash flow needed to borrow more. Having exhausted their sources of debt capital, they may seek equity finance.

Equity investors seek their returns through dividend payments and capital gains on their initial investment. They are typically more concerned with the market potential of a firm than with its net asset backing.

They may look to contribute business skills and experience as well as finance, and seek to influence the management and strategic direction of a firm. This aspect of equity finance is unpalatable to many owners of small firms, and is one reason why many firms do not seek equity finance until they have exhausted their sources of debt capital.

Providers of start-up equity finance in Australia are often individuals who have come into contact with a firm in need of capital and, after examination, conclude that the risks and likely returns are acceptable. The decision to invest is likely to hinge on an assessment of the people in the firm as much as the firm itself. Reflecting on its experience, MN Information Technology Group said:

> Generally [private investors] are difficult to locate and they need to be excited by the specific opportunity. They will often want to take an active part in their investment. If they can be located they are often the only source of investment capital for small companies. (Sub. 3, p. 8)

Equity finance can be more expensive than debt finance for a variety of reasons:

- the risks for the investor are high — the firm seeking start-up capital may have little business experience and the chance of failure may be high. There may be few assets the investor can acquire if the firm does fail because any holders of debt finance in the firm have first call over the firm's assets. Firms carrying a high level of debt may be particularly unattractive to an equity investor;
- the investor must be patient — equity finance cannot be withdrawn quickly, unless an alternative investor or source of funds can be found; and
- small firms may not have the information a potential investor typically requires before making an investment. Independent investigation is an option, but this is costly and all the information needed may be 'in the owner's/entrepreneur's head'.

The risks to the investor are heightened where the start-up finance is intended to launch a firm or product based solely on an invention or technical innovation of the proprietor (for instance, an innovative piece of software). In this case, the investor may need to exercise technical as well as commercial judgement.

A potential constraint on the ability of IT firms to source start-up equity capital may be a lack of investors in Australia with the combination of capital, managerial skills and experience needed to evaluate proposals and, if necessary, have an active role in the business.

Some participants sought tax concessions for individual investors as a way of reducing the 'start-up finance' gap in Australia's venture capital market. MN Information Technology Group said:

> The existing government schemes and other sources of funds are good for companies with a significant track record that either want to launch a new product or expand the market for an existing one. They are failing to serve the needs of very small and start-up software businesses that have developed a good product and need money to commercialise it. (Sub. 3, p. 8)

> If you gave tax breaks to angels [individual investors] to invest in software, you would get a lot more angels investing in software and they're taking the risk. ... The Government is taking some risk because they have possibly forgone some tax they could have collected. So there is a risk sharing going on. The angel has risked his capital and the taxman has risked some tax he could have collected today for the possibility of collecting more tax tomorrow. (Transcript, p. 12)

9.1.2 Finance for business expansion and market development

At a later stage, a firm may require external finance to develop a new product (eg a new version of a software program), develop a new market domestically or internationally, or increase capacity. Again, it may seek debt or equity finance.

MN Information Technology Group argued that development capital is generally available for established firms:

> Once a company gets to $10 million in sales there is lots of access to finance and development capital in this country and it's not difficult at all to get. It's practically impossible for a small company with $1 or $2 million in sales. (Transcript, p. 6)

Those with sufficient assets or cash flow can seek debt finance from a variety of financial and non-financial institutions. Those unable, or unwilling to use debt finance are more limited in their choice of institutions, but companies are beginning to specialise in the provision of equity finance to small and medium sized enterprises (SMEs). Some (which tend to be offshoots of larger financial institutions) have begun targeting firms in the IT industries.

Such 'development capitalists' generally look to invest $500 000 to $10 million in exchange for up to 50 per cent of the firm's total equity. Like providers of start-up equity capital, development capitalists may seek to provide a package of finance and managerial/business skills. Hence, their willingness to invest may be influenced as much by their ability to manage an investment in the IT industries, having regard to their own skills and experience (perhaps in other sectors), as by the availability of funds.

As with other equity holders, they are likely to have less interest in the tangible assets of the firm than in its potential to grow and generate dividends. Once again, the focus is likely to be on the individuals in a firm as much as the firm itself.

Precision Circuits told the Commission of its endeavours to find equity capital for a management buyout:

> No one would look at [the proposed buyout] apart from BLE Capital and the reason BLE Capital looked at it [was] the people and my partner's experience. ... they were more interested in the people than the turnover etc. (Transcript, pp. 40-41)

Firms carrying a high level of debt finance may also be unattractive to development capitalists because in the event of the firm failing, holders of debt finance will have first call over the firm's assets.

As a typical investment is for three to five years, an exit strategy is an important consideration. There may be a requirement for the firm to publicly float at the end of the investment period. For this to occur the firm must be of a reasonable size when the investment is made, or be capable of rapid growth and consolidation during the investment period.

Alternatively, the investor may rely on the firm's capacity to attract a new investor, or the existing owners to resume the full equity.

9.2 Issues relating to risk

9.2.1 Assessing risk

A number of participants expressed concern that local venture capital companies are unwilling to invest in IT firms because of perceptions that the risks are too high:

> In the past the industry has faced difficulties in obtaining access to the needed capital for investment owing to the lack of understanding of the industry and a perception that investment would be 'risky'. Consequently investment had to be funded from internal resources. (Australian Printed Circuit Manufacturers' Association, Sub. 19, p. 9)

> There is a feeling in the financial circles that providing capital to anyone in the computer industry is a dangerous thing to do. ... This has certainly hampered our growth and development. (GUICare, Sub. 21, p. 3)

The Australian Information Industry Association (AIIA) put a different view:

> You certainly can't say the Australian capital markets are risk averse, because they have put money into fairly risky mining ventures and all sorts of things from time to time. (Transcript, p. 459)

It concluded that problems arise through 'lack of understanding and communication between the industry and finance markets' (Sub. 27, p. 38), and suggested:

> Problems with access to finance, especially for SMEs, can be addressed through joint industry/government initiatives under the auspices of AusIndustry to enhance education of, and contact between, finance suppliers and the IT industries. (Sub. 27, p. v)

The problem may be one of a failure of IT firms and financiers to communicate, as the AIIA suggests. It may also be the case that unsuccessful investments attract the most attention, and this contributes to the perception that IT firms are high risk.

But venture capitalists are unlikely to underinvest in a sector because of general perceptions, or to invest on a sectoral basis. They evaluate proposals on a case-by-case basis.

A more likely constraint is the lack of investors with the industry-specific knowledge needed to properly evaluate proposals from IT firms. However this is a transitional problem, and progress is being made. Finance companies are employing people from the IT industries as investment advisers and as their representatives on their investee companies' boards.

9.2.2 Risk sharing

Participants referred to the limited options in Australia for investors interested in high technology firms. AT&T Global Information Solutions said:

> In the US you will get a large venture capital company that will essentially take positions in a number of competing companies so that they win regardless of the outcome of the technology battle. The opportunities for Australian venture capitalists to take positions in multiple companies are restricted and therefore other mechanisms need to be found where those companies can perhaps offset some of their risk with international venture capitalists. (Transcript, p. 336)

The experience of venture capitalists who participated in the Management and Investment Companies program suggests that this may not be the case. By taking smaller holdings in firms, investors can create a portfolio with a manageable level of risk, even in a small market like Australia.

Investing in several smaller parcels is, however, more expensive. This is because 'due diligence' is needed with each investment. The cost can be reduced where one investor draws on the work of another, but it will still be more expensive than if the same equity is held by fewer firms.

The small size of Australia's venture capital market, while adding to the costs of investing, is not necessarily an impediment to achieving a portfolio with manageable risk. Governments looking to intervene in the venture capital market should focus on measures to reduce the costs of undertaking due diligence, rather than on incentives to share the 'risks' of providing venture capital. Some measures to improve communication between borrowers and

lenders were announced in the Commonwealth Government's *Working Nation* White Paper (Keating 1994) (see below).

The Australian venture capital market is still developing. Companies are likely to invest more freely when existing venture capitalists have established a track record.

9.3 Valuing intellectual property

There is a perception that venture capitalists in Australia find it difficult to value a firm's intellectual property. The AIIA said:

> The Australian finance industry — both suppliers of debt and equity — does not fully understand the asset represented by intellectual property in software or hardware. Nor are the IT industries readily able to explain the market potential represented by that intellectual property. Australia's accounting rules for the valuation and reporting of intellectual property as assets are also not well developed. (Sub. 27, p. 38)

Computer Vision International said the problem lies in convincing a non-technical person (usually an accountant) of the commercial value of a firm's intellectual property:

> I have been dealing with a company X — one of the better venture capitalists — but you will find that they will bring somebody in the company, an accountant, and they will go through the assets of the company, bricks and mortar and chairs and paintings on the wall and say to you, 'Your company is worth X amount'. (Transcript, p. 119)

> We have no means of constructing an argument or a formula of putting together intellectual property or design property and put that in front of an accountant, not an engineer, and for that person to say, 'Yes, that's a fair investment. The assets of this company are X, Y, Z'. (Transcript, p. 126)

AT&T Global Information Solutions contended that:

> One [Australian] company's valuation in the USA was double the valuation of the Australian venture capitalists. (Transcript, p. 337)

The value of a firm's intellectual property to an investor is determined, among other things, by expectations about the extent to which that intellectual property can be exploited. These expectations will be influenced by the legal system under which rights to exploit intellectual property are granted. Where different markets operate under different legal systems, the value ascribed to a firm's intellectual property in those markets may also differ.

It may also be affected by the extent to which an investor in a firm can exploit the firm's intellectual property in the event that it fails to do so (for example, if the firm enters liquidation). This will depend on whether the intellectual property can be separated from the firm; whether once separated, it can be sold

or used; and whether the investor is confident that the previous owners can be restrained from exploiting the intellectual property in the future.

Other factors may also affect the value placed on a firm's intellectual property by investors in different markets. These may include differences in projected earnings, expectations about exchange rate movements, and differences in expected average price/earnings ratios in different capital markets. These factors will also affect investors' perceptions about the value of the firm's other assets, and hence the amount investors are willing to loan or invest in a firm.

For venture capitalists, an important consideration is having an exit strategy. The risks associated with investing in a firm in one market may be lower than in another if the first market has a larger potential pool of new investors which original investors can rely on when seeking to redeem their investment.

9.4 Business skills

Several participants suggested that firms in the IT industries lack the business skills necessary to prepare and present their case for finance to venture capitalists and others. The AIIA said:

> ... many firms lack management, finance and business strategy skills to develop and present their business case in a way that is appealing to financiers. (Sub. 27, p. 38)

The South Australian Government said:

> While difficulty in raising capital for development and expansion is cited by companies in the IT industries as an issue, there is a view in this State that the real issue is one of companies being able to get their business fundamentals right and to then develop and present a good business case to the financial institutions. (Sub. 26, p. 5)

This problem is not limited to the IT industries. In reference to a survey of Australian service exporters undertaken for Austrade, LEK Partnership (1994) said:

> Survey data repeatedly indicated that too many firms seeking finance were clearly ill-prepared, poorly organised and in some cases, not well administered. (pp. 74-75)

The problem is not necessarily one-sided. AT&T Global Information Solutions (Sub. 28) cited a case where a firm in the IT industries needed finance to exploit a market opportunity, but the financier took 18 months to approve the firm's application, by which time the marketing opportunity had passed. LEK Partnership (1994) noted similar problems affecting exporters of services:

> Professional funders also lack a sophisticated approach to understanding the needs of the service exporter. They need to get a grip on the real risks involved in providing finance to service enterprises, and to develop ways to better manage this risk. They

> also need to manage what is growing demand for finance from a burgeoning sector of the economy. (p. 75)

In its response to the draft report, the Chamber of Manufactures of New South Wales said its experience suggests that:

> ... this lack of skills, knowledge and experience [among potential investors] extends to evaluating proposals from the manufacturing sector generally.
>
> Some capital providers have sought to improve their skills in this area. They remain, however, in a very small minority. This represents a significant market failure which is impeding Australian industry development. (Sub. 94, p. 2)

The Chamber referred to several solutions which it said the Commonwealth Government could adopt:

> The most obvious of these being mechanisms to accelerate improvement in the skills of capital providers in assessing proposals. This might be achieved in concert with the major lenders and/or by encouraging the entry of new players and products into the business lending market. (Sub. 94, p. 2)

In its *Working Nation* White Paper, the Commonwealth Government announced that it will introduce a range of measures including:

- establishing a model of best practices for a range of industry sectors to assist banks to understand and assess the future prospects of SMEs and to standardise their loan application and approval processes.
- providing improved training for accountants, business advisers and bankers to enhance their knowledge of the special needs of SMEs and particular types of lending such as cash flow lending and export finance.
- providing assistance directly to SMEs to obtain expert advice on export finance facilities and on the preparation of applications for finance facilities. This will complement the current work of NIES [National Industry Extension Service] to improve the skills of SMEs in applying for loans.
- promoting the role of the Commonwealth Development Bank in lending to small business through a major advertising campaign, and
- facilitating, in consultation with the Australian Bankers Association and small business representatives, constructive dialogue between banks and small business to address the concerns of SMEs. (Keating 1994, p. 74)

The AIIA (Sub. 27) said that improving communication between the IT industries and the finance sector is a matter the Association will address in 1995.

The Commission supports recent initiatives by government and industry to improve the channels of communication between small and medium sized enterprises and providers of debt and equity finance and their financial advisers.

9.5 Government intervention in Australia's venture capital market

Since the mid-1980s, the Commonwealth Government has actively intervened to enhance the venture capital segment of Australia's capital market.

In 1983, the High Technology Financing Committee of the Australian Academy of Technological Sciences released a report (Espie 1983) which examined the provision of venture capital in Australia. The Espie Report (Espie 1983) concluded that two factors which most inhibit the growth of high technology companies were an absence of risk capital and poor management and commercial skills within firms. The report recommended that the Commonwealth Government create companies to invest in and provide managerial skills to these firms.

9.5.1 The Management and Investment Companies program

The Management and Investment Companies (MIC) program was introduced in 1984, in response to the recommendations of the Espie Report. The aim of the program was:

> ... to encourage the development of a private venture capital market in Australia and to provide management and financial support to young innovative, export-oriented businesses with the potential for rapid growth. (BIE 1987, p. xiii)

The program was underpinned by a tax concession which allowed equity investors in a MIC a tax concession equal to 100 per cent of their investment, provided that it was held for at least four years.

The cost to government of the tax concession was set at $20 million per annum. This limited the amount of tax concessional credit the MICs could raise. In turn, it created problems for the MIC Licensing Board which had to determine which firms could raise tax concessional capital, and how much each could raise. The Board increasingly rationed funds by giving priority to the funding needs of existing MICs.

The funding limit also created problems for the MICs. The amount initially allocated by the Board enabled some MICs to begin building investment portfolios. But the firms in which funds were invested needed subsequent injections of capital, and in most cases the MICs did not have access to sufficient funds.

When the Bureau of Industry Economics (BIE) reviewed the scheme in 1987, it was told by the MICs that each company needed a capital base of around $20 million to $25 million to enable it to maintain the in-house expertise needed to manage investments, and create 'a balanced portfolio of investments of

reasonable size' (BIE 1987, p. 46). But the MICs had not yet established a sufficient track record of investments to enable them to raise capital except through the tax concession.

A further problem with the scheme was the requirement that each MIC invest at least 70 per cent of the funds invested in it in eligible businesses on at least one day within any six month period. In practice, investors took advantage of the tax concession, and so most of the funds came into the MICs in June each year, just before the end of the financial year.

The growth in the estimated base of the Australian private venture capital industry over the life of the MIC program is shown in Table 9.1. The program expired on 30 June 1991.

Table 9.1: **Australian private venture capital industry (estimated base), 1983 to 1991**

Year ended	*MIC funds*		*MIC parallel funds*[a]		*Non-MIC private funds*		*Cumulative total*
	$m	*%*	*$m*	*%*	*$m*	*%*	*$m*
30 June 1983	0	0	0	0	2	100	2
30 June 1984	33	65	0	0	18	35	51
30 June 1985	79	68	0	0	38	32	117
30 June 1986	120	53	10	4	97	43	227
30 June 1987	175	50	31	9	147	41	353
30 June 1988	216	42	41	8	257	50	514
30 June 1989	161	22	59	8	503	70	723
30 June 1990	217	30	68	9	448	61	734
30 June 1991	257	32	67	8	470	59	794

a Funds established and managed by MIC professionals, but not subject to the MIC Act.

Source: MIC Licensing Board (1991).

9.5.2 The Pooled Development Funds program

The Government announced the creation of the Pooled Development Funds (PDF) program in its *One Nation* White Paper in May 1992 (Keating 1992). PDFs are Australian companies which provide long-term equity capital to SMEs. The program is administered by the PDF Registration Board.

Government support is provided as tax concessions to PDFs and to investors in PDFs. Profits of PDFs are taxed concessionally. Profits derived from investments in SMEs are taxed at a rate of 15 per cent, and profits from all other sources are taxed at a rate of 25 per cent. This compares with the general company tax rate of 36 per cent. Capital gains on the sale of shares in a PDF

are tax exempt in the hands of PDF shareholders. Unfranked PDF dividends in the hands of PDF shareholders are exempt from tax. Franked PDF dividends are also exempt unless shareholders elect to be taxed through the imputation system.

Unlike the MIC scheme, the Government has chosen not to limit the cost to government revenue of the tax concessions, and there are no restrictions on the amount of capital which can be invested in PDFs.

Conditions imposed on PDFs in order to qualify for the tax concessions include:

- 65 per cent of a PDF's raised capital must be invested in eligible businesses within five years of the Fund receiving it;
- PDFs may only invest in businesses with total assets of less than $50 million;
- a PDF can invest up to 30 per cent of its raised capital in one investee business (but this limit can be raised at the discretion of the Board);
- firms other than life offices and banks may own no more than 30 per cent of a PDF;
- investments by a PDF must be used as 'start-up' finance or to expand an investee company's production capacity or markets; and
- investments may be made in any business activity except for retail operations and real estate investment (except where the investment is integrated with a broader business activity).

As at 30 June 1994, 11 firms were registered as PDFs. Three had raised $35 million in capital since July 1992 and invested $19.4 million in 37 firms. Between 30 June 1994 and 1 June 1995, another 15 PDFs were registered and a further $21 million has been raised by two PDFs.

The cost to government revenue is expected to be $8 million in 1995-96, and $9 million in both 1996-97 and 1997-98. Administration costs are around $400 000 per annum.

9.5.3 Australian Technology Group

In 1992, as part of the measures announced in the *One Nation* White Paper, the Commonwealth Government established the Australian Technology Group (ATG) as a source of start-up capital for Australian industry. The ATG was established as a link between research institutions and the marketplace to assist in the translation of ideas, research results and breakthroughs into commercial reality. The ATG was given a one-off capital base of $30 million and is expected to become self-financing through fee and investment income.

The ATG does not rely on concessionary tax arrangements. Four tasks of the ATG are to:

- help identify research with commercial potential, particularly from public sector research bodies, but not limited to the public sector;
- secure effective control and protection of intellectual property (eg patents) for itself and its partners;
- market research output to Australian and overseas companies (including, where necessary, by providing seed capital to bring the idea to a stage where it would be attractive to private sector partners); and
- further develop an export industry in intellectual property. (Keating 1992, p. 79)

In 1994, the Group evaluated over 500 proposals. After nearly three years, only three proposals have satisfied the Group's investment criteria. Each investment is in the $500 000 to $2 million range. No proposals from the IT industries have yet satisfied the Group's investment conditions.

9.5.4 Business Equity Information Service

The Commonwealth Government announced in its *Working Nation* White Paper (Keating 1994), it will establish a scheme for individual investors called the Business Equity Information Service. The Service will 'network' State Chambers of Commerce and Industry, seeking to match potential investors with small firms requiring equity finance. The scheme's aims are to: increase capital mobility; raise awareness of equity financing as an option for small firms; and assist in disseminating management best practice to small, growing firms.

9.5.5 Partnerships for Development and Fixed Term Arrangements

The Commonwealth Government encourages investments by multinational companies into approved independent venture capital funds through its Partnerships for Development (PFD) and Fixed Term Arrangements (FTA) programs. Investments of more than $1 million per annum into an approved venture capital fund are recognised as a sign of 'good corporate citizenship', and investments are 'valued' at three times their face value in recognition of the risks associated with such investments.

AT&T Global Information Solutions (Sub. 28) questioned the need for money to be invested in 'approved' venture capital funds, and suggested that all money invested as venture capital should be treated equally.

The PFD and FTA programs are discussed in Chapter 5.

9.5.6 Other government assistance

Various forms of government assistance can reduce the need for external finance or assist firms in obtaining finance (eg by providing a 'bankable' asset). Participants said their need to raise finance has been reduced because of funds received through the computer bounty, the Research and Development (R&D) Tax Concession and R&D Competitive Grants Schemes. Telspec, for instance, said:

> The R&D tax concession and the bounty program have been good examples of policies that should be continued. In an environment where risk capital for high-tech ventures such as those undertaken by Telspec is limited, these government programs have played an important role in allowing companies such as ours to build upon our international technical expertise and technology and to use Australia as a centre for the exporting of computer-based products and services. (Transcript, p. 79)

Others said access to finance for smaller firms would be improved if, in place of these programs, the Government adopted a policy of purchasing IT from Australian owned or Australian-based firms. It was argued that this would influence the lending policies of banks in favour of IT firms.

9.6 Availability of finance

In 1993, the Australian Development Capital Association Limited (ADCAL) began a series of annual surveys of Australian development capital providers. The survey covered 17 of ADCAL's 31 investor members. Table 9.2 shows total funds under management.

Not all capital available is invested as development capital. Fund managers retain some liquidity for new and additional investments. The companies raised $23.8 million in 1991-92 and $164.1 million in 1992-93.

During 1992-93, those surveyed:

- invested $90 million in 69 new investee companies;
- invested an additional $16 million in existing investees;
- recovered nearly $164 million (based on cost) from 36 investments, of which $94 million (51 per cent) was the repayment of debt; and
- wrote off 24 investments worth nearly $22 million (nearly 4 per cent of total funds invested as at 30 June 1992).

Table 9.2: **ADCAL funds under management**

	30 June 1992		*30 June 1993*	
	No. of Investees	*$m*	*No. of Investees*	*$m*
Total capital invested	411	567.8	420	488.6
Total capital committed	14	6.4	18	20.4
Total uncommitted capital		262.8		359.9
Total	**425**	**837.0**	**438**	**868.9**

Source: Arthur Anderson (1994).

Of the 69 new investments, 39 were for expansion of an existing business, 18 were for management buy-outs or buy-ins, and 12 were for start-ups. Some $274.4 million was repaid to those who contributed to the funds under management.

Comparing the venture capital markets in Australia and the United States of America (USA), Arthur Anderson found that 90 per cent of investee companies in the USA were under seven years old, while in Australia, only 30 per cent were. A comparison of venture capital investments by industry is shown in Table 9.3.

Table 9.3: **Investments by industry: Australia and USA, 1992-93** (per cent)

	Australia	*USA*
Communications	11	11
Computer related	7	20
Electronics	4	5
Medical	2	24
Other	76	40

Source: Arthur Anderson (1994).

The Commission's discussions with firms at various stages of development revealed that success in obtaining finance depends on many factors including a firm's size, its asset base and its preference for debt or equity finance.

Many firms, like *Sybiz Software*, rely on cash flow, profits and/or debt finance. *Netsource*, a network integration company, is typical of firms that prefer debt finance because it allows them to maintain full control. However, there is a

perception that the banks are only interested in 'bricks and mortar' and this is reflected in the number of firms whose founders have 'mortgaged the house'. *Working Systems*, an applications software firm and *Mosaic Electronics*, a hardware supplier, are typical of firms that have drawn upon a home mortgage.

Stallion Technologies, a data communications firm, has relied on a combination of profits, government assistance and debt finance since it was established in 1985. Hambro Grantham, a venture capitalist, acquired a 50 per cent interest in the firm in 1992. *Computer Management Centre*, a software and services company, and *Fundi Software* have likewise obtained venture capital in exchange for equity.

Execom Group, a supplier of software related services, said it lacks the financial resources for its next stage of expansion and is seeking links with a joint venture company or strong partner. *Intellect Australia*, a hardware designer/developer, looked to a public float for its last major capital injection. *JNA Telecommunications*, has used a variety of sources, including profits, debt finance and R&D syndication, and in July 1992 was listed on the Australian Stock Exchange.

9.7 Conclusions

The problems that SMEs face in obtaining debt and equity finance have been well documented. The lack of venture capital, in particular, is seen as an obstacle to the growth and development of small business. Indeed, the Beddall Committee (Beddall 1990) concluded that reforms are needed to ensure that equity finance in the relatively modest amounts of $50 000 to $100 000 is available to support new ventures by small business. The concerns persist despite various interventions by government.

The Industry Commission (IC 1991a) in its *Availability of Capital* inquiry was asked to examine impediments faced by businesses in obtaining equity and loan capital (having regard to the position of SMEs), including the availability of 'venture capital'.

In that inquiry, the Commission set about examining whether the perceived gap in financing could persist in a deregulated capital market. It sought evidence of impediments to efficiency within the capital market which might bias investment flows away from smaller companies, and problems in matching investors with investees. It made a number of recommendations aimed at improving capital markets, but generally concluded that the difficulties faced by small firms reflect the risk preferences of investors, rather than institutional impediments or market failures. The Commission did not consider that direct

government intervention to expand the institutional funds available to smaller companies would improve the efficiency of the capital market or the economy generally.

This inquiry lends support to these arguments. It has found that SMEs in the IT industries have the capacity to tap many sources of finance. Many are very successful in doing so, whereas others have difficulty accessing sources of commercial finance and are forced back on trade creditors, home mortgages, etc. Many IT firms have been established within the past 10 years and continue to rely upon the IT skills, business acumen and financial backing of their founders.

The problems are not unique to the IT industries, though the risks in lending to firms in these industries are heightened where the business is based mainly on the intellectual property embodied in a piece of software or a novel piece of hardware. In some respects the IT industries are advantaged — through strategic relationships with larger firms and government funding of R&D.

Firms in the IT industries may be disadvantaged in the provision of venture capital, not because of a shortage of venture capital funds, but because venture capital firms lack managerial expertise relevant to the IT industries. This has been recognised by private venture capital firms and some are employing people from the IT industries to help evaluate and oversee suitable investments. The shortage of skills is likely to be a temporary phenomenon. As Australia's venture capital market continues to develop and its links with the IT industries strengthen, the problem will recede.

In *Working Nation,* the Commonwealth Government announced new initiatives to improve communication between borrowers and lenders and generally minimise financial constraints on the development of high growth firms:

> ... including early stage businesses, those with new technologies, and those seeking to expand into overseas markets. (Keating 1994, p. 74)

The Commission supports the initiatives in the *Working Nation* White Paper to improve the availability of capital to SMEs. These initiatives, with the further maturing of the venture capital market, will help create a climate more conducive to innovation — an outcome also facilitated by government support for R&D.

Notwithstanding the new initiatives, many firms are unlikely to get all of the financial support they are seeking. However it is not an appropriate role for governments to underwrite the risks faced by individual firms, including the high risks faced by fledgling firms seeking to commercialise an innovation. Such an approach would not improve efficiency, would penalise less risky ventures, and could impose major costs on the rest of the economy.

10 INTELLECTUAL PROPERTY

Protection of intellectual property in Australia occurs through legal instruments, usually modelled upon and constrained by various international conventions (see Appendix G). Intellectual property as it relates to the information technology (IT) industries may be protected under patent or copyright. Of particular interest in this inquiry is the protection afforded holders of copyright in software. This chapter discusses the issues of most concern to participants including: parallel importing; the scope to decompile computer programs; the enforcement of copyright protection; and government ownership of intellectual property

Two features of intellectual property will tend to discourage its creation in a free market economy. The cost of producing intellectual property is high relative to the cost of reproducing it, and it is difficult for the owner of intellectual property to preclude others from copying and distributing it.

One option is to subsidise the cost of investing in intellectual property (eg through research and development grants). Another is to grant the owner of intellectual property a monopoly over its sale (eg by granting a patent right or copyright). Patent protection is used in the hardware sector of the IT industries. Copyright protection is important to software developers and producers of integrated circuits.

Participants raised no issues relating to Australia's patent system. Several participants raised issues relating to the extent of protection offered by Australia's copyright system.

10.1 Patent protection

In Australia, inventions (ideas which are original, novel, involve an inventive step, and are commercially useful) can be granted patent protection under the *Patents Act 1990* for a period of 16 years. The term of protection will be extended on 1 July 1995 to 20 years for all patents granted after 1 July 1995 and all existing patents which would expire from that date, when the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (*TRIPS Agreement*) comes into force.

Patent protection was extended to include computer software-related inventions in 1992, following a decision of the Federal Court in *International Business*

Machines Corporation (IBM) vs. Commissioner of Patents (1991) 22 IPR 417. IBM Australia had sought to patent software that produces a curve image on a computer graphics display, involving the application of a mathematical algorithm. Mathematical algorithms used in computer programs are not protected under copyright law because they cannot be considered an original expression of an idea (see Section 10.2).

The Federal Court concluded that the test of whether a software invention was patentable was: 'Does the invention claimed involve the production of some commercially useful effect?'. In the case of IBM's software, the Court found that it did. Hence mathematical algorithms can now be patented in Australia if they can be shown to produce commercially useful effects.

10.2 Copyright protection

Expressions of ideas

Expressions of ideas, as opposed to the ideas themselves, can be protected under the *Copyright Act 1968*. This Act is modelled on the *Berne Convention* for the protection of literary and artistic works. Australia is a member of the Convention.

The *Copyright Amendment Act 1984* extended copyright protection to computer software. This Act ensures that software is protected under the original Act as a 'literary work'. Unlike patent protection, copyright protection is automatic, and commences when the computer program is completed. Protection applies for the life of the author (or in the case of joint authorship, the last surviving author) plus 50 years. Protection also extends into distribution — computer programs cannot be imported into Australia, except by individuals for their own use, without the permission of the copyright owner. This prohibition extends to the electronic transmission of computer programs.

In 1988, the Copyright Law Review Committee (CLRC) was asked to review the *Copyright Act 1968* as it applies to computer programs. The Committee released its report in April 1995 (CLRC 1995), recommending that:

> ... computer programs continue to be protected by the Act as literary works. (p. 39)

The CLRC noted that Australia had acceded to the *TRIPS Agreement*, putting the issue of the form of protection offered to computer programs in Australia beyond debate.

In February 1995, the Minister for Justice announced that the CLRC would conduct a comprehensive review of the whole of the *Copyright Act 1986*. The

aims of the review are to update the current Act to cope with changes in technology, and to simplify the Act for copyright creators, owners and users.

Circuit layouts

The *Circuit Layouts Act 1989* was passed in order to obtain temporary protection for Australian integrated circuit layouts in the United States of America (USA) under the United States Semiconductor Chip Protection Act. Circuit layouts must be registered under the Act. Protection is provided for a period of 10 years from the date an application for registration is filed, or from the date of the first commercial exploitation of that design, wherever in the world it occurs.

Designs

Copyright in a design can also be protected in Australia under the *Designs Act 1906*. Protection remains in force as long as a design remains registered.

The concerns of inquiry participants relating to the protection of intellectual property were in areas of computer software protected under the *Copyright Act 1968*.

10.3 Extent of copyright protection

Most participants were satisfied with the extent of protection offered in Australia to holders of copyright in software — the life of the program's author (or in the case of multiple authors, the life of the last surviving author) plus 50 years. The protection offered in Australia matches that required by the *Berne Convention* and the *TRIPS Agreement*. The CLRC (1995) suggested that if Australia were not bound by its adherence to the *TRIPS Agreement*, the Committee would have recommended that copyright protection not exceed 50 years from the year the program was made. As Australia is bound by the Agreement, the CLRC:

> ... reluctantly concluded that the provisions of s.33 of the Act ... must remain as they are. (p. 98)

It did, however, recommend that the existing term of protection of life of the author plus 50 years should apply to all computer programs, whether published or unpublished, removing an anomaly in the current Copyright Act which allows the copyright in unpublished computer programs to exist indefinitely.

The European Union has recently adopted the life of the author plus 70 years as a uniform copyright period for many works, ostensibly to protect cultural diversity. Legislation has recently been introduced in the Senate of the USA

which will, if passed, extend copyright protection to life plus 70 years, or to 95 years for corporate authors.

Two issues relating to the extent of protection were raised in submissions and at public hearings: parallel importing and decompilation rights.

10.3.1 Parallel importing

Under Sections 37 and 38 of Australia's *Copyright Act 1968*, the owner of the Australian copyright in a software program can prevent legitimate copies of that program from being imported except through 'authorised distribution channels', unless those copies are imported by an individual for their own use. Legitimate copies are those which have been made with the consent of the copyright holder in the country in which they were produced. Imports of legitimate copies are referred to as 'parallel imports'.

The Commission received a number of submissions from participants in this inquiry arguing for the retention of Australia's parallel import provisions. Most came from industry associations (eg the Australian Information Industry Association, Australian Record Industry Association, Video Industry Distributors Association) and from software distributors (eg Dataflow Computer Services, Sega-Ozisoft, Electronic Arts). Few submissions referring to this issue were received from copyright holders (eg IBM Australia).

The issue of parallel importing was considered by the CLRC specifically in 1988 (CLRC 1988), and then as part of its review of *Computer Software Protection* (CLRC 1995). The Prices Surveillance Authority (PSA) also examined the impacts of Australia's parallel importing provisions during its inquiry into *Computer Software Prices* in 1992 (PSA 1992). The CLRC released its report on *Computer Software Protection* in April 1995.

In 1988, the CLRC (1995) concluded that:

> ... parallel import provisions should continue to apply in relation to computer software and other copyright materials, but that their application to such imports should be relaxed in a number of respects. In particular, the Committee recommended that unlicensed importation by a person engaged in trade or commerce should be allowed either where a specific order for an article is made by a customer or where the article sought to be imported is unavailable in Australia for longer than a reasonable period. (pp. 196-197)

During its broader review of software protection, the CLRC received several submissions referring to its 1988 recommendations that were split between the computer industry and those advocating consumer interests.

The Law Council of Australia summarised the arguments put before the CLRC:

> ... on the one hand, that the current law has the effect of increasing the prices and decreasing the availability of copyright articles in Australia. On the other hand, these claims were denied and it was further claimed that the international copyright system is based on a territorial framework and that if the current import provisions are repealed or drastically altered this may well result in many producer industries not providing for the Australian market and also not subsidising the Australian publishing and manufacturing industries which are reliant on such subsidies. (CLRC 1995, p. 199)

The PSA completed its inquiry during the CLRC's broader review and concluded that computer software prices in Australia were higher than would otherwise be the case if the parallel import provisions of the *Copyright Act 1968* were removed. This was because the provisions allow copyright holders to extend the protection offered by copyright into distribution. The PSA (1992) noted that Australia was not obliged under any international treaty to extend copyright protection of computer software into distribution, and recommended:

> ... that Sections 37 and 38 of the *Copyright Act 1968* be repealed in relation to parallel imports of computer software and associated manuals from countries signatory to the Berne Convention and Universal Copyright Convention. (p. 81)

The PSA maintained this position in its submission to this inquiry (Sub. 79).

The CLRC released a draft report on *Computer Software Protection* in 1993 (CLRC 1993). On parallel imports, the CLRC said:

> The Committee is divided on the issue of parallel importation. A bare majority agrees with the recommendations of the PSA concerning the parallel importation provisions. Accordingly, that majority recommends:
>
> (1) parallel importation of computer programs and subsequent commercial dealing with such imported copies should be allowed from only those countries which are the major source of computer programs used in Australia;
>
> (2) parallel importation of, and subsequent commercial dealing with, computer manuals (whether or not sold together with computer programs) should be permitted to the same extent. (p. 14)

In its final report, the CLRC (1995) reversed the position taken in its draft report, and unanimously recommended that:

> (a) the restrictions on parallel importation of computer programs remain unchanged;
>
> (b) the position be reviewed in three years time;
>
> (c) computer manuals that are available separately from computer programs should be able to be imported in the same way as other books; and
>
> (d) its recommendation concerning the importation provisions should apply equally to second-hand computer programs. (p. 14)

According to the CLRC:

> ... the threat of piracy is a principal reason why parallel importation of computer programs and associated manuals should not be allowed. (p. 225)

Other reasons advocated included:

- doubts about the compatibility of the CLRC's draft recommendations with Australia's obligations under the *TRIPS Agreement* (on the grounds that the CLRC draft recommendations contravened GATT principles of non-discrimination);
- the downward trend in software prices which the Committee understood had begun before the PSA's inquiry into computer software prices in 1992;
- the extent of competition in the software distribution industry; and
- adverse impacts on employment in Australia, investment in Australia by overseas producers, and research and development undertaken in Australia.

After examining the CLRC's report and submissions from participants, the Commission has paid particular attention to the issues of trends in software prices, competition among software distributors and piracy.

Trends in computer software prices

According to the CLRC (1995), the principal criticism of Sections 37 and 38 are that they allow copyright holders to price discriminate between markets. That is, to charge higher prices for a software program in one market (Australia) than in others (in particular the USA).

As part of its inquiry into computer software prices, the PSA (1992) surveyed the prices in Australia and the USA of 33 of the highest selling personal computer business computer programs sold in Australia, over a 37 month period from July 1989 to July 1992. The survey showed that the average price differential over the period was 49 per cent. In January 1992, the differential was around 36 per cent. By October 1992, the differential was down to 25 per cent. However, the PSA (1992) said that:

> ... the reduction in the Australia: USA price differential has come about almost entirely as a result of external factors. Changes in industry structure and competitive forces in Australia have contributed little. Consequently there is nothing to suggest that the differential will not widen if the Australian dollar appreciates against the USA currency or if suppliers exercise discretionary price setting powers to increase prices at the completion of this inquiry. (p. 59)

The PSA continued to monitor software prices after its inquiry finished, and observed that the Australia-USA price differential had declined to around 20 per cent by mid-1993.

Reasons why prices may differ between countries include:

- some programs may require modification to suit local operating conditions. (most shrink-wrap software is unlikely to require such modifications);
- programs sold in one market may include features not provided in another. (not comparing 'like' with 'like');
- generally higher costs in doing business in one country than in another (eg airfares, telephone charges etc); and
- different economies of scale in distribution, because of differences in population (eg size, geographic location).

While such factors could explain varying degrees of price discrepancy, prohibitions on parallel imports can also create price discrepancies by allowing copyright holders to raise the price of a software program in one market above that charged in another.

In its examination of prices, the CLRC noted that software prices in general have, and perhaps still are, subject to a downward trend, and that software prices in many or all other countries outside the USA (eg the United Kingdom) are generally higher than in Australia. The CLRC (1995) concluded:

> The Committee is not able to weigh up the validity of these reasons [for the downward trend in software prices] but, whether or not they are valid, it is clear to the Committee that the prices of computer programs in Australia are not in its view *unacceptably* high, even if they are higher than in the US. (p. 207, emphasis in original)

The CLRC concluded that allowing parallel imports of computer software would not necessarily lower the prices of legitimate software in Australia, given that a range of factors affect software prices. It also noted that the price of software in Australia was lower than that in many other markets outside the USA.

But Sections 37 and 38 do not preclude competition between software packages. They limit competition among distributors (and would-be distributors) of the same package. Allowing parallel imports would therefore preclude copyright holders from discriminating between customers in one market and customers in another.

The question this raises is whether a copyright holder needs an additional incentive to sell a software program in one market than it does to sell the same program in another?

The ability to sell copyright material in different markets is sufficient incentive for a copyright holder to do so. Extending a copyright holder's monopoly into the distribution of software gives the copyright holder an opportunity to earn the

maximum return on each copy sold. But this is likely to reduce the number of copies purchased and used in each market.

Dataflow Computer Services (Sub. 50, 80), an importer and distributor of computer software in the home and education markets, said that extending protection into distribution gave copyright holders and software distributors the incentive needed to provide after-sales support. If parallel imports were allowed:

> There would be extremely little incentive to provide warranty support, upgrade information or any after-sales servicing of software. ... there may be many lines of supply into Australia but if none of the lines of supply were interested in post-sales support, then the fact that there are many of them is irrelevant. (Sub. 50, p. 6)

It said some copyright holders and software distributors do not charge separately for support:

> ... because they are providing a service to the consumer for buying a commodity product in a complex environment, where the consumer does not want to be passed around from company to company, or technical support officer to technical support officer, at a charge of $3.00 per minute, watching the clock as it ticks by. (Sub. 80, p. 7)

However, Dataflow conceded that some copyright holders charge for after-sales support. It said that Lotus, Microsoft, Adobe, Claris and others have provided paid for support, however:

> ... such paid for support is intensely resented by the Australian consumer. Indeed, we get many phone callers to our company, saying that they are dissatisfied with the fact that they have to pay to have a program installed and up and running on their machine. (Sub. 80, p. 7)

It is of course open to a company to include after sales support in the price charged for software if this would be more attractive to customers. However, the customer still pays for after-sales support, either explicitly, by buying a program and buying user support, or implicitly, by buying software from a firm like Dataflow which includes after-sales support with each software package sold. In the latter case, the consumer may not know the price of that support.

Restrictions on parallel importing (imports other than by copyright holders or their licensed distributors) limit competition in the distribution and retail markets and have the potential to raise the price of software.

A partial offset is that the Copyright Act allows individuals to import computer programs from overseas where the copies are imported for own use. Individuals can thus avoid existing price differentials between their local and the copyright holder's domestic market. However, the extent to which they can benefit from this provision is limited by the costs they may face in identifying a source of supply (although this may be low), and the risks associated with importing a

product for which there may be limited local support (although some firms offer limited third-party support in Australia).

In the CLRC's inquiry, Australian software distributors sought to undermine this provision by having software mail order houses overseas banned from advertising in Australia. The CLRC rejected the arguments on the grounds that it would be impossible to enforce.

Software mail order houses should be allowed to advertise in Australia, not because they cannot be prevented from doing so, but because Australia's Copyright Act allows individuals to import software for own-use. Preventing mail order houses from advertising in Australia would inhibit the use of this provision of the Act.

Competition

Several participants in the Commission's inquiry argued for the retention of Sections 37 and 38 on the basis that the software distribution market in Australia was competitive, and there are other legal remedies available (notably the *Trade Practices Act 1974*) if copyright holders or their licensed distributors act in an anti-competitive manner.

While the software distribution market in Australia may be relatively competitive across program types (eg word processing packages), the distribution of a specific program is not. Allowing parallel imports will ensure that the distribution market is competitive.

Dataflow, in its submission, said that based on its experience:

> ... competition for **exactly the same product line** stifles initiative. We see this time and time again in products for which we are a non-exclusive distributor. After a period of time, our company and the other distributor, or distributors, lose interest in that product. Marketing ceases, support ceases and the net result is that the publisher's products do not come to market in a timely fashion, the products are not supported, the products do not become available to the consumer and at the end of the day the consumer loses out. (Sub. 80, p. 9)

This raises several issues in relation to parallel imports. Firstly, allowing parallel imports will create a contestable distribution market for software programs in Australia. This does not mean that there will be parallel imports of every software program sold in Australia. The market for some programs may be so competitive already that investment by an unlicensed distributor would not be commercially viable. The important point is that a contestable market will generally ensure downward pressure on prices, with due regard to quality.

Secondly, while increased competition may give a distributor less incentive to market a particular software program, successful programs will still be

distributed in Australia. Thirdly, the current provisions can only benefit those Australian software distributors which have exclusive distribution agreements with overseas copyright holders, and then only if the programs are successful in Australia. A distributor could be appointed exclusive agent for a program which, for a variety of reasons, fails to succeed in the Australian market.

The National Amusement Machine Operators Association (Sub. 93) supported the Commission's draft recommendation favouring parallel importation. It pointed out that since parallel imports were allowed in the coin operated video game market, its industry has prospered and the public has benefited from the greater availability and lower cost of coin operated video games.

In its report, the CLRC (1995) recognised that the parallel import provisions could be used by copyright holders in an anti-competitive manner, but said that no evidence was given to indicate that this had occurred. It noted that if such activities did occur, the appropriate way to deal with them is through the provisions of the *Trade Practices Act 1974* and through the three-tiered approach to price monitoring which will be introduced when the Australian Competition Commission is established in July 1995.

However, one member of the CLRC disagreed with this assessment:

> That member believes there are insufficient remedies available to prohibit anti-competitive behaviour by the exclusive licensee of copyright licences. While parallel importation sanctions remain, the issue of addressing anti-competitive behaviour must be raised in the Trade Practices Act to ensure that protection of the exclusive licence granted in Australia does not have the effect of granting that licensee any economic rights over and above market based performance criteria. The grant of an exclusive licence effectively prohibits competition, therefore incentives must apply to require that licensee to perform adequately by way of service, availability of product, correction of faults and tailoring product to the needs of the local market. (CLRC 1995, p. 211)

Even if Australia's Trade Practices Act were strengthened, the difficulties of proving anti-competitive behaviour would remain. Price monitoring, while an option, is not costless. A more direct way to safeguard the interests of consumers is to allow parallel imports of computer software.

Piracy

The CLRC (1995) was concerned by the threat that piracy posed to copyright holders. It considered that others had dismissed the threat of piracy too easily:

> ... piracy should not be treated dismissively and all possible measures should be taken to reduce its incidence and discourage its growth. (p. 225)

The Commission is also concerned by the threat of illegal copying of copyright material. Unless Australia's copyright system affords copyright holders

sufficient protection, they will choose not to sell copyright-protected material in Australia.

Some developers of low volume software protect their copyright by write-protecting or 'locking' their software against copying. By requiring customers to purchase a 'key' to unlock the program, these firms typically know when copies are made and how many copies of their programs are in use. Others, particularly those exploring new market niches, rely on regular updating of programs and close contact with their customers to discourage piracy. One such firm, ACADS-BSG said:

> The industry that we serve cannot afford the additional cost of software protection and hence we do the minimum by way of preventing piracy. All we do is encrypt the name of the firm in the software and rely on the fact that we do regular updates and enhancements to provide an incentive for organisations to buy legal copies from us and keep in touch. (Sub. 18, p. 4)

Controlling illegal copying in high volume markets is more difficult. A distinction can usually be made in these markets between some low value programs, like computer games, and higher value programs like word-processing or spreadsheet packages. Some low value software is locked against copying. This may reflect the fact that there is little after-market support needed for such products, and hence copyright holders have only one opportunity to benefit from the sale of their product.

Higher value software tends not to be locked, perhaps because the need for after-sales support is higher, and developers can profit through the sale of technical support and program upgrades. In order to encourage potential users to buy legitimate copies, developers may require owners to register before being eligible to lodge warranty claims and seek after-sales support. Some copyright holders separate the sale of a computer program from the provision of after-sales support.

Australia's current importation provisions can assist those copyright holders who maintain registration systems where the copyright holders choose to retain distribution in-house or choose to appoint a sole Australian distributor by restricting the number of channels through which legitimate software is sold. This reduces the number of avenues the copyright holder needs to check to identify whether a copy of a software program is legitimate or not, thereby lowering the cost of doing so.

The provisions do not assist those who choose to allow parallel imports of their software, or who protect their software through encryption devices or program locks.

This raises the question, 'What would copyright holders do if parallel imports were allowed into Australia?'.

The answer is that they would continue to protect their copyright by encrypting or locking their software, by registering owners for warranty claims and after-sales support, and by separating the sale of a computer program from the provision of after-sales support. While allowing parallel imports would increase the cost of maintaining registration systems, copyright holders already face a significant cost in doing this because illegal copies of software can be produced as easily in Australia as overseas.

Through the *Copyright (World Trade Organisation Amendments) Act 1994*, the Commonwealth Government has strengthened the legal rights of software copyright holders in two ways. From 1 January 1996, copyright holders will have the right to authorise or prohibit the commercial rental of their programs. From 1 July 1995, Customs authorities will have the power to intercept and seize imports of illegal copies of computer programs. This will not solve the problem of imported illegal computer programs because the Australian Customs Service will face the same difficulties copyright holders now face in identifying when and where such shipments take place.

Some developments in technology will help copyright holders protect against illegal copying by improving encryption devices, improving their ability to register owners of legitimate copies, and enabling developers to market software direct to consumers (eg via global digital communications networks and new storage media such as compact disks), thereby avoiding the need to appoint distributors on a country-by-country basis.

Some software developers already provide encrypted or 'locked' copies of their programs on such networks and on compact disks. This allows potential buyers to trial the encrypted versions of software programs and then, if they choose, to purchase a code from the copyright holder which 'unlocks' the encrypted software. After-sales support, where required, can be provided via electronic mail or telephone.

Other developments will act in the opposite direction, making it more difficult for developers to prevent illegal copying.

Summary

Restrictions on parallel imports of computer software allow copyright holders to extend the protection offered by copyright laws beyond the first sale of copyright material and into distribution. This allows them to discriminate between buyers in different markets by charging different prices for the same

product, and earn the maximum return from their investment in developing and marketing copyright material.

The provisions which allow an individual to import a software program for own-use provide some constraint on the extent to which a copyright holder can benefit from prohibitions on parallel imports of a particular program, but importing a program for own-use is not costless, nor risk-free. So some potential for price-discrimination will remain. Allowing parallel imports would create a contestable market for each software program sold in Australia, and reduce this potential. It would not preclude copyright holders from selling copyright material in Australia.

Illegal copying of computer software is a significant problem for software developers, who may use a range of measures to counter this threat. They may:

- encrypt or 'lock' programs against copying. By requiring customers to purchase a 'key' to unlock the program, these firms can know when copies are made and how many copies of their programs are in use;
- register program owners before allowing them to lodge warranty claims and seek after-sales support;
- rely on regular updating of programs and close contact with their customers to discourage piracy; and
- separate the sale of a computer program from the provision of after-sales support.

Sections 37 and 38 of the Copyright Act assist those copyright holders who maintain registration systems by allowing them to restrict the number of channels through which legitimate software is sold. This reduces the number of avenues the copyright holder needs to check when seeking to identify whether a copy of a software program is legitimate or not, thereby reducing the cost of doing so.

Hence the provisions do not protect copyright holders against illegal copying, but do reduce the cost of maintaining a software registration system.

If parallel imports of software were allowed, copyright holders would respond to the threat of illegal copying in the ways that they do now. As the CLRC (1995) noted in its report:

> ... Australia's intellectual property regime is extremely effective in protecting Australia's creators and investors and would continue to offer protection even if controls over parallel importation were relaxed ... (pp. 215-216)

Through the *Copyright (World Trade Organisation Amendments) Act 1994*, the Commonwealth Government has authorised Customs authorities to intercept and seize imports of illegal copies of computer programs from 1 July 1995.

Whether this will reduce the threat of imported illegal computer programs is debatable because the Australian Customs Service will face the same difficulties copyright holders now face in identifying when and where such shipments take place.

Some developments in technology will help copyright holders protect against illegal copying by improving encryption devices, reducing the cost of registering owners of legitimate copies, and enabling developers to market software direct to consumers (eg via global digital communications networks), thereby avoiding the need to appoint distributors on a country-by-country basis. Other technological developments will act in the opposite direction, making it more difficult for developers to prevent illegal copying.

Removing the parallel import restrictions on software raises the issue of the interaction of Australia's Copyright Act and the global copyright system. Australia could allow parallel imports on a unilateral basis without breaching the international agreements on intellectual property rights it has already signed. However, if Australia were to allow parallel imports of computer software, other countries may take the view that it is no longer a 'safe' country in which to sell copyright-protected material and introduce retaliatory measures. Accordingly, there may be little benefit to Australia from *unilaterally* allowing parallel imports of computer software.

The issue of parallel import controls is being considered by the World Intellectual Property Organisation 'Committee of Experts' currently working on a possible Protocol to the *Berne Convention*. To date, the Committee has argued that a right to control parallel imports is implicit in the current reproduction right.

Recommendation 8

The Australian Government should actively support moves to allow parallel importing of legal (non-pirated) copies of software in the forum established by World Intellectual Property Organisation to consider a Protocol to the *Berne Convention* (the Committee of Experts). If the agreed Protocol expressly prohibits parallel importing, the Australian Government would then need to consider whether, in the light of the costs and benefits involved, it should take unilateral action to permit parallel imports of computer software into Australia.

10.3.2 Decompilation

Decompilation is the working back from the object code of a computer program to a version of the source code. In decompiling a computer program, some of the program's source code and most of its object code will be reproduced. This is not allowed under the current Copyright Act.

This issue was raised by IBM Australia (Sub. 17) in response to the CLRC's draft recommendation to introduce a limited decompilation right for interoperability and error correction. IBM acknowledged that the European Union has introduced a decompilation right to allow licensed owners to achieve interoperability of independent computer programs, but said decompilation provisions have been considered and rejected in Japan, New Zealand, Hong Kong and South Korea. IBM warned that:

> Any change to the current law may have an adverse commercial impact on investment decisions regarding the development of software in Australia and may delay the introduction of leading edge software to the Australian marketplace. (Sub. 17, p. 11)

IBM considered that market forces are driving the software market in directions which will make the need for a decompilation right redundant:

> As the market place for software suppliers becomes increasingly sophisticated, customers are demanding that software suppliers provide interoperable products. Given this customer demand, new standards and the increasing move to 'open' systems, ... we submit there is no justification for the CLRC's proposed decompilation provisions. (Sub. 17, p. 11)

It contended that other legislation such as the *Trade Practices Act 1974* provides a safeguard against software developers using access to interface information to limit entry to a market or to damage a competitor. IBM concluded that allowing a decompilation right, however limited, would only benefit those seeking to copy software illegally.

At the public hearings in Brisbane, IBM Australia made the following additional points:

> ... once decompilation, for however restricted a set of reasons, is permitted then you legitimise decompilation tools ... It is not a difficult job to decompile software nor to rebuild software with similar function which bears no resemblance in terms of the code to the original software. ... once you legitimise decompilation aids or tools, how do you police [their use], how do you check on why people might be decompiling software? (Transcript, p. 865)

IBM reaffirmed its view that Australia's existing competition laws provide sufficient protection for software buyers where suppliers do not meet a buyer's need for interoperability or support, or where they fail to supply error-free versions of computer programs. IBM argued that allowing decompilation, even in such limited circumstances, would undermine the value of Australia's system

of intellectual property protection, and discourage investment in software development by trans-national firms.

However, in a submission to the CLRC:

> IBM also submitted that if the Committee remained inclined towards recommending an exception for decompilation it should recommend that any Australian legislation follow the precise wording of the EC Directive on Computer Programs. (CLRC 1995, p. 158)

In its review of *Computer Software Protection*, the CLRC (1995) examined the reasons why users would need to decompile a computer program, and whether a limited right to decompile a computer program was warranted. It concluded that in two cases a limited decompilation right was warranted: to obtain interface specifications between programs; and to allow owners of licensed copies of a program to correct errors in that program, where no error free version of the program is available within a reasonable period of time at a normal commercial price.

Interoperability

The CLRC (1995) considered that most software developers do not provide adequate interface specifications. So others may have little option but to obtain it by decompilation. The CLRC contended that allowing a limited decompilation right may encourage developers to publish more detailed and accurate interface specifications, thereby discouraging others from decompiling a program. This would promote the move to open systems.

The CLRC (1995) therefore recommended:

> ... that decompilation of a computer program should be allowed where it is necessary to achieve the interoperability of an independently created computer program or hardware device with other programs or hardware devices provided:
>
> (a) decompilation is performed by the owner of a lawfully acquired copy of the program or another person having a right to use the copy or on their behalf by a person authorised to do so; and
>
> (b) the information necessary to achieve interoperability has not previously been readily available; and
>
> (c) the acts are confined to those necessary to achieve interoperability. (p. 162)

The CLRC's recommendation closely follows Article 6 of a directive issued by the European Union on 14 May 1991. The directive relates to the legal protection of computer programs and Article 6 allows licensed owners a limited right to decompile computer programs in order to make independent computer programs interoperable. The Commission supports this recommendation.

Error correction

Most software developers correct errors as new versions of programs are released. Indeed, correcting errors is a major driver of software 'upgrades'. Hence, usurping the right of copyright holders to correct errors by allowing licensed owners to do so could reduce the potential market for software upgrades.

However, software users buy software in good faith that it will perform the task for which it was purchased. In the event of an error, the user should be able to pursue the course of least cost in having the error corrected.

Errors may be corrected under current copyright law in two ways. One option is for the copyright holder to correct the error and supply an error-free version of the program. Alternatively the developer may licence the owner of a copy of the program to correct the error in their copy. The CLRC (1995) said:

> Ideally the error is reported to the manufacturer, who often has exclusive access to the source code and hence is better equipped than most to isolate and rectify the error. (pp. 166-167)

However, it noted that some errors arise when programs interact with each other, and in those cases, the licensed owner and not the developer may be best placed to correct the error.

The CLRC's main concern was not that there is no scope in the current legislation to allow licensed owners to correct errors, but that the current options take time, and in many cases, the licensed owners may not have that luxury. The CLRC (1995) recognised that attempting to correct an error in a program's object code without making use of decompilation was impractical and so recommended:

> ... that decompilation for error correction be allowed to ensure the correct operation of a program with another program(s) or hardware device(s) provided:
>
> (i) decompilation is performed by the owner of a lawfully acquired copy of the program or another person having a right to use the copy or on their behalf by a person authorised to do so;
>
> (ii) a version of the computer program free of the error has not previously been readily available;
>
> (iii) the acts are confined to those necessary to correct the error; and
>
> (iv) a version of the program free of the error is not available within a reasonable time at a normal commercial price. (p. 171)

A licensed owner of a computer program should be able to decompile that program in order to correct errors in it, providing that the conditions set out by the Copyright Law Reform Committee (CLRC 1995) are satisfied.

10.4 Enforcement of copyright protection

The enforcement of copyright protection was seen as a major issue by some participants. According to the Business Software Association of Australia (BSAA):

> Although the protection of computer software under the *Copyright Act 1968* is now well established, copyright owners often face serious difficulties in enforcing their rights against infringers. Some of these difficulties are:
>
> 1. the relatively small penalties prescribed by the Copyright Act for criminal offences and the lenient attitude of the courts to these offences;
> 2. the low level of damages and costs awarded to the successful plaintiff in civil actions for copyright infringement;
> 3. the difficulties of proving ownership and subsistence of copyright; and
> 4. the lack of resources of the Australian Federal Police to undertake criminal investigations and prosecutions for software theft. (Sub. 35, p. 4)

The Copyright Act identifies and distinguishes between two forms of software theft: illegal copying for the purposes of sale, distribution or other commercial gain; and illegal copying for an individual's or firm's own use.

Both forms of theft are civil offences, meaning the copyright holder is entitled to a court injunction preventing further illegal copying of their work, and 'damages' relating to the damage done to the value of the plaintiff's intellectual property from the defendant. Illegal copying for commercial gain is also a criminal offence, the maximum penalties in Australia for which are:

> ... for a first offence:
> - for an individual, $500 per illegal copy;
> - for a corporation, $2500 per illegal copy;
>
> for a subsequent offence:
> - for an individual, $500 per copy plus a term of imprisonment not exceeding six months;
> - for a corporation, $5000 per copy. (*Copyright Act 1968*)

There are also overall limits of $50 000 for an individual and $250 000 for a corporation.

The BSAA considered that the criminal penalties are too lenient:

> In our view, the penalties for software theft should be substantially greater and not less than those for films or videos given ... that, on average the [retail] value of a business software package is at least 10 times that of a video. (Sub. 35, p. 5)

The Australian Information Industry Association (AIIA) requested:

> ... that the Commission examine and compare penalties arising from the theft or abuse of intellectual property rights with those under legislation or law covering other forms of property, and recommend to the Government that such penalties should be consistent. (Sub. 27, p. 31)

In its report on *Computer Software Protection*, the CLRC (1995) recommended that criminal penalties for software theft should be brought into line with those currently applying to films and those proposed for sound recordings. The PSA (1992) also saw merit in bringing penalties into line across the range of Copyright protected material.

Recommendation 9

Criminal penalties for software theft should be brought into line with similar breaches of the Copyright Act.

The BSAA brought to the Commission's attention a court case in Brisbane which illustrates the PSA's point:

> ... in a case decided at the Magistrates Court in Brisbane on 24 July 1992, a computer dealer ... pleaded guilty to nine charges under section 132(2)(b) of the Copyright Act and on those charges he admitted to making 50 copies of the relevant software. The Director of Public Prosecutions estimated and submitted that the maximum fine faced by this individual was in the region of $70 000. The Magistrate fined ... $2000 and ordered the confiscation and destruction of one hard disk and a quantity of software on floppy disks which was determined to have a value of $1500. (Sub. 35, p. 6)

The BSAA recommended that in cases where the defendant knew their activities infringed the Copyright Act, a term of imprisonment should be mandatory.

The BSAA was also critical of the way that courts determine 'damages' for illegal copying:

> [Damages] are normally calculated by reference to the successful plaintiff's lost income caused by illegal copying of the software. In most cases the copyright owner will be at the head of the distribution chain and the lost income from the sale of one copy to the copyright owner's distributor will amount only to a small proportion of the normal retail price of the program. The large losses caused to distributors and dealers by illegal copying is not recovered. (Sub. 35, p. 7)

The Copyright Act is designed to protect the value of the intellectual property in a piece of software. Hence, in compensating a copyright holder for the illegal copying of software, the value used to determine the extent of damages should be the value to the copyright holder of each illegal copy made. The Commission notes that the Act allows the courts to take into account any wider 'damages' caused by illegal copying of software if they so choose.

A related issue is the awarding of 'costs'. According to the BSAA:

> In the case of costs, the successful party is entitled only to 'party and party costs' as these are taxed or assessed by the court. The award of costs on this basis varies between 30 per cent and 50 per cent of the actual legal costs incurred and fails to take

> account of the substantial costs of investigating the suspected case of infringement even before the legal case is prepared. (Sub. 35, p. 7)

Most owners of physical property which is stolen do not face these costs because once the crime has been committed, the police take over the investigation and, where necessary, bring the case to trial. However, in the case of software theft, it is currently the responsibility of the software copyright holder to undertake all of the preliminary steps involved in preparing a prosecution case. The AIIA said:

> ... if one's car is stolen, one reports the matter to the police who thereafter investigate and prosecute the matter.
>
> In contrast, if a software developer discovers product piracy, ... the developer will need to obtain a court order for relevant search warrants, gather evidence and subsequently to initiate prosecution under the Copyright Act. (Sub. 27, p. 31)

The copyright holder is often in the best position to determine whether illegal copying has occurred or is occurring, and to prepare the legal groundwork for a successful prosecution. The BSAA suggested that the courts should recognise this when awarding costs:

> ... we advocate a change in the Federal Court procedure so that a successful plaintiff in a software theft case is automatically entitled to an award of costs which covers the whole of these costs (ie indemnity costs). (Sub. 35, p. 7)

The imposition of higher penalties on those who steal software would provide an added deterrent. It may also give software developers a greater incentive to launch prosecutions where they know software theft is occurring. It may be a solution to the apparent discrepancy in the law regarding the treatment of tangible and intangible property theft, and would have major implications for Australia's legal system.

The BSAA referred to loopholes in Australia's copyright law which defendants can use to 'stall' legal proceedings:

> [In Australia] if the defendant puts ownership of copyright in issue [ie questions it] in any proceedings, then the copyright owner is required to produce direct evidence that each person involved in writing the program was an employee of the owner at the time he wrote it or, where all or part of the program was written by an outside contractor, that an assignment of copyright in favour of the owner was executed. (Sub. 35, p. 8)

In the USA, this problem is avoided by means of a system of copyright registration. In the United Kingdom, the *Copyright, Designs and Patents Act 1988*:

> ... contains a provision to the effect that where copies of a computer program are issued to the public bearing a statement that a named person is the owner of copyright in the program, that fact is presumed to be correct unless the contrary is proven by the defendant. (BSAA, Sub. 35, p. 8)

The BSAA considered that an equivalent provision should be incorporated into the Australian Copyright Act.

In its report on *Computer Software Protection*, the CLRC (1995) recommended the introduction of a provision in Australia's Copyright Act similar to that introduced in the United Kingdom Copyright, Designs and Patents Act, which will allow the courts to presume that the copyright holder is the owner of copyright in a computer program unless the defendant can show otherwise.

10.5 Other issues

Other issues raised in relation to intellectual property rights were:

- concessional copyright fees for educational and research purposes; and
- government ownership of intellectual property.

10.5.1 Concessional copyright fees for educational and research purposes

Avram *et al.* (Sub. 20) advocated the creation of a fair dealing provision under the *Copyright Act 1968* which would allow students limited access to volume software programs in order to expand the range of programs students are exposed to during their formal studies. They also called for a similar provision to allow access by researchers.

According to Avram *et al.* part of the problem arises because buyers in Australia do not have access to the copyright holder when negotiating software licensing arrangements. They must negotiate licence arrangements with the locally licensed distributor, who may not have the authority or incentive to negotiate the specific licence arrangements universities seek.

The CLRC (1995) considered the problems faced by schools and tertiary institutions in obtaining access to computer programs during its review of *Computer Software Protection*. The main issue for institutions was the cost of computer programs. In order to reduce this cost, the CLRC proposed two solutions. The first was to allow institutions and computer program manufacturers to negotiate individual licence agreements. The second was to impose a statutory licence scheme as has been done for copyright protected works and audio-visual material. Participants rejected the introduction of a statutory licence system. This view was endorsed by the CLRC. However, the CLRC noted that the situation should be reviewed in three years to determine whether an optional statutory scheme should be introduced to encourage voluntary licensing.

10.5.2 Government ownership of intellectual property

Many participants were concerned by the attitude of government departments and authorities to the issue of ownership of intellectual property. The Department of Administrative Services (DAS) confirmed that:

> Currently civil standard conditions of contract transfer to the Commonwealth ownership of intellectual property paid for with public money and requires pre-existing rights to be licensed to the Commonwealth. (Sub. 38, p. 11)

This approach to intellectual property creates problems for developers because the software sold to governments is often made up of pre-existing intellectual property incorporated in discrete 'blocks' of software ('tools') and newly created intellectual property in the form of software which links the 'blocks' together. Industry concerns have centred around what happens to pre-existing intellectual property. The AIIA said this problem has now been resolved:

> The industry has reiterated its concerns about that in sufficient length to have the provision reversed so that you could quite clearly specify which pieces of the intellectual property belonged to you as the developer and which pieces are newly created. (Transcript, pp. 438-439)

However the more general issue of ownership of intellectual property is still under consideration. Wormald Technology suggested the current approach to intellectual property:

> ... inhibits the supplier from further investment in the relevant computer element, especially software, as the supplier would not have unrestricted use of the finished product for future commercial exploitation.
>
> A change in the Government's intellectual property rights policy, possibly through the introduction of an 'escrow' agreement provision or a 'non-exclusive right to the use of software' clause, would be a very constructive step towards promoting the further development of the products of a Government purchase contract for computer based product. (Sub. 22, p. 31)

According to DAS, changes in the Commonwealth Government's approach to intellectual property will be announced in 1995. The Department of Defence has already changed the way it views intellectual property rights:

> Following an extensive review, the Minister for Defence announced on 10 May significant changes to Defence policy and procedures on intellectual property. In future Defence will only pay for intellectual property rights it actually needs and will place less emphasis on outright ownership. (DAS, Sub. 38, p. 11)

Other government organisations are changing their approach to the ownership of intellectual property. ACADS-BSG said Australian Construction Services assigned the property rights to two software programs over to them in December 1994, in exchange for free copies of the programs whenever ACADS-BSG update them.

Recommendation 10

Government departments and agencies should not seek automatically to acquire intellectual property rights associated with the goods and services they purchase. Ownership of intellectual property rights should be resolved through negotiation on a case-by-case basis.

11 TAXATION AND OTHER MATTERS

This chapter explores:

- *the taxation treatment of the information technology (IT) industries;*
- *labour market issues affecting these industries;*
- *export assistance, including program awareness;*
- *overlapping government programs; and*
- *certain environmental matters.*

11.1 Taxation issues

Many participants described the taxation system as unnecessarily complex. A survey undertaken by the Australian Information Industry Association (AIIA) found that over 60 per cent of its members identified taxation as a key issue for the inquiry. The complexity of the system and its anomalies were said to create specific problems for the IT industries. Some participants said the taxation system does not have regard to unique characteristics of the IT industries. Specific concerns included sales tax, withholding tax and depreciation provisions. The 150 per cent tax concession for research and development is discussed in Chapter 6.

While the taxation system clearly influences the overall environment in which the industries operate, the Commission has focussed on issues specific to participants' operations.

11.1.1 Sales tax

The *Sales Tax (Exemptions and Classifications) Act 1992* contains seven schedules that specify the rates of sales tax for particular goods. Goods that are not assigned to a specific (scheduled) rate are covered by Schedule 4 and taxed at the rate of 22 per cent — sometimes referred to as the 'general rate'. Computer hardware and software media (diskettes and packaging) are taxed at the general rate. Services are exempt, as well as some software.

For sales tax purposes, computer programs (software) fall into two broad categories — those that are 'tax-advantaged' and those that are not. A tax-advantaged computer program is one that is embodied on a carrying medium (other than a microchip). Programs embodied on a microchip are only tax-advantaged where they are for educational or entertainment use and are

enclosed by a cartridge for use in a personal computer or home electronic device.

Following the 1995 Federal Budget, the situation with respect to 'tax-advantaged' computer programs has changed. In September 1992, the Australian Taxation Office (ATO) issued a draft tax ruling to allow the value of a good containing a tax-advantaged computer program to be reduced by the value of that program for taxation purposes. The reduction was allowed where it could be established that the program was embodied on an erasable, reprogrammable read-only-memory (EPROM) microchip. Where the value of the program could not be verified by an Australian-based computer engineer, a deduction of 10 per cent was allowed.

Following the May 1995 Budget Statement, the value of a computer program embodied in *any* kind of microchip in a cartridge will form part of the taxable value of the good of which it is part, except in certain circumstances. From 9 May 1995, a computer program is only considered to be 'tax-advantaged' where:

1) the cartridge is marketed exclusively for use with:
   i) a personal computer; or
   ii) a home electronic device that is for use with a computer monitor or with a television screen; or
   iii) either a personal computer or such a home electronic device; and

2) the program is marketed as being exclusively for educational use, entertainment use or a combination of both. (ATO, Sub. 70, p. 1)

Therefore, microchips used in the manufacture of electronic goods such as mobile phones, video recorders and washing machines will no longer be eligible for the concession.

The minimum 10 per cent deduction will no longer apply where the value of the good contributed by the computer program cannot be determined.

Telstra submitted that the May 1995 Budget decision was premature given the nature of this inquiry and that:

> To date neither the Government nor, more particularly, the ATO have attempted to seriously address the requirements of the Australian software industry or the need to have a workable software concession in place. This needs to occur. (Sub. 89, p. 5)

With regard to CD-ROMs, Telstra submitted:

> In the case of CDs incorporating both program and database, if the data is to be taxed, as indicated in the draft ruling, on taxable values, there will inevitably be disputes as to the relative value to be attributed to the exempt and taxable components. (Sub. 89, p. 5)

IBM Australia argued that, because sales tax is not levied in some Asian countries, this is an 'impediment to industry', and that 'to generate more investment through productive assets ... the general rate ... must be reduced to a concessional rate' (Sub. 17, p. 5). IBM (Sub. 17) also requested that software media be exempt from sales tax.

This inquiry is not the appropriate forum to determine whether goods should be moved from one sales tax schedule to another on a piecemeal basis. However, the Commission notes that the concessional rate of 11 per cent is levied on 'household goods', including snack foods, biscuits, flavoured milk, fruit and vegetable juices and low alcohol wine/cider.

Spare parts

The AIIA was concerned about tax legislation that came into force on 1 January 1993 that required sales tax to be paid on spare parts that are exported, or used in repairing equipment that is subsequently sold or leased to government or government agencies. The equivalent new and remanufactured products from overseas are exempt.

In December 1993, the legislation was amended (Credit Ground 22) to allow for the recovery of tax paid on spare parts used in the repair of equipment, provided it was subsequently sold to a goods producer for primary production, mining or manufacturing business. However, Credit Ground 22 did not address the non-recoverability of sales tax where goods are repaired and sold to government or semi-government purchasers or exported.

According to the AIIA, the ruling 'can increase the cost of repaired goods to government from 5 to 21 per cent, depending on the value of new parts etc used in repair' (Sub. 27, p. 22).

The *Taxation Laws Amendment Bill (No. 3) 1994* came into force on 28 November 1994 to address these anomalies. It allows a sales tax credit to be paid on spare parts used to repair goods that are subsequently exported, backdated to 1 January 1993.[1] It also allows a credit for sales tax paid on new parts used in repairing, renovating or reconditioning goods that are sold to always-exempt users (such as government departments).

11.1.2 Depreciation provisions

In depreciating items of plant and equipment, taxpayers can use the 'effective life' determined by the Commissioner of Taxation or submit their own estimate.

[1] Where the tax has been passed on to the consumer, the value of the credit must be refunded to the consumer before the credit can be claimed by the repairer.

Effective life is the 'period that the item can reasonably be expected to be used in producing assessable income, assuming it is maintained in good condition' (ATO, Sub. 48, p. 3).

Computer equipment is depreciated at 40 per cent diminishing value method or 27 per cent prime cost method. This implies an effective life of at least five years.

IBM Australia contended that depreciation provisions have not kept pace with the high rate of obsolescence of IT equipment:

> If you would take, say, a 386 microprocessor of 2 years ago that might have cost you $3500, that same product today is worth $600. If you apply the depreciation rates that are allowed ... you would be carrying it at about $1200 in your books ... and that would only be rectified when you subsequently disposed of the asset.[2] (Transcript, p. 472)

The Australian Printed Circuit Manufacturers' Association (APCMA) argued that depreciation rates for capital inputs have failed to keep pace with innovation and constrain investment in new technology:

> ... currently advanced computer equipment such as drilling machines etc have to be depreciated over 10 years, a considerably longer period than the leading edge life of such equipment (typically three years). Depreciation provisions should recognise the concept of 'leading edge' life. (Sub. 19, p. 9)

The APCMA sought the introduction of accelerated depreciation provisions. Manufacturers of printed circuit boards (PCBs), such as Morris Productions (Sub. 29) and Precision Circuits (Sub. 12) called for equipment to be depreciated over three years to reflect its 'leading edge' life, rather than its effective useful life. Morris Productions argued that the inability to write off this machinery quickly adds to the difficulty in remaining competitive.

Although a higher rate of depreciation is allowable if the claimant can show that the item has a shorter effective life than is reflected in the relevant schedule[3], IBM Australia (Sub. 17) said this is difficult to manage and costly to administer. It added that stringent guidelines make it difficult to argue for 'expected life' depreciation under ATO audit. This is compounded for IBM which leases computer equipment through its credit company. Leasing companies are unable to substantiate expected life because they do not know how the equipment is used by the lessee.

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[2] Under balancing adjustment provisions provided by the ATO, if an item is scrapped for technical reasons, the portion of price not written off may be claimed in the year of disposal.

[3] The taxpayer must produce information on: manufacturer's specifications; independent engineering information; the taxpayer's own past experience with similar assets; or past experience of other users of similar assets. (ATO, Sub. 48, p. 4)

In the Commission's view, it is appropriate that the ATO allows a higher rate of depreciation where claimants can demonstrate a shorter effective life, albeit at some cost and inconvenience to the company concerned. It would not be appropriate to adjust depreciation schedules *ex ante* on the assumption that a downward trend in effective life for particular items will necessarily continue, even though this may be the case. In any event, software and hardware may continue to be used long after the technology has been superseded.

For capital equipment, it may be more appropriate for industry associations to provide a case to the ATO establishing that particular industries have special characteristics (not catered for under the current guidelines) which should be recognised in depreciation schedules.

According to Avram *et al.* (Sub. 20), many IT products are superseded annually by new versions and it is common for the old version to be devalued by up to 90 per cent. Avram *et al.* argued that purchases of some computer hardware and software products should be treated as operating expenses, thereby avoiding the question of depreciation.

11.1.3 Withholding tax

Australian IT companies that manufacture or supply goods and services for which a royalty or licence fee is paid to non-residents are required to pay a withholding tax on the fee. A tax of 30 per cent has applied to royalties paid or credited since 1 July 1993. Where countries have a double tax agreement with Australia, the rate (in most cases) is reduced to 10 per cent.

The AIIA said that withholding taxes have a similar effect to tariffs, as they raise the price paid by Australian firms for access to technology above the price paid elsewhere in the world. Australian firms are disadvantaged when there is competition from firms which purchase technology free of withholding tax either in the domestic market or when exporting.

The AIIA (Sub. 27) requested that Australia adopt the provisions of the Model Tax Treaty of the Organisation of Economic Cooperation and Development (OECD), which recommends (Article 12) that a zero rate of withholding tax be imposed on royalty payments.

McNab (1994) reported that Australia and Greece view the royalty article of the OECD tax treaty differently from other countries. For example, most members consider that a payment for software is a royalty only if the software is lent or hired. If the software is sold, the payment is treated as commercial income. Australia considers that all such payments, made for the right to copy or adapt

the software (in a manner that would, without the permission of the copyright owner, constitute an infringement of copyright) are royalties.

According to McNab:

> The comprehensive nature of the protection offered by copyright law ensures that many modern usages of software require the permission of the copyright holder. This is of course routinely given so as to facilitate what is effectively just a sale of goods. (BDO Nelson Parkhill, Sub. 63, p. 1)

McNab (1994) noted that the Australian view that many payments for software acquired for personal business use (rather than for copying and resale or distribution) represent royalties is a minority one, and that:

> ... it is open to taxpayers to dispute the ATO view and to argue quite strongly that the generally accepted OECD view on this area is correct. (p. 37)

Australia's double tax agreement with New Zealand was amended with effect from 1 April 1995 — withholding tax has fallen from 15 per cent to 10 per cent, management fees are no longer to be treated as royalties and monies paid for shrink-wrap software are to be treated as royalties. Although Australian firms are eligible to claim a foreign tax credit on their Australian income tax return in relation to the tax, there is a lag in repayment. The AIIA sought the removal of withholding tax on payments to New Zealand through government to government negotiation.

There is merit in the recommendation for a zero rate of withholding tax as outlined in the Model Tax Treaty of the Organisation of Economic Cooperation and Development.

11.1.4 Other tax-related issues raised by participants

Fringe benefits taxation

Fringe benefits taxation (FBT) was introduced on 1 July 1986 to tax non-money income. The FBT rate was increased from 48.4 per cent to 48.475 per cent on 1 April 1995 and will increase to 48.5 per cent from 1 April 1996.

IT firms believe they are adversely affected by FBT because sales and marketing activities are essential to their business. According to the AIIA (Sub. 27), FBT imposes compliance costs related to record-keeping which is compounded by the 1 April to 31 March year for calculating FBT.

The application of FBT to Employee Share Acquisition Schemes is also of concern to the AIIA (Sub. 27), which believes it will hinder companies' ability to create employee loyalty.

A Commonwealth Government review of FBT was released in February 1995. The measures introduced will reduce the compliance costs of FBT — for example, employers will be given the simple option of declaring 50 per cent of entertainment expenditure to be subject to FBT. Since 1 April 1995, items primarily used for business purposes: namely, laptop and other portable computers, business-related software, electronic devices and mobile phones have been exempt from FBT.

Despite recent changes to FBT, the AIIA (Sub. 79) remains concerned about the costs of FBT compliance.

Investment allowances

Australian companies can claim a general investment allowance on investment in new plant and equipment. An income tax deduction of 10 per cent, additional to depreciation, can be claimed.

An investment allowance (a 20 per cent deduction) was repealed with effect from July 1987, but reintroduced with effect from 8 February 1993 at 10 per cent. IBM Australia argued an investment allowance of 25 per cent would provide a more 'genuine incentive for new investment' (Sub. 17, p. 5).

11.2 Labour market issues

The prospects for growth in the IT industries are strongly influenced by the availability of an appropriately skilled and trained workforce, and efficient labour market practices. Labour market flexibility was not often raised by participants. Robert Bosch (Australia) (Sub. 8) commented that enterprise bargaining had provided benefits and IBM Australia (Sub. 17) commented favourably on the flexibility of its regional workforce (in Wangaratta). Others claimed that government outsourcing can pose some problems — for example, in relation to the responsibilities of a successful tenderer to take on all employees previously engaged in the work to be outsourced. This is a matter for the Commission's current inquiry into Competitive Tendering and Contracting by Public Sector Agencies.

11.2.1 Employment

Employment in the IT industries in Australia accounts for less than 1 per cent of global IT employment (International Data Corporation 1995). Employment in the IT industries grew rapidly until the recession in 1991. Since 1990-91, higher levels of employment in the hardware sector have not offset the decline in employment in software and services (Table 11.1).

Table 11.1: **Employment in the IT industries, 1983-84 to 1992-93**

Year	*IT hardware*	*Packaged software*	*IT services*	*Total IT*
1983-84	2 031	1 069	8 538	11 638
1984-85	2 261	1 058	9 838	13 157
1985-86	2 515	1 777	10 622	14 914
1986-87	2 517	2 628	10 895	16 040
1987-88	2 663	3 130	11 212	17 005
1988-89	3 244	3 599	11 439	18 282
1989-90	3 784	3 605	11 731	19 120
1990-91	4 039	3 600	11 999	19 638
1991-92	4 401	3 443	11 156	19 000
1992-93	4 842	3 240	10 441	18 523

Source: BIE (1994a).

It seems likely that the upward trend in IT employment will be resumed. According the Australian Bureau of Statistics (ABS), vacancies for IT professionals have risen over the past two years.

According to the 1992-93 ABS survey of *Information Technology in Australia* (ABS 1995a), businesses specialising in computer hardware, software and related services[4] employed 45 990 people. The large disparity between the ABS data and that recorded in Table 11.1 reflects the fact that the former includes people employed in computer wholesaling, maintenance, storage and leasing.

11.2.2 Education and training

Many participants were satisfied with the skills of the Australian workforce and the availability of skilled professionals. However, some participants questioned the adequacy of the education and training system to produce graduates with relevant skills, and the adequacy of immigration arrangements.

The number of graduates in IT-related disciplines has increased since 1988, when an additional 950 tertiary places were created in computer science disciplines and 100 in electrical/electronic engineering. From 1988 to 1992, computer science graduate numbers grew by 17.1 per cent and electrical/electronic engineering graduates grew by 7.1 per cent (Table 11.2). In 1994, 8745 people were expected to complete IT-related degrees — over three times the number in 1984 (DIST 1994a).

[4] See Chapter 2 for a definition of ‘computer hardware’, ‘software’ and ‘related services’.

Table 11.2: **Graduates in IT-related disciplines, 1988 to 1992**

Discipline	*1988*	*1989*	*1990*	*1991*	*1992*	*Ann growth (per cent)*
Electrical/electronic engineering	1 311	1 348	1 373	1 604	1 727	7.1
Computer science/info systems	1 888	2 127	2 521	3 187	3 548	17.1
Total all courses	**86 859**	**90 482**	**94 621**	**107 561**	**120 583**	**8.5**

Source: BIE (1994a).

While the number of graduates in IT-related disciplines has increased, a survey of 1992 graduates showed that less than 50 per cent found full-time employment (Table 11.3). At 30 April 1993, around 15 per cent of graduates in IT-related disciples were not in employment — more than the ratio for all disciplines (11.3 per cent). The Bureau of Industry Economics (BIE 1994a) suggested that the decline in the graduates absorbed into the workforce reflects the tendency for employers to favour experienced workers.

Table 11.3: **Destination of graduates, 1992**

	Full-time work	*Part-time work*	*Not working*	*Full-time study*	*Overseas*	*Total (per cent)*
Electrical/electronic engineering	48.0	5.4	14.3	17.3	15.0	100.0
Computer science	47.2	7.7	15.3	20.3	9.6	100.0
All graduates	**44.1**	**14.4**	**11.3**	**24.5**	**5.6**	**100.0**

Source: BIE (1994a).

Some participants suggested there is a shortage of:

- analogue and radio frequency engineers, as a result of education focussed on computing and digital systems (Integrated Silicon Design, Sub. 7, p. 2);
- end-user technicians to support personal computer (PC) users in their day-to-day operations (GUICare, Sub. 21, p. 2);
- experienced technicians and tradesmen, as a result of rationalisation of apprentice training (Canberra Region Advanced Technology Manufacturing Association (CRATMA), Sub. 30, p. 5);
- technically-trained persons in the communications industry, in particular software process improvement, and configuration and quality management (Montgomery, Sub. 81, p. 4)

- system engineers to analyse system requirements, allocate the required functionality to hardware or software and implement the process (Wormald Technology, Sub. 22, p. 17);
- management finance and business strategy skills (AIIA, Sub. 27, p. 38);
- marketing executives (CRATMA, Sub. 30, p. 5); and
- multimedia skills sufficient to cope with the volume of production enabled by the multimedia funding program (Microsoft, Sub. 43, p. 12).

The New South Wales Government said:

> The issue of training and the supply of skilled professionals is important ... although there are isolated instances of shortages of specific types of skills, most companies seem to be able to find the skills they need. (Sub. 52, p. 4)

The AIIA (Sub. 27) said it is the joint responsibility of government and industry to ensure that resources and curricula are relevant to the industry's needs. Wormald Technology (Sub. 22) called for tertiary institutions to liaise with industry to keep abreast of technical change in the industry and to ensure that the appropriate level of training exists and is readily available.

The Associate Professor and Head of Computer Science at the Royal Melbourne Institute of Technology suggested that there is a need for a Board with responsibility for developing and pooling the knowledge needed to ensure an adequate supply of skilled IT professionals and para-professionals (Montgomery, Sub. 81).

The AIIA's Education and Training Forum and State Committee assists in curriculum development in graduate and vocational education and training, and provides assistance to training providers. The AIIA said it is in the process of establishing an IT Competency Standards Body and a National Industry Training Advisory Board which will ensure that courses offered match the demand for skills by industry.

Australian Electronic Manufacturing Services (Sub. 71) is developing courses in 'surface mount technology', 'high reliability soldering and surface mount components' and 'basic electronic fault finding'.

The Employment and Skills Formation Council, through the National Board of Employment, Education and Training, has been asked to report on the employment, education and training issues associated with the convergence of technologies. The Council is expected to report in December 1995.

Meeting the industries' needs for skilled labour is best addressed through an industry to government cooperative framework. The Commission supports recent initiatives in this area.

11.2.3 Immigration

The skill needs of the IT industries have been met, in part, by business migrants. Around 55 per cent of migrants establish enterprises (mainly in the services area) within two years of their arrival and around 30 per cent claim export earnings within the same period (LEK Partnership 1994). From 1989-90 to 1991-92, arrivals of migrants with IT skills exceeded departures by more than 3000 (Table 11.4).

Table 11.4: **Permanent and long-term migration of skilled labour, 1986-87 to 1992-93**

	1986-87	*1987-88*	*1988-89*	*1989-90*	*1990-91*	*1991-92*	*1992-93*
				Electrical/electronic engineers and technicians			
Arrivals	na	na	na	1 928	2 084	2 385	1 974
Departures	na	na	na	600	578	590	504
Net Arrivals	**672**	**905**	**1 106**	**1 328**	**1 506**	**1 795**	**1 470**
				Computer scientists			
Arrivals	na	na	na	3 114	3 818	4 087	3 460
Departures	na	na	na	1 306	1 998	2 195	2 327
Net Arrivals	**980**	**977**	**1 546**	**1 808**	**1 820**	**1 892**	**1 133**

na not available
Source: BIE (1994a).

Australia's temporary resident entry policy, among other things, seeks to facilitate the entry of skilled persons who can contribute to the economic development of Australia. Migrants are entitled to a maximum stay of four years.

The AIIA suggested that there is scope to streamline immigration arrangements:

> Current employment sponsored immigration arrangements are cumbersome and slow and result in Australian firms losing access to valuable skills. ... there is scope for greater use of negotiated arrangements covering temporary entrants. (Sub. 27, p. 41)

Streamlined immigration procedures apply to companies transferring staff to Australia under the regional headquarters scheme. Staff can be relocated to Australia under a four-year multiple-entry visa.

11.3 Export assistance

The Commonwealth Government provides, on average, more than $1 billion in export assistance to Australian firms each year. Most of this is provided to the manufacturing sector. In its *Working Nation* White Paper, the Government said:

> The Government will continue to place a high priority on facilitating export growth by equipping Australian firms with an excellent export market intelligence network, providing targeted financial assistance to new exporters and by promoting the growing export culture across Australian industry. (Keating 1994, p. 78)

Assistance is provided through a variety of programs. The programs of most benefit to IT firms include the:

- Export Markets Development Grants (EMDG) scheme;
- International Trade Enhancement Scheme (ITES);
- National Industry Extension Service (NIES);
- Access to Export Finance program;
- Export Access program;
- Export Market Planning (EMP) program;
- Tariff Export Concession/Duty Drawback schemes; and
- computer bounty.

These programs are administered by the Australian Trade Commission (Austrade), the Export Finance and Insurance Corporation (EFIC), the Department of Industry, Science and Technology (DIST) and the Australian Customs Service (Customs).

A description of the various schemes, including eligibility requirements, is provided in Appendix D.

11.3.1 Awareness and use of export assistance programs

In 1994, the AIIA undertook a survey of export activity by its members (Table 11.5). Of the 263 respondents, 51 per cent indicated an interest in exporting.

The AIIA said:

> There is a relatively high level of awareness, amongst current exporters, of Austrade and other sources of [export] assistance. However, it is much lower amongst new exporters. ... EMDG is by far the most used of the programs amongst successful exporters, but that new exporters have made little use of the programs so far. (Sub. 27, p. 104)

Table 11.5: **Awareness and use of export assistance programs**

Assistance Program	*Aware of*		*Currently using/Have used*	
	Current	*New*	*Current*	*New*
Export Finance and Insurance Commission	32	10	4	1
Export Market Development Grant	25	16	35	4
International Trade Enhancement Scheme	32	9	2	0
Austrade Market Research	38	17	13	1
National Industry Extension Service	38	14	9	4
Telecommunications Market Profiles	14	2	6	0
Other	1	1	1	0

Source: AIIA (Sub. 27, p. 105).

In 1994, LEK Partnership (1994) surveyed 1370 service exporters for Austrade. Respondents were asked: which export assistance programs they were aware of; which programs they were able to use; and how useful, from their perspective, the programs were. Not all programs identified provide export assistance.

The results of the survey are presented in Table 11.6. For many programs, less than half of those surveyed were aware of the program's existence. Where respondents were aware of programs and were eligible for assistance, the programs had been helpful.

Table 11.6: **Awareness, eligibility and use of export programs**

Assistance Program	*Awareness (per cent)*	*Eligibility and use (per cent)*[a]	*Help to user (per cent)*
Export Market Development Grants	73	98	96
Other Austrade assistance	54	86	85
150 per cent tax incentive for research and development	50	76	95
National Industry Extension Service	41	66	92
Australian Industry Development Assistance Bureau	36	65	92
Grants for Industrial Research and Development	39	56	94
Export Access	27	45	86
EFIC: Credit Insurance	46	44	91
EFIC: Finance	28	28	93
Development Import Finance Facility	21	28	100
Investment Promotion Program	6	27	97
International Trade Enhancement Scheme	27	10	89
Australian Best Practice	11	10	100

a Proportion of respondents aware of the scheme who were eligible to use it and did.

Source: LEK Partnership (1994).

The Commonwealth Government, through DIST's Office of AusIndustry, has improved access to information about the various schemes. Its 'BizHelp' program is a computer-based directory of Commonwealth, State and private programs and services designed to assist small and medium sized enterprises (DIST 1994c). The package describes the services available, eligibility criteria and contacts.

LEK Partnership recommended that funding for the NIES, EMDG and ITES schemes be increased to provide additional incentives for firms to develop export markets. It also suggested that EFIC should be involved in projects with listed non-bank organisations as well as recognised banks, and that EFIC's Working Capital Guarantee facility be extended to cover all services, not just those related to the sale of capital goods.

Many of these issues were addressed by the Government in its *Working Nation* White Paper released in May 1994 (see Appendix D).

The May 1995 Budget Statement announced the continuation of the Export Access, NIES and EMDG schemes. Although the EMDG scheme has been extended for four years, $42.9 million will be cut from the scheme and the maximum grant paid in any one year will fall from $250 000 to $200 000 from 1 July 1995.

The Commission understands that exporters will need to comply with new 'export readiness' criteria by 1 July 1996. Exporters must show evidence of an export plan before any assistance is granted.

11.3.2 Participants' comments on export schemes

Inquiry participants who have used or are using the EMDG scheme, were supportive of the scheme. Telspec said:

> ... programs such as the Export Market Development Grants Scheme have been demonstrated by the Government's own reviews to be effective mechanisms to encourage and facilitate proactive export marketing leading to significant export sales by Australian businesses, and this form of Government program needs to continue. (Sub. 15, p. 3)

However, the AIIA said:

> ... payment under the [EMDG] program is very slow, often taking up to eighteen months from the time the firm incurs the original expense. This significantly reduces the value of the benefit. (Sub. 27, p. 37)

The AIIA also commented on the ITES:

> The ITES is of limited use to small firms that have developed a product and are bringing it to export markets as a central strategy. These 'born global' firms may not

> be able to generate the five year threshold of $20 million in export sales, and need support in advance, not in retrospect. (Sub. 27, p. 37)

It advocated the introduction of a program of seed grants or loans to assist firms in advance rather than in retrospect, and requested that:

- the Commission examine the extension of support under ITES to meet the needs of small firms unable to meet the current five year, $20 million export threshold; and
- the Commission review the limitation of ITES support on the basis of five years per firm and recommend that the Government consider amendments enabling further grants to be payable where firms develop and sell products addressing a completely unrelated market. (Sub. 27, pp. 37-38)

The Commission notes that the ITES is not primarily designed to assist small 'born global' firms, although some can make use of it. Other programs like the Access to Export Finance, Export Access, EMP and the EMDG schemes have been widely used by small and medium sized enterprises in the IT industries.

The Commission is not in a position in this inquiry to assess the value of the ITES to IT firms or the impact of the five year limit. The AIIA's call for seed grants and loans is more a finance issue than support for export market development (see Chapter 9).

In 1993, the EMDG scheme was reviewed by both Austrade (1994a) and the Australian National Audit Office (ANAO 1994). The Austrade review focussed on the effectiveness of the scheme, and administrative arrangements were reviewed by the ANAO. Austrade also reviewed the ITES. Appendix D considers the results from these reviews.

11.4 Overlapping programs

It is not unusual for an IT firm to receive support through many government programs — for instance, EMDG, ITES, the computer bounty, Partnerships for Development (PFD) or Fixed Term Arrangements (FTA). The support can come at different stages in the development of a particular product, or for different activities within the one firm. Inevitably, there is a degree of overlap in the assistance that any one firm can obtain from the various programs.

At the Commonwealth level, the support is usually intended to promote a more efficient and competitive economy by changing the structure and orientation of Australian industry. Incentives are offered to encourage firms to research, develop, commercialise and export technology-intensive products. At State and Territory level, government support is usually linked to wider objectives of industrial and regional development.

Reviewed in isolation, government support programs are usually found to have value in their own right. The PFD and FTA programs, for instance, were evaluated by the BIE (1994a) and found to have 'at least made a modest net contribution to national welfare and may have made a more significant contribution' (p. xv).

The Commission supports this assessment. However, the PFD and FTA programs are 'market friendly' interventions (Chapter 5). Whether or not other measures that make up the present plethora of support programs bring benefits to national welfare is open to question since the community has no means of evaluating the cumulative costs and benefits where there are overlapping programs. The combined effects will remain unknown while:

- the fragmented reporting on each program works against any attempt to match costs and benefits;
- the assessment of any one program is clouded because claimed outcomes are affected (and claimed) by other programs; and
- there is no publicly available record of the support that the array of programs provides to individual firms or projects.

With overlapping programs assisting various stages of production and marketing, the effective assistance given to some firms (including firms best informed about support opportunities) is likely to be well above the levels that can be demonstrated at an aggregate industry level. The competitive position of these firms is enhanced, but it cannot be assumed that the outcome is a more efficient and competitive economy, or that there are net benefits for the community at large.

The assistance accorded to any one firm can be at the expense of the competitiveness of other firms. There are also costs where the opportunity to gain assistance, perhaps under several programs, provides an incentive for firms to concentrate on activities or products that will qualify for support.

In the absence of publicly available information on government support to individual firms/projects, there is no way of knowing whether the multitude of overlapping programs contributes to a more efficient and competitive economy.

11.5 Environmental issues

The Commonwealth Government offers assistance for businesses to adopt environmentally sound business practices. It can also use its purchasing influence to encourage environmentally sound practices — for example, environmental criteria form part of the Endorsed Supplier Arrangement.

The Enterprise Energy Audit Program offers up to $5000 per audit or 50 per cent of the cost of the audit (whichever is the lesser) to encourage Australian companies to audit their energy use. Audits may be subsidised for up to three establishments per enterprise. This program encourages companies to achieve cost savings and reduce energy use.

State Government programs also exist. For example, the Support for the Environmental Management program aims to increase the competitiveness of the New South Wales based 'environment industry' by promoting the commercialisation of innovative technology.

Commonwealth, State and local governments impose environmental (and other) standards on industrial production processes. Those regulations are the major determinants of disposal methods, including recycling.

Of the activities under reference, PCB production, in particular, has the potential to release environmentally damaging waste water and residues from the manufacturing process. However, PCB manufacturers have taken steps to comply with environmental regulations. Morris Productions (Sub. 29) contended that the need to comply with environmental standards imposes costs on Australian companies that are not borne by its overseas competitors. It added:

> ... what source of funding should be used by printed circuit manufacturers for necessary environmental works?
>
> Why should individual companies be required to carry the cost of achieving (admirable) Australian community standards while at the same time being forced to operate on an international 'level' playing field? (Sub. 88, p. 4)

In 1993-94, Morris Productions spent $450 000 on pollution control equipment.

It is government policy (Commonwealth and State) that all industries operating in Australia are required to meet environmental guidelines. The IT industries are not unique in this respect.

Environmental regulations may adversely affect a firm's competitiveness vis-à-vis jurisdictions where environmental concerns have a lower priority. However, this is one of many trade-offs to be considered when communities determine pollution standards and disposal charges in areas affecting industrial activity.

Boomerang Imaging Supplies (a remanufacturer) operates a national cartridge collection program and has launched an 'intelligent' vending machine to enable used cartridges to be deposited in return for a replacement, credit or stationery. The ATO has provided Boomerang with a ruling that recycled cartridges are not subject to sales tax. (Boomerang Imaging Supplies, Sub. 31)

Boomerang criticised a perceived lack of legislative support for recycling and requested that:

> ... government legislation be introduced to provide a competitive advantage to government suppliers who have a higher recycled content in their products and who have a responsible collection and disposal system for environmentally damaging waste. (Sub. 74, p. 2)

Boomerang said that the Department of Administrative Services should give preference to products with a recycled content and that:

> ... the US Federal Government has introduced legislation to give preference to toner cartridges that are recycled or have a higher recycled content. ... there has been legislation passed in Congress in the US [with regard to purchasing policy] to support the industry we are in ... (Transcript, pp. 736-737)

Boomerang referred to cost savings for government:

> ... we provide around $10 million worth of annual cost savings to government departments and industry through the cost savings associated with the re-use of valuable raw materials. (Sub. 74, p. 1)

In the Commission's view, recycling should, in the first instance, be commercially driven and products should compete on price and quality considerations. It would be inappropriate to recommend legislation to provide a competitive advantage to suppliers of toner cartridges with a high recycled content. Should governments wish to provide support for activities using recycled products, this should be addressed as a general, rather than IT-specific, strategy.

Any cut-off point for recycled content can also create distortions, an outcome acknowledged in the Budget proposal to remove the sales tax exemptions on 100 per cent recycled paper products from 1 November 1995. These exemptions have been difficult to administer, have created inefficiencies in production and could not be targeted to encourage recycling exclusively (Commonwealth of Australia 1995).

Colour Vision Systems (Sub. 2) noted that its vision sorting equipment is exempt from sales tax if it is sold to primary producers. It suggested that machinery used for recycling should also be sales tax exempt to encourage the 'development of new technology applications to the recycling industry' (Sub. 2, p. 4).

As noted in the Industry Commission report on *Recycling* (IC 1991b):

> The tradition in the sales tax legislation of tying the taxation of capital goods to that of the final product underlies the whole tax system. It is not specific to recycling. (p. 146)

The Commission understands that a tax exemption already exists on the product (outputs) emerging from a recycling plant.

COMPUTER HARDWARE SOFTWARE AND RELATED SERVICE INDUSTRIES

APPENDICES

A INQUIRY PARTICIPANTS AND VISITS

A.1 Inquiry participants

Organisations and individuals who made submissions to the inquiry are listed below. Participants marked * appeared at public hearings. Participants marked ** made no written submissions but appeared at the hearings. The remainder made written submissions only.

Participant	Submission No.[1]
Abberfield Technology Pty Ltd	69
ACADS-BSG *	18
ACRA Australia Limited	116
Australian Capital Territory Chief Minister's Department	41, 101
Agridry Rimik Pty Ltd	58
Applied Electro Systems Pty Ltd	90
Aristocrat Leisure Industries Pty Ltd	49
Artronic Productions (Australia) Pty Ltd	64
AT&T Global Information Solutions (Australia) Pty Ltd *	28
Automation & Process Control Services Pty Limited	114
AUSTEL	77
Australian Customs Service	40
Australian Electronic Manufacturing Services Pty Ltd *	71
Australian Information Industry Association *	27, 42, 79
Australian Library and Information Association	34
Australian Printed Circuit Manufacturers' Association *	19, 102
Australian Record Industry Association Limited	109
Australian Software Quality Research Institute *	25
Australian Taxation Office	48, 70
Australian Telecommunications Industry Association *	32, 33, 62
Avram, Blucher and Eaves *	20
Banksia Technology Pty Limited *	61
BDO Nelson Parkhill	63
Boomerang Imaging Supplies Pty Ltd *	31, 74
Bounty Claim Consultants *	13
Bruce Patten & Associates *	45, 68
Business Software Association of Australia Ltd	35

[1] Submissions from number 53 onwards were submitted after release of the draft report.

Participant	Submission No.
Canberra Region Advanced Technology Manufacturing Association *	30
Chamber of Manufactures of New South Wales	94
Clayton Utz	84
CNS Precision Assembly	67
Colour Vision Systems Pty Ltd *	2
Communitron (Aust) Pty Limited	115
Computer Power Group Pty Ltd *	54
Computer Vision International Pty Ltd **	
CSSC Australia Pty Limited	51, 117
Dataflow Computer Services Pty Ltd *	50, 80
Department of Administrative Services	38, 47, 105
Department of Commerce and Trade — Western Australia	108
Department of Industry, Science and Technology	97
Didco Systems Pty Ltd **	
Draper, Mr R.	4, 39
Electronic Arts Pty Ltd	99
Electronic Industries Association of Western Australia (inc) *	66
Emired Pty Limited	75
Excel Infotech Pty Ltd	55
Formosa International Group	56
Future Computers	78
GUICare *	6, 21
Hypertec Research Pty Limited *	16
IBM Australia Limited *	17, 37, 82, 103
Integrated Silicon Design Pty Ltd	7
Intelligent Machines Pty Ltd	36
JED Microprocessors Pty Ltd	104
JNA Telecommunications Limited	24, 107
Layson Pty Limited	60
Lodin Computer Supplies Pty Ltd	10
Memoryworld Australia Pty Ltd	57
Microsoft — Advanced Technology Group	43
MN Information Technology Group Pty Ltd *	3, 72
Montgomery, Mr A.	81
Morris Productions Pty Limited *	29, 88

Participant	Submission No.
MRad Pty Ltd	14
National Amusement Machine Operators Association Limited	93
National Procurement Board	106
NetComm Limited *	23
Newtronics Pty Limited	59
New Zealand High Commission *	73
New South Wales Government	52, 111
Omnitech Engineering Pty Ltd	9
P2 Computing Pty Limited	87
PC Assemblies Pty Ltd	83
Potent Professionals Pty Ltd *	11
Precision Circuits Pty Ltd *	12, 98
Prices Surveillance Authority	44
Profound Computer (Australia) Pty Ltd *	5
QPSX Communications Pty Ltd	91
Queensland Government	46, 112
Radbe Consulting Pty Limited *	76
Robert Bosch (Australia) Pty Ltd *	8
Sega-Ozisoft Pty Limited	92
South Australian Government *	26, 65
Southern Cross Computing Pty Ltd	86
Staldone Computers	53
Standards Australia	95, 110
Tasmanian Government	118
Tanner James — Management Consultants *	1
Telspec Pty Limited *	15, 85
Telstra Corporation Limited	89
Victorian Government	113
Video Industry Distributors Association Limited	96
Wormald Technology *	22, 100

A.2 Informal discussions and visits

The following organisations, companies and individuals were visited:

Australian Capital Territory

Australian Bureau of Statistics
Australian Customs Service
Australian Electrical and Electronic Manufacturers' Association Limited
Australian Information Industry Association
Bureau of Industry Economics
Department of Administrative Services — Purchasing Australia
Department of Industry, Science and Technology

New South Wales

Alcatel Australia
AT&T Global Information Solutions
Australian Electronic Manufacturing Services
AWA Limited
Bailey Controls Australia Pty Ltd
Borland International Australia Pty Ltd
Digital Equipment Corporation
Ernst & Young
Fujitsu Australia Limited
Honeywell Limited
JNA Telecommunications Limited
Lexmark International (Australia) Pty Ltd
Microsoft Pty Ltd
Morris Productions Pty Limited
NetComm (Australia) Pty Limited
Osborne Computers Pty Ltd
Wormald Technology

Queensland

Able Engineering Pty Ltd
Byte Power
Centre for Information Technology Research
DMR Group
Email Printed Circuits
Megami Corporation Pty Ltd

Mincom
Mosaic Electronics
Queensland Information Industry Board
Queensland Information Policy Board
Stallion Technologies Pty Ltd

South Australia

AWA Defence Industries Pty Ltd
Computer Management Centre Pty Ltd
Lane Telecommunications Pty Ltd
Sybiz Software Pty Ltd

Victoria

Aspect Computing Pty Ltd
Austrade
BHP Information Technology
Datacraft Limited
Department of Business and Employment
Ericsson Australia Pty Ltd
Ferntree Computer Corporation Ltd
Hewlett Packard Australia Limited
IBM Australia Limited
Labtam Australia Pty Ltd
Logica Pty Ltd
Precision Circuits
Robert Bosch (Australia) Pty Ltd
Siemens Limited
Tandem Computers Pty Ltd
Trevor Robinson (ISR Group Limited)

Western Australia

Department of Commerce and Trade
Dynamic Business Resources Pty Ltd
ERG Australia Limited
Execom Group Pty Ltd
Fundi Software
Intellect Australia Pty Ltd
Netsource Pty Ltd
Working Systems

B RECENT REVIEWS

This appendix outlines some recent reviews of relevance to this inquiry. Some of the reviews relate to programs outlined in Appendix D.

B.1 Partnerships for Development and Fixed Term Arrangements programs

In February 1994, the Department of Industry, Science and Technology (DIST) commissioned the Bureau of Industry Economics (BIE) to evaluate the Partnerships for Development (PFD) and Fixed Term Arrangements (FTA) programs (BIE 1994a). The review was conducted under the guidance of an advisory committee whose members were drawn from DIST (3); the Department of Finance (2); industry associations (2: the Australian Electrical and Electronic Manufacturers' Association (AEEMA) and the Australian Information Industry Association (AIIA)); and industry (1: Ericsson Australia). The report was released in February 1995.

The terms of reference called for the BIE to:

1. Assess the effectiveness of the PFD and FTA programs against their stated objectives of:
   - exploiting international capital and technology to strengthen Australia's information technology and telecommunications (IT&T) related industries (excluding carrier services);
   - stimulating exports and export-related import replacement activity;
   - reducing the IT&T trade imbalance through strategic, long-term commercially viable industry development activities; and
   - facilitating the development of mutually beneficial business relationships between international IT&T companies and local IT&T firms and research institutions.
2. Analyse the intended and unintended impacts of these programs, including the impact of the programs on:
   - employment, the development of a skilled workforce and the transfer of technology from overseas; and
   - the competitiveness, market structure and performance of the IT&T industries.

3. Assess the relevance of the programs' objectives in the context of overall trade, industry and technology policy objectives.
4. Assess the role of the programs against the background of the global IT&T industries, programs in other countries impacting on the IT&T industries and programs in Australia with similar objectives.
5. Recommend whether the programs should be continued, and if so, ways of improving the programs.

The BIE (1994a) judged that the programs have made at least a modest net contribution to national welfare, and may have made a more significant contribution. It judged the induced increases in activity to have been commercially-based, rather than underwritten by government support. It found the IT&T industries and the economy in general to have benefited from the transfer of knowledge and the fuller integration of Australia's IT&T base into the global scene.

The BIE found that the programs are at a delicate stage, with full realisation of the potential benefits resting on the development commitments of recent and prospective program entrants and the further development of ties with local firms. Accordingly, it recommended that the programs continue and be reviewed in four years time. The BIE also recommended changes to improve the programs' performance — in particular, a much stronger focus on building business relationships between Partners and local firms.

The report accepted two economic — but short-term — justifications for the programs. The first was attaining 'critical mass'. The BIE considered that temporary and flexible intervention through the programs can be useful in stimulating the acquisition of new skills, demonstrating Australian capabilities, establishing linkages into international production and marketing networks and realising the benefits of clustering and agglomeration. The second justification was knowledge and innovation-related externalities. The BIE considered that there is scope to supplement general research and development (R&D) support instruments with leverage programs, and that the programs stimulate the infusion of firm-specific knowledge from abroad.

The report found that the main apparent impact of the programs on Partners had been to increase their levels of exports and R&D. Partners estimated that exports in 1997-98 would be 21 per cent lower in the absence of the programs, that R&D expenditure would be 24 per cent lower, and technology transfers would fall. Employment levels overall appeared to have remained steady as labour productivity and total production increased.

The effects of the programs on local firms were found to have varied considerably, with a relatively small number of firms sharing most of the

benefits — mainly information technology (IT) hardware firms. Some local firms considered there to have been small reductions in sales to government. But overall, the BIE considered that the programs had not significantly altered sales. A small number of local firms believed they had been adversely affected by more intense competition for resources; however, the BIE drew attention to labour market conditions which '[provide] some support for the view that the [PFD program] contributed more to the development of practical expertise than to the creation of skill bottlenecks'.

Total audit costs for the programs (paid by the Commonwealth) were approximately $125 000 for 1993-94; this was expected to increase to $238 000 for 1994-95 on account of many new Partners undergoing their first audit. Total administrative costs to the Commonwealth (excluding audit costs) were approximately $583 000 in 1993-94. Survey returns indicated that the annual compliance cost to Partners averaged about one person year of effort, or $120 000. This amounted to a little over $4 million over the total Partners. The BIE concluded that the prices of IT&T products seem to have been largely unaffected by the programs.

The BIE was unable to identify an explicit link between government purchasing and the programs. Initially, the PFD program was an alternative to incurring offset obligations. With civil offsets being abolished, the Government's formal undertaking to a Partner is only to promote them as 'good corporate citizens'. This includes the Commonwealth and State/Territory Governments notifying procurement agencies of the Partner status of firms. No undertaking is given to prefer Partners. Indeed, foreign non-Partners have secured large contracts in competition with Partners, and some firms only entered the programs after winning large contracts. However, once a firm does become a Partner, the Government had demonstrated a willingness to penalise those who fail to meet their agreement (eg through 'sin binning'). Recent changes to procurement policy — the Endorsed Supplier Arrangement (ESA) and arrangements for major acquisitions — which explicitly require industry development commitments from all firms, will effectively reduce the extra cost of entering a Partnership agreement.

The BIE raised concerns about trends in State/Territory industry policies which are in conflict with the PFD approach. These are discussed in Chapter 5, Section 5.4

B.2 Systems Integration Panel

The Systems Integration Panel (SIP) is a restricted panel for the supply of IT services to Commonwealth agencies. The arrangements require IT services

over $1 million to be met through the Panel, either by contracting out entirely or by using a systems integrator. Panel members were selected on criteria of competence, commitment to government IT purchasing policy and local industry development.

The SIP has been reviewed by a Joint Steering Committee, which reported in October 1994. It found that the restricted panel approach was inconsistent with the reforms announced in *Working Nation*, particularly the Endorsed Supplier approach and the desire to facilitate access by small and medium sized enterprises (SMEs) to the government market.[1]

The Committee recommended replacing the SIP with an IT Services Common Use Contract Panel. There would be no limit on the number of firms in the new Panel, but Panellists would be accepted on the basis of performance and commitment to long term strategic activity in Australia. In addition, the Industry Impact Statements and Two Envelope Tendering arrangements would apply for projects over $10 million (see Chapter 5, Section 5.5). Panellists would be required to choose their subcontractors from this and other Panels (or Endorsed Suppliers). Government agencies would be required to use the Panel for projects over $1 million and encouraged to do so for smaller projects.

In response to the review, the Federal Government announced that the SIP will be replaced with a Common Use Contract Panel (Beazley *et al.* 1995) (see Appendix D).

B.3 Information Technology Review Group

In October 1994, the Minister for Finance established an independent Information Technology Review Group (ITRG) 'to assist the Government to identify opportunities for the more cost effective delivery of government IT services'. The Group comprised four representatives from industry and government and was convened by Dr Ian Reinecke. Its task was described as being 'to identify ways to ensure that as we move towards the 21st Century, the Government is positioned to take advantage of technological developments to maximise efficiency gains'. (Beazley 1994)

The terms of reference were:

1. To consider major trends in the development of computer technology and assess their applicability to and likely impact on Commonwealth information technology.

[1] Full details of the ESA were released subsequent to the SIP review. They do not envisage an increase in the size of panels.

2. To identify and assess recent State Government and overseas initiatives in the provision of computing services by government agencies with particular reference to any initiatives to secure economies of scale by adopting a 'whole of government' approach.
3. To assess the applicability of these approaches in the Commonwealth and to identify and document options including possible consolidation of mainframe sites, rationalising of support structures and outsourcing computing services.

The Review Group reported to the Minister of Finance on 1 March 1995 (ITRG 1995).

Recommendations of relevance to this inquiry include:

- Government IT procurement be subject to increased contestability to enable innovative solutions to be adapted with appropriate risk management.
- The principle of contestability be extended to all elements of government IT, including hardware, software, applications development, operational support, telecommunications, desktop support and applications support.
- Procedures and guidelines for government procurement of IT should be developed to emphasise:
  - shorter procurement processes to save costs and take advantage of the rapid pace of development of IT;
  - greater flexibility and innovation through less specification of requirements based on existing practice and technology;
  - a thorough business analysis should precede all major procurement proposals, if necessary using external sources; and
  - where skills required for project management of procurement are not available within agencies, they should be outsourced.
- More precise guidelines be provided to agencies to encourage Partnership arrangements that supplement conventional procurement through specification and two-stage tender processes.
- The agency three-year forward procurement plans should be replaced with a systematic process for communicating agencies' IT intentions to industry.
- Greater promotion of partnering opportunities between government and industry IT projects be pursued.
- Urgent attention be directed to finalising the outstanding Government Information Technology Conditions (GITC) liability and risk sharing issues and agreed conditions included in the GITC.

- Outsourcing proposals be strictly driven by business requirements that take into account Commonwealth industry development guidelines.
- Any proposal to outsource the Commonwealth Government's total IT infrastructure in a single contract would exceed the capacity of the local industry and should not be considered. Multiple sourcing of large elements of the infrastructure should not be precluded.
- Before choosing activities to be outsourced, government agencies should develop business plans that define what elements of their IT investment are considered core business.
- In addition to negotiating volume discounts for commodities such as telecommunications, agencies should pursue opportunities to outsource services.

The report commented that 'communications and computing are now inextricably linked'.

B.4 Inquiry into Commonwealth Government purchasing policies

The House of Representatives Standing Committee on Industry, Science and Technology is undertaking an inquiry into government purchasing policies, with particular reference to:

- the efficiency and effectiveness of Commonwealth Government procurement policies to maximise commercial opportunities for Australian suppliers:
  - selling to Commonwealth Government departments, agencies and government business enterprises (GBEs), and
  - participating in major development projects;
- the application of those policies by departments, agencies and GBEs;
- measures adopted by departments, agencies and GBEs to develop their supply bases in Australia;
- the regulation of 'Made in Australia' labelling;
- Commonwealth Government efforts to promote the use of Australian made goods and services;
- agreements and cooperative arrangements with State and Territory Governments and the New Zealand Government; and
- the contribution that industry support programs make to the use of Australian and New Zealand goods and services.

The Committee wished to ascertain, among other things, whether the Commonwealth Government had programs in place to ensure the maximum involvement of Australian suppliers in its acquisition of goods and services.

The Committee's first report was released in March 1994 (House of Representatives 1994). It concluded that policies aimed at maximising competitive opportunities for Australian and New Zealand suppliers were not being implemented effectively by government agencies — decentralisation and devolution of the purchasing function were found to have been the key factors in this. The Committee made 45 recommendations, including recommending major changes in the structure by which purchasing policy is developed and by which its implementation is monitored.

Key elements of the Commonwealth Government's response to the report — the ESA and arrangements for major acquisitions — are presented in Appendix D.

The Committee is presently extending its review to GBEs.

B.5 Industry Commission report on defence procurement

The Industry Commission reported on *Defence Procurement* in August 1994 (IC 1994c). The Commission addressed the costs of tendering — an important issue for participants in this inquiry. The following is a summary of the salient findings and recommendations.

The defence procurement process had been improved in recent years, but Australian industry still had a raft of complaints, particularly about the costs of tendering. The Commission asked: what could be done to simplify, quicken, and in other ways improve the procurement process, to the benefit of defence, industry, and the community generally? In approaching the issues, the Commission sought solutions which are efficient from both economy-wide and defence perspectives.

A 1992-93 survey undertaken for the Department of Defence (Defence) indicated that costs of tendering for individual firms could be large (around 10 per cent) for small projects of less than $10 000, although they declined to about 1 to 3 per cent of project value above $1 million. If there are (say) still five contenders well after the process has begun, the total tendering costs can be considerable. A majority of survey respondents thought that two-stage tendering would reduce costs.

It is legitimate to seek market and product information in the tendering process, but not at any cost. Firms must still make individual commercial decisions about bidding for contracts. But tender documentation should not be framed in

such a way as to require bidding firms to produce detailed reports or studies, at their own expense, prior to contract award. Such requirements should be met through funded project definition studies or through the contract itself.

Multi-stage tendering has potential to reduce costs. For example, if a shortlist contains four or five tenderers, the subsequent costs will be substantial; yet comparable competitive benefits should generally be available from having just two final contenders. Too many stages of tendering can also be costly.

Inadequate advance information given to tenderers about the selection criteria, and their relative weightings, creates uncertainty. This adds to tendering costs because bidders try to cover all possibilities by providing an overly comprehensive proposal with associated documentation.

All those factors which increase the costs of tendering to industry also increase the resources needed by Defence to examine and assess proposals. Any streamlining of the process will produce dual savings.

The Commission recommended that:

10. To reduce the costs of tendering for itself and industry, Defence should proceed with multi-stage tendering involving more rapid shortlisting and less documentation than at present. In that regard, Defence should:
    (a) use performance specifications in Requests for Proposals (RFPs) and Requests for Tenders (RFTs) wherever possible;
    (b) circulate draft RFP and RFT documents to contending firms for comment;
    (c) advise the appropriate length and format standards for registrations of interest, proposals and tenders in tender documentation;
    (d) specify selection criteria and rank them in order of importance in tender documentation;
    (e) issue more specific guidance to project teams to ensure that no more than the information required at each tendering stage is requested;
    (f) allow adequate time for bid preparation;
    (g) publish tender evaluation schedules as early as possible, and adhere to them; and
    (h) advise losing bidders as soon as they are eliminated by the evaluation process.

Table B.1 summarises what the Commission envisaged in relation to multi-stage tendering and tender documentation. The Invitation to Register (ITR) or RFP stage may not always be required. The numbers are indicative, rather than a firm prescription. For example, where the ITR is to be used as a basis for shortlisting, more than 20 pages could be allowed in a submission.

Table B.1: **Stages in the tender process**

Tender stages	*Number of responding firms*	*Maximum number of pages allowed in a submission*
Invitation to Register Interest	Open	20
Request for Proposal	5 to 6	Up to 100
Request for Tender	2	As required

Defence spending on the procurement process itself needs to be subject to the criterion of 'value for money'.

Administrative costs are likely to be better controlled if project teams set, publish and adhere to a timetable. A further step would be to implement project-based accounting for major procurement projects so that the administrative costs are made known, and can thus be better controlled.

The next step would be to contract out elements of the procurement process. This could involve specialist positions within a project team, or significant parts of a project such as a specialist contracting team to negotiate final conditions of the contract.

There could be substantial savings if the whole of the procurement process were competitively contracted to a commercial organisation. Trials of this nature would have the added benefit of giving Defence some benchmark against which it could compare its administrative costs, and a basis on which to strive for improved performance.

The Commission recommended that:

12. In order to improve the efficiency of the procurement process and to provide a benchmark for its in-house administrative costs, Defence should contract out the procurement process for a few selected projects.

The Commission's report was considered by the Costs of Tendering Committee convened by the Department of Administrative Services.

C STATE/TERRITORY POLICIES AND PROGRAMS

This appendix outlines the policies and programs adopted by State/Territory Governments to influence the development of the information technology (IT) industries, and their use of government purchasing to promote industry development. The information presented here is drawn from a survey undertaken by the Bureau of Industry Economics (BIE) in the course of its recent review of the Partnerships for Development (PFD) and Fixed Term Arrangement (FTA) programs, along with information gained by the Commission in this inquiry (BIE 1994a).

Commission comments on these matters are found in Chapter 5, Section 5.4.

New South Wales

New South Wales has historically had the largest share of Australian IT activity. Its IT industries policies and programs are aimed at consolidating and further developing these industries. In 1992, the New South Wales Government issued a ten-year vision statement and program of activities titled *Information Technology and Telecommunications: Clever Companies/Clever Customers* (Department of State Development 1992). Sydney is promoted as the finance, business and telecommunications centre of the Asia-Pacific region and the stated aim is to develop a sustainable information technology and telecommunications (IT&T) export industry in high value market sectors. Key actions include capturing new investment, outsourcing government IT&T, and leading edge use of IT&T by the New South Wales Government.

The New South Wales Government consults with industry through the Information Industries Advisory Council whose members are drawn from industry and approved by the Minister. The Council receives departmental administrative and research support and secretariat services.

Industry development commitments may be sought on selected major acquisitions, possibly in conjunction with a firm's PFD commitments (in which case non-New South Wales firms could also benefit).

A national preference margin of 20 per cent can apply to goods (not services) where Australian content is claimed and goods are effectively identical. However, in practice, it is not often used.

Victoria

The Victorian Government has recently revised its IT&T strategy, but it has not yet been released. The Commission understands that the policies embodied in the strategy aim to (among other things): assist IT&T companies to increase their sales; facilitate investment in IT&T; increase Victorian content in government purchasing; broker IT&T research and development; and encourage the creation and development of new exportable applications of intellectual property.

On selected large contracts, industry development requirements are specified — usually local content requirements. Industry development objectives have been pursued in conjunction with regional development objectives. This approach can be seen in outsourcing related to VicRoads and the Public Transport Corporation, which required a data centre to be located in Ballarat. As part of the operation, IBM will establish a hub in Ballarat for its Asian network services — a decision influenced by the exercise of leverage (IBM Australia, Transcript, p. 487). The cost of outsourcing the IT activities of VicRoads is confidential.

Participation in the PFD scheme is a standard requirement in tender documents for the supply of major equipment. Nevertheless, the Commission understands that bids are accepted from non-Partners.

Preference margins are not applied.

Queensland

The Queensland Government has identified the IT industries as 'critical to continuing the State's strong record of economic development' (Sub. 46, p. 2). The Queensland Government's vision and strategy for the growth and development of these industries is set out in the 1992 Queensland Information Technology Industry Strategic Plan.

The Plan is implemented through the Information Industries Board (IIB), whose membership is 'dominated by private sector representatives' (Queensland Government, Sub. 46, p. 4). The Board's objectives include attracting IT&T organisations to Queensland, expanding Queensland's IT&T exports, and assisting these industries to reach critical mass.

Major IT procurements have to be approved by the Board and Cabinet and all tenders for purchases over $250 000 must include an industry development component. Industry development statements are evaluated in consultation with

the IIB and are currently weighted at 10 per cent in tender evaluation[1]. They must indicate the firm's 'actual and proposed contribution to assisting the Queensland Government to achieve its objectives of building a local industry capable of export earning and import replacement' (Queensland Government 1994, p. 12). PFD activities are considered in assessing the industry development component of IT purchases, but are not necessarily sufficient. No State preference margin is applied to tender prices.

All vendors are required to have quality assurance by 1996.

Queensland imposes a national preference margin of 20 per cent. A 'decentralised preference' of 5 per cent is also applied, only 'when all other offers with interstate or New Zealand content have been otherwise eliminated'. This intra state preference allows 'minor discrimination against Brisbane manufacturers' (Queensland Government, Sub. 112, p. 3).

South Australia

The IT industries in South Australia consist primarily of small software and services companies, and branch offices of national and multinational hardware and professional services vendors. The South Australian Government views IT as:

> an industry critical to the economic development of South Australia and a vital tool for the growth and increased competitiveness of other industries in the State. (Sub. 26, p. 1)

Particular focus is given to the software and professional services sectors of IT, on the basis that these have the highest growth rates (13 per cent and 20 per cent).

Central to South Australia's IT policy is the 'industry leader strategy'. The South Australian Government is outsourcing its own IT infrastructure in order to 'leverage significant investment from a major multinational player' (Sub. 26, p. 4). Electronic Data Systems (EDS)[2], the winner of the contract, will be required to take a leadership role within the industry and to develop subcontracting arrangements with local firms. The intention is that there will be fewer, larger, better performing local companies providing services to the public sector and that those firms will be able to point to their 'government reference sites' and use their alliance with EDS as a competitive advantage in other markets (South Australian Government, Sub. 26, p. 7).

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1 This weighting is under review.

2 The final contract has yet to be negotiated.

The industry leader strategy is aimed specifically at export development by local firms. An IT Centre of Excellence will be established by the South Australian Government to provide marketing (and other business) assistance to small software and services companies, with an emphasis on exporting to the Asia-Pacific region. Through the Centre of Excellence, EDS is to assist local firms in developing their products to export quality and in gaining access to international distribution channels.

The PFD and FTA programs are viewed as important mechanisms for attracting further IT activity, and the States' 'marriage broking' effort is being increased. EDS joined the PFD program after winning the South Australian Government contract (DIST 1995b).

Preference margins are not applied.

Western Australia

Western Australia does not have a specific IT industries development strategy and IT procurement is not used in pursuit of sectoral objectives. However, a science and technology strategy is being developed.

In relation to government IT purchasing, the Western Australian Department of Commerce and Trade (DCTWA) stated that:

> The importance of IT as a growth source and a supplier to other sectors of the economy is acknowledged. However, it is considered that distortion of market forces through bidding for locationally mobile investment and the use of contract leverage to derive industry development outcomes is not a valid or worthwhile approach. (Sub. 108. p. 6)

The attraction of business investment to Western Australia is pursued through non-sectoral policies. For both contracting out and more conventional purchasing (including major projects), 'the only general industry development requirement is that successful contractors are prepared to test the market for competitive, local sub-contractors' (DCTWA, Sub. 108, p. 6).

Western Australia applies a preference margin of 10 per cent against non-Australian/New Zealand content. No offsets are sought outside the PFD program.

Tasmania

Tasmanian IT organisations are few and operate in niche areas outside of the mainstream businesses of PFD/FTA Partners. The State's version of the Government Information Technology Conditions has a clause requiring Partners to comply with any industry development obligations.

While the Tasmanian Government supported a national approach to the development of the IT industries, it believed that the any such agreement should allow for State and local initiatives to foster the industries, particularly in niche areas. It stated that:

> The judicious use of tenders can be a valuable tool in fostering industry development at the regional level. Such government purchasing arrangements should only apply where the product involved has comparable price/quality characteristics to those available under national development programs. (Sub. 118, p. 2)

National preference margins (10 per cent) have not, in practice, been applied for several years.

Australian Capital Territory

The Australian Capital Territory (ACT) Government has identified 'advanced technology' as a priority industry for development. However, it does not have an IT-specific purchasing policy. The Commonwealth Government market is an important factor in the ACT's ability to attract investment.

The ACT Government general purchasing policy, which came into effect on 1 January 1995, includes industry development and local preference considerations. The policy has three elements.

1. *Best value for money* is stated to be the key element. 'Canberra Region supply benefits' are considered in determining 'value for money'. This is said to be done 'to ensure that all relevant benefits and costs ... are taken account of' (ACT Chief Minister's Department, Sub. 101, p. 2), and appears to be an attempt to pursue value for money for the Canberra region, rather than for the purchasing office.
2. *Open and effective competition*. Included in this element is a requirement that, for acquisitions over $1 million, tenderers must submit a Canberra Region Industry Plan. The Plan, which identifies the potential of the tender to enhance local region industry capabilities and the long-term benefits to the region, is taken into account as part of the overall evaluation of 'best value for money'.
3. *Better opportunities for Canberra Region suppliers*. Benefits from sourcing locally are stated to include 'benefits to the Canberra community from related transactions ... employment created locally, [and] the general benefit to the Canberra Region and Australia from ongoing Government support given to local manufacturing, construction and service industries'. Government agencies are required to 'purchase local goods and services where they meet the necessary standards of competitiveness, quality and

availability' and to 'encourage prime contractors to use local suppliers, as partners or subcontractors' (ACT Government 1994).

Preference margins are not applied.

Northern Territory

The Northern Territory Government does not have a separate IT industries development strategy. However, a *Procurement Policy and Strategies* document includes features which tie government purchasing to industry development (not specifically IT).

In assessing value for money, considerations include:

- costs that can be justified on the grounds of significant benefits to the Northern Territory in economic areas;
- support of competitive local industry with long-term prospects for growth;
- enhancement of business with long term prospects for export potential; and
- maximising support for, and development of, local employment.

In the evaluation of tenders, an advantage is afforded to local suppliers with recognised training schemes or a history of employing local trainees, and to those with demonstrated export potential. Justification statements are required where local offers are rejected.

The principle of 'enhancing the capabilities of local business and industry' includes giving preference to locally-sourced suppliers. Other measures are designed to ensure local suppliers are not excluded by practices which have the effect of favouring overseas or interstate suppliers (eg plans and specifications which do not take account of local capabilities).

National preference margins of 10 per cent are applied.

D GOVERNMENT PROGRAMS AFFECTING THE IT INDUSTRIES

D.1 Information Industries Strategy

Programs for the development of the information technology (IT) industries operate in the context of the Information Industries Strategy — a long-term integrated package of programs introduced by government, in consultation with industry. Since its commencement in 1987, the Strategy has been updated as market structures and technology have changed. The Information Industries Strategy 'remains the central plank of government policy for [the IT] industry' (Cook 1994, p. 8).

The aim is to focus on Australia's strengths (rather than seeking to make everything in Australia), encouraging local companies to 'increase their international competitiveness, enter new markets and step up the development of new products and services' (DITARD 1993, p. 3). The Strategy has four key goals:

1. Integration of Australian firms into regional and global markets.
2. Innovation.
3. Development of 'reference sites' (demonstrating companies' capabilities).
4. Compliance with and influence on international standards. (Cook 1994)

The primary component of the Strategy has always been the Partnerships for Development (PFD) program, supplemented in 1991 by the Fixed Term Arrangements (FTA) program (see Chapter 5, Section 5.3). Other programs in the original Strategy included the Vendor Qualification Scheme, the IT Training Foundation, and a component of the Industry, Research and Development (IR&D) Grants scheme.

The May 1994 *Working Nation* statement, which set out the Commonwealth Government's broad industry strategy for the remainder of the decade, is the most recent update of the Strategy (Keating 1994). Some of the changes foreshadowed in *Working Nation* were effected in a further statement in December 1994 (Commonwealth of Australia 1994).

Working Nation sought to focus on what were seen as key factors critical to success in global markets:

- innovation;
- technology uptake;

- business improvement;
- access to finance; and
- skills development. (Cook 1994)

D.2 Government purchasing

D.2.1 National Preference Agreement/Government Procurement Agreement

The National Preference Agreement (NPA) came into effect on 1 July 1986. The Agreement allowed the Commonwealth and State/Territory governments to apply a preference margin for Australian content when purchasing goods and services, while prohibiting State governments from applying State preference margins. Preference margins for Australian content were extended to include New Zealand content when New Zealand joined the NPA on 1 June 1989.

The Agreement was revised in 1991 and the title changed to the Government Procurement Agreement (GPA). The aim of the GPA is to enable Australian and New Zealand (ANZ) suppliers to compete on an equal footing for government contracts in New Zealand and all States of Australia.

The signatories agreed, among other things, to:

> promote opportunities for Australian and New Zealand suppliers to compete for government business on the basis of value for money and avoid purchasing practices which are biased in favour of foreign goods and suppliers ... (Commonwealth of Australia 1991, p. 1)

Under the GPA no government is allowed to apply preference margins based on the State of origin of a supplier. However, preference margins may be applied against non-ANZ suppliers of goods and related services. These margins differ between governments and are explicitly listed in the Agreement, ranging from no preference to 20 per cent.[1] No government may apply preference margins for purchases of services alone.

D.2.2 Partnerships for Development and Fixed Term Arrangements

These programs apply to overseas firms making significant IT and communications equipment or software sales to government. The programs are

[1] New Zealand and the Australian Government apply no preference margin. See Appendix C for specific margins applied by the States.

outlined in broad terms in Chapter 5, Section 5.3. A recent Bureau of Industry Economics (BIE) review of the programs is summarised in Appendix B.

Partnerships for Development program

The PFD program is designed for overseas information technology and telecommunications (IT&T) firms with annual sales over $40 million to the government of equipment, software or services. Partners commit to achieving, by the seventh year, base levels of activities including:

- expenditure on research and development (R&D) in Australia equivalent to 5 per cent of annual local turnover;
- exports (possibly including facilitation of local firms' exports):
  - of goods and services equivalent to 50 per cent of annual imports into Australia; or
  - for software firms, equivalent to 20 per cent of Australian turnover; and
- an average of 70 per cent local value added across all exports.

Modifications to the program announced by the Prime Minister in the 'Building a Competitive Australia' Statement (Keating 1991) included recognition of venture capital and strategic investments as part of the R&D program.

Activities are to be based on sound commercial and strategic business criteria. Agreements can be revised to accommodate changes in a Partner's global strategy or in the commercial appropriateness of activities. Partners are subjected to an independent audit and to an annual report/review. After graduating, firms must maintain their activity level.

The Commonwealth Government's commitment is to provide a supportive infrastructure environment to the industries in general and to promote the Partners' contribution to Australia's industrial development. Partners had also benefited from exemptions to the civil offsets arrangements, prior to its termination in 1992.

Fixed Term Arrangements program

The FTA program originally catered for overseas IT&T firms with annual sales of $10 million to $40 million to the government of equipment, software or services. With the introduction of the Endorsed Supplier Arrangement (ESA) the minimum threshold was removed and participation effectively made compulsory for overseas firms (see Section 5.5.1). Australian firms are now also permitted to participate.

FTA Partners commit to a four-year program of activities. The quantitative R&D and export targets of the PFD program do not apply, but the activities must have a value of 15 per cent of the projected level of total government business.

The range of recognised activities is broader than for the PFD program, and includes:

- export of Australian developed products and services;
- facilitation of local firm's exports;
- R&D;
- training;
- technology transfer;
- strategic capital investment; and
- venture capital investment.

As in the PFD program, FTA Partners are independently audited and expected to maintain their activity level after graduating from the program.

D.2.3 Common Use Contracts

Common Use Contracts (CUCs) are standing offer arrangements negotiated by the Department of Administrative Services (DAS) for use by government buyers. All Commonwealth departments, and agencies subject to the *Audit Act 1901* must use them wherever possible. The CUCs applying to IT cover:

- small computing systems:
  - hardware and maintenance; and
  - software;
- mid-range and large scale systems:
  - hardware, software and maintenance; and
- Communications:
  - voice and data communications.

The CUC arrangements covering systems integration — the Systems Integration Panel — are under review (see Appendix B).

D.2.4 Endorsed Supplier Arrangement

The ESA applies to all purchases of IT and major office machine products. The program is outlined in broad terms in Chapter 5, Section 5.5.1.

Applicants for Endorsed Supplier status are required to provide information on:

- 'reference sites' demonstrating their company's capabilities;
- sales to the three levels of government;
- employment;
- product groups offered:
  - value adding activities done in Australia;
  - where the product was developed;
  - where the product was manufactured/assembled; and
  - where the components were sourced;
- conformance with general government policies (eg Affirmative Action, sanctions, environmental purchasing);
- conformance with general government IT policies (eg open systems environment, electronic commerce);
- commitment to quality processes;
- commitment to product standards (eg AUSTEL Technical Standards, Occupational Health and Safety);
- through-life support;
- whole-of-life costs;
- financial viability;
- demonstrated commitment[2] to mandatory industry development activities:
  - product development, for example:
    - product design and engineering;
    - ownership of intellectual property;
    - value adding to products; or
    - value adding services;
  - investment in capital equipment, skills development and service support; and
  - sourcing services and product components, parts and/or input locally; and
- demonstrated commitment to at least one of the additional non-mandatory industry development activities:
  - R&D;
  - exports (including participation in government export programs);

[2] The activity level which would demonstrate commitment is not specified.

- development of strategic relationships with ANZ suppliers and customers;
- facilitation of new market opportunities for other ANZ firms;
- technology transfer, including:
  - patents;
  - licences;
  - software;
  - technical;
  - data packs; and
  - process instructions and continuing access to overseas expertise and data; and
- participation in a company development program (eg National Industry Extension Service, Export Access). (DAS: Endorsed Supplier Application Form)

Applications are jointly assessed by DAS and the Department of Industry Science and Technology (DIST), which also conduct random verification of continued compliance.

D.2.5 Major acquisitions

Arrangements for major acquisitions are discussed in Chapter 5, Section 5.5.2. Agencies making purchases over $10 million, not covered by CUCs, are required to prepare an Industry Impact Statement (IIS) identifying potential industry development opportunities which could be addressed by prospective bidders. Under Two Envelope Tendering, tenderers are required to submit an ANZ industry development proposal, which should address the matters raised in the IIS. The *Guidelines for the Development of Industry Impact Statements* state that the following may provide an indication of the range of issues which could form all or a part of the industry development evaluation criteria:

- the commitment of the bidder to long-term and commercially sound Australian activities through, for example:
  - a long-term business plan demonstrating current and planned activity levels; and
  - the ability to export goods and services;
- the commitment of the bidder to world best practice in terms of standards, quality and service over the life of the acquisition;
- the impact of the bidder on suppliers by assessing, for example:

  - the strength of the bidder's network of ANZ suppliers;
  - plans for the formation of strategic alliances and clusters; and
  - proposals to assist suppliers with manufacturing, quality assurance, training, marketing, R&D and export potential;
- the ability of the bidder to promote and participate in R&D and exporting through:
  - an ability to develop R&D expertise and exports required for a world market;
  - a commitment to undertake collaborative R&D with other locally based companies and institutions;
  - ensuring well established links between market demand and R&D activity; and
  - linking the R&D of network suppliers to established world centres of excellence; and
- the ability of the bidder to promote and deliver leading edge value added goods and services through:
  - a firm commitment to develop leading edge suppliers;
  - an ability to fund and drive the development of new services without the need for Government financial support; and
  - promotion of such services domestically and internationally.

D.2.6 Acquisition Councils

Acquisition Councils have operated since 1988 to provide independent advice and scrutiny of major IT acquisitions (from $10 million) and acquisitions involving sensitive or high risk areas. Councils are chaired by the buying agency, with membership from DAS, DIST, the Department of Finance and an independent member. Acquisition Councils continue to be used under the new arrangements for major acquisitions (see Chapter 5, Section 5.5.2).

D.2.7 National Procurement Board

The National Procurement Board was established by the Commonwealth Government as an initiative of the May 1994 *Working Nation* White Paper (Keating 1994). The Board's role is 'to provide independent advice to Ministers on purchasing policies and procedures, ... [ensure] that procurement reforms are carried out, and to establish a closer policy link between government purchasing and industry development' (National Procurement Board, Sub. 106, p. 1).

Other activities of the Board include: planning for the introduction of electronic commerce across the Commonwealth Government (the Board is encouraging greater involvement of government business enterprises (GBEs) in the process); and establishing Strategic Working Parties 'to analyse and report on the issues involved in GBE spending' (National Procurement Board, Sub. 106, p. 1).

Board members are drawn from industry, unions, and Commonwealth Government departments, with a secretariat supplied by DAS.

D.2.8 Systems Integration Panel

The Systems Integration Panel (SIP) was a restricted panel for the supply of IT services to Commonwealth agencies. The arrangements required IT services over $1 million to be met through the Panel, either by contracting out entirely or by using a systems integrator. Panel members were selected on criteria of competence, commitment to government IT purchasing policy and local industry development.

The SIP was reviewed by a Joint Steering Committee, which reported in October 1994. This review is summarised in Appendix B.

In response to the review, the Commonwealth Government is replacing the SIP with an IT Services Panel. The Government expects the changes to enable 'more small to medium sized businesses [to] tap into this multi-million dollar market' (Beazley *et al.* 1995, p. 1).

This new CUC Panel will be made up of a number of specialist sub-panels, the details of which have yet to be finalised, but which are understood to cover a variety of services, including software development and network services. Entry to the Panel will be more open, although all intending panellists will need to be certified under the Endorsed Supplier Arrangement. While this removes some restrictions on Panel entry, the number of panellists is expected to fall.

The Panel will be established and administered by DAS, with support from DIST and the Department of Finance, and with 'ongoing consultation with industry on issues surrounding [its] implementation' (Beazley *et al.* 1995, p. 2).

D.2.9 Government Information Technology Conditions

IT contracts are made up from standardised sets of conditions called Government Information Technology Conditions (GITC). There is a series of GITC modules (eg for systems integration, software packages, etc). Conditions cover such things as sourcing from CUCs, risk assessment, liability, intellectual property rights, indemnity, financial undertakings, performance guarantees,

insurance, liquidated damages and warranties. The GITC has recently been reviewed by a committee comprising State and Commonwealth Government representatives and the Australian Information Industry Association.

D.3 Export assistance programs

The following provides a brief description of the various assistance schemes that may be accessed by potential IT exporters. It also provides a brief outline of the eligibility criteria for each of the schemes.

D.3.1 Programs administered by Austrade

Austrade is a Commonwealth Government agency which assists Australian companies to find and develop export markets for the goods and services they produce. It offers: an export planning and preparation service; a background market information service; more specific market research services; in-market support; and financial support.

Export Market Development Grants scheme

The Export Market Development Grants (EMDG) scheme is a financial support scheme which aims to promote the development of exports by Australian firms. The scheme was set up to provide taxable cash grants on eligible expenditure to promote exports. The scheme is intended to fund export marketing and sales promotional activities such as overseas market research, publicity, trade fairs and preparation of tenders.

Any Australian resident (company, partnership or individual) may apply for a grant if they incur eligible expenditure in the course of setting up or developing overseas markets for goods, specified services[3], industrial property rights or know-how, that they export or supply. To be 'eligible', goods must contain Australian content of at least 50 per cent of free on board value and must be manufactured, produced, processed or assembled in Australia. Expenditure on activities involving trade with New Zealand, capital expenses, tax and other expenses are not 'eligible' under the scheme.

Exporters must spend at least $30 000 on 'eligible' activities[4] and earn less than $25 million from export sales[5] in a grant period (currently one financial year) to

[3] Services must be specifically declared eligible for export market development grants in the regulations relating to the *Export Market Development Grants Act 1974*, as amended.

[4] New claimants can elect to accumulate eligible expenditure over two successive years and are required to submit an export plan with their claim.

be eligible to claim. Grants are paid at the end of each grant period at a rate of 50 per cent of a firm's eligible expenditure above a threshold of $15 000[6] in a grant period. The maximum cash grant payable was reduced in the 1995 Federal Budget from $250 000 to $200 000 in any one year, effective from 1 July 1995.[7]

Grants are retrospective. A firm may receive support for up to eight years (eight grants), and if seeking entry to new export markets, can receive support for a further three years. In the third and subsequent years, the maximum grant payable is reduced to a maximum of the lesser of 50 per cent of eligible expenditure above the $15 000 threshold and a declining percentage of export earnings[8].

Claimants may lodge a grant claim every six months during their first three years in the scheme. While payments are not made until the end of the grant period (ie the financial year), these claims are assessed by Austrade and if acceptable, a Notice of Determination of Grant (effectively a promissory note) is issued. The purpose of the Notice is to assist firms in obtaining supplementary bank finance until the grant is paid.

The scheme has special facilities for trading houses, joint ventures and consortia and other 'approved bodies'.

In 1993, the EMDG scheme was reviewed by both Austrade and the Australian National Audit Office (ANAO).

The Austrade review (Austrade 1994a) focussed on the effectiveness of the scheme, and left evaluation of the administrative arrangements to the ANAO review (ANAO 1994). Both reviews were published in 1994.

The ANAO found it could not effectively evaluate the administration of the scheme because of a lack of data. It recommended Austrade collect and publish more useful data about the scheme.

In its *Working Nation* White Paper, released in May 1994, the Government announced that the EMDG scheme will continue for a further five years (Keating 1994). It extended the scheme to include single service tourism

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5 Approved Bodies and Approved Trading Houses are exempt from this export earnings provision, while wholly owned subsidiaries are treated with their parent as a single entity for the purpose of the $25 million export sales test.

6 Or $30 000 for new claimants who elect to accumulate their eligible expenditure. See Footnote 1.

7 Approved Trading Houses may receive up to $500 000.

8 The percentages of export earnings are: in year three, 40 per cent; year four, 20 per cent; year five, 10 per cent; year six, 7.5 per cent; and years seven and eight, 5 per cent.

operators, and said it will examine the scope for extending it further to include 'key service sector exporters' during 1994-95.

Around 3400 exporters are expected to receive $211 million in EMDG assistance in 1995-96. Payments are expected to grow to $292 million by 1998-99.

For claims lodged after 1 July 1996, firms will be required to meet 'export readiness' criteria, which will require that firms have an export plan in place before they are eligible for assistance. Companies which do not meet the criteria will be referred to other assistance programs.

International Trade Enhancement Scheme

The International Trade Enhancement Scheme (ITES) was set up to enhance the international business prospects for Australian firms, joint ventures, consortia and industry associations, which may generate substantial foreign exchange earnings for Australia:

> The principal objective of the ITES is to substantially increase Australia's net export earnings by assisting firms developing export markets. A subsidiary objective is to enhance international business development by Australian companies. (Austrade 1994a, p. 47)

ITES is a discretionary incentive program which provides low interest loans or, under special circumstances, advances to established, capable exporters. The scheme was introduced to assist exporters:

> ... which have demonstrated a successful track record in exporting, but need financial assistance to undertake and accelerate the expansion of their exporting activities. (Austrade 1994a, p. 47)

The scheme aims to:

- add to Australia's net foreign exchange earnings;
- enhance international business development; and
- support the expansion of export marketing activities.

Prospective applicants must comply with detailed eligibility and selection criteria. Applicants must be Australian residents, have the ability to achieve a minimum of $10 million in cumulative net foreign exchange earnings over five years and be prepared to fund at least 50 per cent of the project's budget. Austrade will provide funding up to 5 per cent of projected net foreign exchange earnings over the five years, up to a maximum of $5 million. Funds are made available over a two to three year period.

Finance can be secured to fund market entry, expansion activities and activities facilitating new investment. Funds are available in the form of a concessional loan or as an advance attracting royalty payments.

A concessional loan is offered for up to six years, with no interest being levied in the first three years. In the second three years, interest is levied at up to 40 per cent of the Commonwealth Bank Loan Reference Rate. Repayments are made in six six-monthly instalments, commencing three and a half years from when the loan commences.

An advance is available in exceptional cases only. This can be repaid at a rate of up to 5 per cent of the annual revenue generated by the project at six monthly intervals over a period of six years, and payments commence six months after exports first occur. Royalty payments are capped at twice the amount advanced by Austrade.

Austrade was asked to review the scheme in 1993 and released its report in 1994 (Austrade 1994a).

In *Working Nation*, the Commonwealth Government announced it will extend the ITES scheme for a further four years, and it will provide sufficient funds to support $50 million in new loans annually as recommended by Austrade. The cost to Government is estimated at $39 million in 1994-95, and $20 million in each of 1995-96, 1996-97 and 1997-98. The cost of administering the scheme is around $1.8 million per annum.

Export Market Planning

Export Market Planning (EMP) is a joint National Industry Extension Service (NIES)/Austrade program, which is designed to test whether a business is ready to export. It aims to encourage a planned approach to export by producing an 'Export Marketing Plan'. The process is designed to encourage managers to ask the right questions before they enter into export activities. It also helps managers to target export markets, adopt the appropriate market entry strategies and assess the impact on the existing business.

Firms undertaking the program may be eligible for a subsidy from NIES, equal to half their costs incurred employing an external EMP-accredited consultant. To be eligible for the subsidy, firms must have four or more employees and a turnover exceeding $700 000 per annum.

D.3.2 Programs administered by DIST

Access to Export Finance

The Access to Export Finance program assists small and medium sized enterprises (SMEs) to obtain export finance. The assistance provides half of the cost of obtaining expert advice about export products and the preparation of an application for export finance up to a maximum subsidy of $5000 for each eligible transaction.

To be eligible for assistance SMEs must provide proof of expenditure on expert advice and proof of application to the export finance provider.

In mid-1995, the Commonwealth Government will release an export finance manual, which will allow SMEs to readily access information on export finance facilities, relevant organisations and application methods.

Export Access

Export Access is a training and practical assistance program, delivered by industry associations, which is available to SMEs which require specialist help to develop their export activities. It does not provide cash grants. It assists SMEs to identify opportunities, training, preparation for and arranging of overseas market visits and post-market evaluation. Specialist trade counsellors provide professional counselling and assistance in planning and implementing SMEs' trade programs.

Entry into the program is based on firms' commitment to exporting, their export potential and their financial viability.

The program is available in all industry sectors to:

- any manufacturer with an annual turnover of less than $20 million or less than 200 employees;
- any service provider with an annual turnover of less than $20 million or less than 50 employees; and
- any firm in the agricultural sector with an annual turnover of less than $8 million or less than 20 employees.

The program was targeted to assist 700 SMEs to enter export markets. More than 400 firms have finished the program to date. It is now estimated that 1400 SMEs will be admitted under the program over the next four years (Schacht 1995).

Although this scheme was due to terminate in November 1995, the Commonwealth Government announced funding of $14.4 million over the next

four years in the 1995-96 Federal Budget. The extended program will be administered by Austrade from 1 July 1995.

D.3.3 Programs administered by the Australian Customs Service

Tariff Export Concession and Duty Drawback schemes

The Tariff Export Concession (TEXCO) and Duty Drawback schemes aim to reduce the costs for Australian companies that use imported components in the production of exports.

The Duty Drawback scheme allows exporters to claim a refund on customs duty (including stamp duty), sales tax and excise duties paid on imported inputs which are subsequently used as inputs to the manufacture of exported goods. Capital equipment inputs are excluded, along with certain other inputs.

Similarly, TEXCO enables importers to gain an exemption from such duties if the imported product will be used in the manufacture of a product which is subsequently exported.

Computer bounty

Computer hardware producers in Australia may receive export assistance through the computer bounty. Bounty is paid on certain computer hardware manufactured in Australia, irrespective of whether it is sold in Australia or overseas.

In 1993-94, $35.6 million (45 per cent of total computer bounty payments in that year) was paid to hardware producers for the production in Australia of computer hardware which was subsequently exported (IC 1994d).

See Chapter 7 for a discussion of issues relating to export assistance and the computer bounty.

D.3.4 Export Finance and Insurance Corporation

The Export Finance and Insurance Corporation (EFIC) is an export credit agency which provides a range of insurance and financial services to Australian exporters. It provides competitive export financing and helps manage payment risk for exports sold on credit. Among its services, EFIC provides:

- insurance against risks of non-payment by overseas buyers;
- guarantees to financial institutions for finance which they provide in support of Australian export transactions (including working capital guarantees);

- finance to overseas buyers of Australian exports of capital goods and related services on commercial, concessional and mixed credit terms;
- performance bonds and indemnities to banks and insurance companies which provide such bonds; and
- insurance for Australian investors in offshore enterprises.

Eligibility is determined on a case by case basis upon application. Over 70 per cent of EFIC's insurance clients are small exporters. EFIC supports around $5 billion of export trading annually and makes loans of around $500 million each year.

In the *Working Nation* White Paper, the Commonwealth Government expanded EFIC's Performance Bond Facility to provide Advance Payment Bonds and extended the Working Capital Guarantee Facility to cover exports of services and manufactured goods (Keating 1994). Advance Payment bonds will be available to exporters with the technical and financial capacity to fulfil an export contract, but which do not have the tangible assets to establish a bond facility.

These changes were anticipated to be revenue neutral for the Government.

D.4 Other programs

D.4.1 AusIndustry

A *Working Nation* initiative, AusIndustry is a Board established within DIST to improve access to government programs and coordination of programs within particular spheres of government and between levels of government. The Board is drawn from a variety of business areas, as well as trade unions and government. AusIndustry provides an entry point for all Commonwealth business improvement programs and a major link to State programs.

The Office of AusIndustry (including its State offices) was allocated $132.9 million in the 1995-96 Budget.

D.4.2 National Industry Extension Service

NIES is a joint Commonwealth, State and Territory network of business information, referral and advisory services for SMEs. NIES helps firms identify and respond to opportunities to improve the way they do business.

NIES can help enterprises to:

- assess their effectiveness and market positioning;
- identify problem areas affecting cost competitiveness; and
- develop a new business operation plan.

NIES also monitors a subsidy of 50 per cent of the cost of engaging specialist consultants who assist in identifying and facilitating change. Subsidies are available for a range of business improvement activities including business, strategic, export marketing and financial planning, quality and design, benchmarking, technology and environment audits and human resource and manufacturing development.

The 1995-96 budget allocation to NIES (Commonwealth and State) totals $39.2 million.

E THE COMPUTER BOUNTY

E.1 Coverage of the computer bounty

The *Bounty (Computer) Act 1984* specifies which goods are eligible for bounty. These goods, linked to Schedule 3 of the *Customs Tariff Act 1987*, include:

- completely assembled machines or units classified to heading 8471 — microcomputers, minicomputers, mainframes and personal computers;
- completely assembled computer-based machines classified to headings 8469, 8470 or 8472 and parts and accessories — machines incorporating electronic microcircuits enabling a machine to work with data (typewriters, word-processing, calculating and ticket-issuing machines and cash registers);
- computer equipment, and computer equipment incorporated in machines such as certain duty free programmable controllers or automatic regulating apparatus to which a zero tariff applies;
- printed circuit boards and electronic microcircuits;
- modems which use digital to analogue modulation and analogue to digital demodulation with transmission speeds of at least 300 binary digits per second; and multiplexers of the time division or statistical type, with transmission speeds of, at most, 2.5 million binary digits per second; and
- systems software for bountiable hardware.

The Minister may declare other computer equipment and computer-based machines to be bountiable (see Table E.2). Equipment destined for New Zealand is ineligible for bounty.

E.1.1 Tariff items relating to bountiable production

The tariff items relating to the computer bounty include:

8469 — typewriters and word-processing machines;

8470 — calculating machines: accounting machines, postage-franking machines, ticket-issuing machines and similar machines incorporating a calculating device; and cash registers;

8471 — automatic data processing machines and units thereof: magnetic or optical readers, machines for transcribing data on to media in coded

form and machines for processing such data not elsewhere specified or included;

8472 — other office machines (for example, hectograph or stencil duplicating machines, addressing machines, automatic banknote dispensers, coin-sorting machines, coin-counting or wrapping machines, pencil-sharpening machines, perforating or stapling machines);

8473 — parts and accessories (other than covers, carrying cases and the like) suitable for use solely or principally with machines of 8469 to 8472;

8517 — electrical apparatus for line telephony or line telegraphy, including such apparatus for carrier-current line systems;

8534 — printed circuits; and

8542 — electronic integrated circuits and microassemblies.

E.1.2 Extracts from the Bounty (Computer) Act 1984

Section 3(1) of the Act specifies a number of important definitions.

"bountiable equipment" means:

(a) a completely assembled machine that, if it were imported into Australia, would be a machine to which heading 8471 in Schedule 3 to the Tariff Act would apply;

(b) a completely assembled unit of a machine referred to in paragraph (a), being a unit that, if it were imported into Australia, would be a unit to which heading 8471 in Schedule 3 to the Tariff Act would apply;

(c) a completely assembled computer-based machine that, if it were imported into Australia, would be a machine to which heading 8469, 8470 or 8472 in Schedule 3 to the Tariff Act would apply;

(d) goods designed for use as a part, or an accessory, of a machine referred to in paragraph (a) or (c) or of a unit referred to in paragraph (b) being goods that, if they were imported into Australia, would be goods to which heading 8473 in Schedule 3 to the Tariff Act would apply;

(e) computer equipment that is included in a class of computer equipment in respect of which a declaration under subsection 5(1) is in force;

(ea) computer equipment:

(i) that, if it were imported into Australia and were not goods manufactured by a preference country or goods to which Schedule 4 of the Tariff Act applies, would be goods the duty of Customs in respect of which, ascertained under the Act, would be free; and

(ii) that is incorporated in a machine that, if the machine were imported into Australia, would be a machine the duty of Customs in respect of which, ascertained under the Act, would be free;

(eb) a printed circuit board that, if it were imported into Australia, would be goods to which heading 8534 in Schedule 3 to the Tariff Act would apply;

(f) an electronic microcircuit that, if it were imported into Australia, would be goods to which heading 8542 in Schedule 3 to the Tariff Act would apply;

(g) a bountiable modem; and

(h) a bountiable multiplexer;

"bountiable modem" means a modem that:

(a) is of a kind that uses digital to analogue modulation and analogue to digital demodulation:

(b) has operational transmission speeds of 300 binary digits per second or greater; and

(c) if it were imported into Australia, would be goods to which heading 8517 in Schedule 3 to the Tariff act would apply;

"bountiable multiplexer" means a multiplexer that:

(a) is of:

(i) the time division type; or

(ii) the statistical type;

(b) has operational transmission speeds of not more than 2 500 000 binary digits per second; and

(c) if it were imported into Australia, would be goods to which heading 8517 in Schedule 3 to the Tariff Act would apply;

"computer based machine" means a machine that:

(a) incorporates at least one electronic microcircuit that, if it were imported into Australia, would be goods to which heading 8542 in Schedule 3 to the Tariff Act would apply, being a microcircuit that is part of the microcircuitry of the machine that enables the machine to have the capacity to store and process, or manipulate data; and

(b) is included in a class of machines, in respect of which a declaration under subsection 5 (2) is in force;

"computer equipment" means a unit, assembly or sub-assembly that:

(a) incorporates at least one electronic microcircuit that, if it were imported into Australia, would be goods to which heading 8542 in Schedule 3 to the Tariff Act would apply; and

(b) is:

(i) designed to have, whether by itself or when incorporated in, or connected to, other equipment, the capacity to store and process, or manipulate data; or

(ii) designed to be able to control, or partly control, the operation of other equipment in which it is incorporated or to which it is connected.

E.2 Bounty rates and payments

As of 1 July 1994, the bounty is payable at a rate of 8 per cent of the value added in the production process by the manufacturer at a registered premises. In line with tariff reductions, the rate of bounty has declined since 1984. (Table E.1)

Table E.1: **Bounty rate**

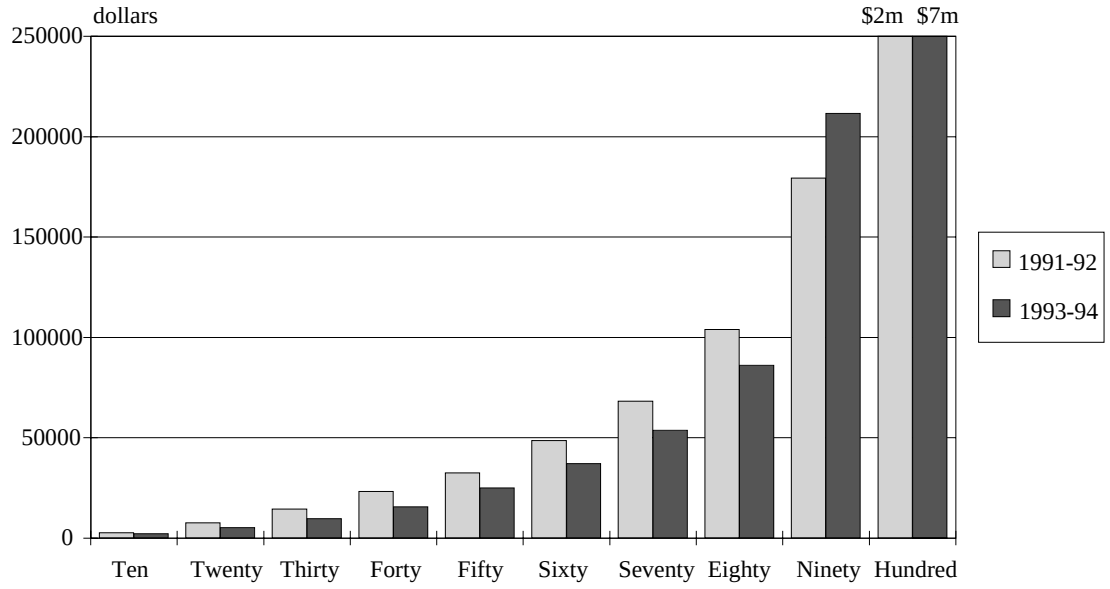
Period	*Per cent*
6 July 1984	25
20 August 1986	20
6 July 1990	17
1 July 1991	14
1 July 1992	12
1 July 1993	10
1 July 1994	8

The total bounty paid in each year, the number of claimants, and the average and median bounty payments are shown in Table E.4.

Figure E.1 presents, the breakdown of bounty payments to establishments during 1991-92 and 1993-94, based on Customs data. It shows payments made at the tenth centile (48th claimant in 1991-92 and 70th claimant in 1993-94) to hundredth centile respectively. The hundredth centile is the highest individual payment.

As the bounty rate declined from 14 to 10 per cent of value added over the period, the data were standardised to reflect trends that would have arisen had the bounty been paid at a constant rate of 10 per cent. Over most of the range, payments made to each category have diminished — the trend is reversed at the ninetieth centile.

Figure E.1: **Centile breakdown of bounty payments, 1991-92 (adjusted) and 1993-94**



Source: Commission estimates based on Customs (Sub. 40, Attachment J).

E.3 Ministerial declarations

Subsection 5(1) provides that the Minister may declare a class of 'computer equipment' to be a class of computer equipment to which the definition of 'bountiable equipment' applies.

Since 1985, many declarations have been made and some have been revoked through the powers vested in the Minister under subsection 5(3) of the Act — refer Table E.2.

Table E.2: **Gazette Notices pertaining to the Bounty (Computer) Act**

13.5.85	Computer equipment for incorporation into: numeric controllers (revoked); programmable servo motor controllers (revoked); gas emission data loggers; controlled energy usage and management monitoring equipment; programmable loom wiring aids; controllers for superintended traffic demand lifts; controlled optical measuring railwear systems; controlled ultrasonic testing tank; electronic controller/timers for heaters/airconditioners, cookers, hotplates, dishwashers/washing machines, flame/temperature units, solar water heaters and clothes drying machines, water-in-fuel detectors, seat belt inertia reel testers, medical therapy units
19.5.85	Microprocessor based wagering terminals; credit card point of sale terminals; point of sale terminals; computer equipment for incorporation into industrial airconditioners; microprocessor based maximum demand gas flow meters; volume, temperature and pressure gas meters; multi-scale weighbridge summing indicators; computer equipment for incorporation into analytical laboratory sampling equipment; microprocessor equipment for incorporation into atomic spectrometers
16.8.95	Revocation computer equipment for incorporation into numeric controllers; computer equipment for incorporation into goods if imported sub-item 9028.900
20.8.95	Price calculating equipment for incorporation into liquid dispensing machines; microprocessor equipment for incorporation into electronic photographic equipment
14.10.85	Computer equipment being goods if imported sub-item 9029.100 in Schedule 3
8.8.86	Computer equipment for incorporation into: electronic apparatus; power station training simulators; electronic photographic equipment; microprocessor based volume, temperature and gas meters; maximum demand gas flow meters
25.9.86	Computer equipment for incorporation into: embroidery machines; inkjet printing systems; fibre testing equipment; word processing machines
6.5.87	Computer equipment for incorporation into programmable controllers (revoked)
17.6.87	Revocation of computer equipment for incorporation into programmable controllers
4.11.87	Circuit cards for incorporating into automatic weapons systems; high resolution colour graphics displays
3.2.88	Computer based piano keyboards; microprocessor based totalisers
23.11.88	Automatic monitoring and control systems for in-motion weighing machines
12.7.89	Computer equipment incorporated into: oxygen analysis machines; sauna controllers; programmable substation distribution systems; train driving simulators; microprocessor controlled interface and data acquisition units for bulk fuel tanks; circuit boards enabling computerised machines to examine video images frame by frame; microprocessor based telemetry base or remote stations and temperature monitor controllers
13.9.89	Computer equipment incorporated into microprocessor based: temperature monitor controllers; data loggers for automatic weather stations; temperature monitor/controllers and automatic spreader controllers; chromatographs
28.9.89	Microprocessor based telemetry systems; gas data systems; in-line irrigation flow meters
15.11.89	Computer equipment incorporated into: microprocessor based grain loss monitors, onboard data loggers, microscopy tissue processors, photoplotters
21.2.90	Computer equipment incorporated into machines attracting a ‘free’ rate of duty
27.6.90	*Bounty Legislation Amendment Act 1990*
24.2.93	Computer equipment being automotive controllers falling to tariff sub-heading 9032.89.90
28.10.92	Implantable cardioverter defibrillators (operative 1.07.90)
02.12.92	Computer equipment for incorporation into an optical character recognition and reading machine for the blind (operative 1.7.91)
24.02.93	Computer equipment being automotive controllers (operative 06.07.84)

Source: Customs (Sub.40, Attachments).

E.4 Research and development

Amendment Section 3A of the *Bounty (Computer) Act 1984* provides an interpretation of research and development (R&D).

3A (1) In this Act, a reference to research and development is a reference to a systematic, investigative or experimental activity:

(a) that is carried out in Australia either in registered premises or on behalf of a manufacturer with registered premises; and

(b) the object of which is the manufacture, within the bounty period, of bountiable equipment:

(i) containing new or improved materials or products; or

(ii) incorporating new or improved processes; or

(iii) applying new or improved system design or systems engineering other than design or engineering undertaken to meet the unique requirements of an individual customer.

(2) For the purposes of subsection (1), the following activities are not to be treated as systematic, investigative or experimental activities:

(a) market research, market testing (including consumer surveys), market development or sales promotion;

(b) quality control;

(c) the making of cosmetic modifications or stylistic changes to products, processes or production methods; and

(d) management studies or efficiency reviews;

6 (2) If, in an accounting period of a manufacture of bountiable equipment:

(a) the manufacturer meets expenditure on research and development in Australia in respect of bountiable equipment; and

(b) the bountiable equipment is of a kind that is, or is likely to be, manufactured in Australia by the manufacturer within the bounty period;

the factory cost incurred by the manufacturer in that accounting period in connection with the process or processes in the manufacture of bountiable equipment carried out at registered premises includes that expenditure but no other factory cost includes that expenditure.

E.5 Systems software

6 (5) For the purposes of this Act, the factory cost incurred by a manufacturer in connection with processes in the manufacture of bountiable equipment does not include:

(h) costs (including costs of development and production) of software, other than operating software or software for testing hardware in Australia.

Included under the definitions found in Section 3 of the Act is a definition for operating software which states:

> **"operating software"** has the same meaning as operating system software in Australian Standard 1189 of the Standards Association of Australia as in force from time to time.

The definition of 'operating system' software appears in the Standard as:

> *Software* that controls the *execution* of *programs* and that may provide services such as *resource allocation, scheduling, input/output* control, and *data* management.
>
> NOTE: Although operating systems are predominantly software, partial or complete *hardware* implementations are possible.

According to the Australian Customs Service, the italicised terms which are terms that appear in italics in the Standard, are defined in other entries or parts of AS 1189. Accordingly, in interpreting the definition of 'operating system' software, regard must be had to these secondary definitions.

E.6 Factory costs

Bounty claims are made on a progressive basis after reconciliation of a statement of factory costs (Customs form: *Return of factory costs and statement of difference*) at the end of a firm's accounting period. Factory costs are specified in Section 6(4) and Section 6(5)(a) to (z) of the Act. In short, factory costs include: salaries and wages; energy costs; depreciation; hire lease and rent of buildings and plant and equipment; interest costs related to bought-in materials, work in progress, Australian R&D (not application software) and plant and equipment; maintenance and repairs; production services; staff amenities and training and superannuation; R&D; system design and engineering costs; factory overheads; testing; and depreciation.

Factory costs exclude: parts and materials bought in; the cost of tariff-assisted parts and materials; selling and service charges; sales tax on completed products; application software; and profit. Where the bounty is paid on R&D

and system design and system engineering costs, those costs shall not be included in any other factory cost.

Factory costs are reduced by Commonwealth or State grants related to manufacture or R&D.

E.7 Bounty assistance issues

This section outlines the assistance afforded eligible domestic computer manufacture from the computer bounty. Estimates are based on the Commission's manufacturing effective rates system and are indicative rather than definitive. For example, activities benefiting from the bounty are included within broader industry categories. Short of a survey of bounty recipients (which would have required a substantial amount of time and effort on the part of industry), more specific production and materials data are not available.

Translating the computer bounty in nominal and effective rate terms requires estimates of the materials to output ratios and the nominal rate of assistance on the materials used by activities benefiting from the bounty. Under the Australian Standard Industrial Classification (ASIC) the main industry receiving computer bounty payments is Electronic equipment nec (ASIC 3352), which receives 70 per cent of all payments. The other industries, receiving between 5 and 10 per cent of the bounty, are: Measuring, professional and scientific equipment nec (ASIC 3343); Radio and TV receivers, audio equipment (ASIC 3351); Electrical machinery and equipment nec (ASIC 3357); and Industrial machinery and equipment nec (ASIC 3369). These ASIC groups include a myriad of activities that are not bountiable.

Table E.3: **Materials to output ratios and nominal rate on materials, 1994-95 and 1996-97**

ASIC	*Description*	*Materials to output ratio*	*Nominal rate on materials*	
			1994-95 (per cent)	*1996-97 (per cent)*
3343	Measuring, professional and scientific equipment nec	0.42	2.5	1.4
3351	Radio and TV receivers; audio equipment	0.47	2.5	1.3
3352	Electronic equipment nec	0.54	5.3	2.6
3357	Electrical machinery and equipment nec	0.47	6.6	3.7
3369	Industrial machinery and equipment nec	0.53	5.8	3.8

Source: Commission estimates.

These industries all have an approximate materials to output ratio of 0.5 (Table E.3). Therefore, value added as a proportion of output is also 0.5. Under this assumption, the nominal rate on outputs will equal 4 per cent (with an 8 per cent of value added rate for bounty). This is equivalent to a 4.5 to 5 per cent tariff rate, depending on the value for duty/cost, insurance, freight ratio.

The nominal rate of assistance on materials used is phasing down as a result of the general program of tariff reductions. Using a weighted average (based on proportion of bounty payments to each ASIC) for the materials to output ratio and the nominal rates on materials, the effective rate of assistance would be 2.9 per cent for 1994-95 and 5.2 per cent for 1996-97 (assuming continuation of the bounty at its current rate). Using the nominal rate on materials for the largest recipient of computer bounty payments (ASIC 3352) of 5.3 and 2.6 per cent for 1994-95 and 1996-97, the effective rate would be 2.6 per cent for 1994-95 and 5.1 per cent for 1996-97 (the increase in effective rates over the period is attributable to a more rapid tariff phasing on inputs than outputs).

However, these estimates reflect the nominal rate on materials for the broad ASIC groups. As a significant proportion of inputs into bountiable production are free and some activities receiving the computer bounty are able to obtain duty drawback (difficult to measure), the nominal rate on materials could be as low as zero for bountiable production. The effective rate of assistance under this scenario would be 8 per cent, assuming no other forms of assistance. Bountiable production probably benefits from a number of other schemes (such as the Partnerships for Development program), but these are difficult to measure, let alone attribute to bountiable production.

On balance, the ASIC groups that include firms receiving bounty assistance would be afforded an effective rate of assistance between 5 and 8 per cent (for 1996-97), probably tending toward the top of this range given the likelihood that the measured nominal rate on materials for the industries is higher than is actually the case for bountiable activity.

Table E.4: **Computer bounty: claimants and total, average and median payments, 1984-85 to 1993-94**

	1984-85	*1985-86*	*1986-87*	*1987-88*	*1988-89*	*1989-90*	*1990-91*	*1991-92*	*1992-93*	*1993-94*
Claimants[a]	11	100	132	153	179	261	326	577	663	688
Total bounty ($'000)	1 532	13 219	19 416	25 739	31 088	44 982	51 338	74 489	74 893	77 999
Average payment ($'000)	139	132	147	169	174	172	157	155	113	111
Median payment ($'000)	127	39	56	60	77	62	52	46	30	25

a Number of claimant establishments.

Sources: BIE (1990), Customs (Sub. 40, Attachment J), Commission estimates.

F LETTER TO THE ASSISTANT TREASURER

On 24 March 1995, the Commissioners on the inquiry into the computer hardware, software and related service industries wrote to the Assistant Treasurer, the Honourable George Gear, concerning a short-term extension of the computer bounty to 30 June 1996.

The letter is reproduced on the following page.

G INTERNATIONAL LIMITATIONS ON AUSTRALIAN COPYRIGHT LAW

G.1 The Berne Convention

The *Berne Convention* for the protection of literary and artistic works was completed in Paris on 4 May 1896. The Convention aimed to protect the rights of authors in 'as effective and uniform a manner as possible'. As new forms of artistic expression have developed (eg cinematographic works), the Convention has been extended to provide protection for their authors. The current Convention is administered by the World Intellectual Property Organisation (WIPO).

In 1971, WIPO began examining the legal protection of computer software. In 1974, a non-government Group of Experts was convened under the aegis of the Paris Union for the Protection of Intellectual Property. The Group met in 1974, 1975, 1976 and 1977, and drafted model provisions which provided for a *sui generis* (unique) protection of computer software. 'Software' was defined to include the computer program, program description and supporting material. The model provisions provided that to be protected, computer software had to be the result of its creator's intellectual effort. The provisions granted the creator exclusive rights over disclosing, copying, using, and selling the software. They offered a length of protection of 20 years from the first use, sale, lease or licensing of the software, but not more than 25 years from the date the software was created.

However, no country adopted the Group's model provisions, and computer software continued to be protected as a 'literary work'.

In 1979, WIPO convened a Committee of Experts to examine the issue of legal protection of computer software and to consider whether a special multinational treaty was needed to ensure the adequate international protection of computer software. The Committee concluded such an agreement was not necessary because computer programs could be adequately protected as 'literary works' under the *Berne* and the *Universal Copyright Conventions*.

WIPO established a new Committee of Experts in 1991 to prepare a possible protocol to the *Berne Convention* dealing with computer software. The Committee has met three times to date.

Box G.1: Articles of the *Berne Convention* which deal with copyright protection for computer programs

Article 2	Member countries must protect computer software programs as 'literary works'.
Article 7	Members must protect literary and artistic works for a period of the life of the author plus 50 years. In the case of joint authors, the term of protection is the life of the last surviving author plus 50 years. Article 7(6) allows member countries to extend the period of protection. Some countries were permitted to offer shorter periods of protection if they were bound by the Rome Act of the convention which was signed on 2 June 1928, and at the time they signed the Act their national legislation provided copyright holders with a shorter period of protection.
Article 8	Authors hold the exclusive right to translate or authorise translation of their works.
Article 9(1)	Authors have the exclusive right to authorise the reproduction of those works in any manner or form.
Article 12	Authors hold the exclusive right to authorise adaptations, arrangements and other alterations of their works.

G.2 Universal Copyright Convention

The *Universal Copyright Convention* (UCC) is the other major convention covering the protection of authors' rights. Some member countries of the *Berne Convention* are also members of the UCC, but several nations are members of only one. WIPO hopes these two conventions will be brought together into a single convention, but this is not expected to occur for some time.

The significant difference between the *Berne* and the *Universal Copyright Conventions* is the length of protection offered to copyright holders. Under Article IV of the UCC, the term of protection offered is the life of the author plus 25 years. Some countries can reduce this term to 25 years from the date of first publication, if the term of protection offered under their national laws when they entered the agreement was determined from the date of first publication.

Australia is a signatory to both conventions. Hence when the conventions disagree, as in the length of protection afforded a copyright holder, the *Berne Convention* with its greater restrictions would take precedence.

G.3 Washington Treaty on Integrated Circuits

> On 26 May 1989, the Treaty on Intellectual Property in Respect of Integrated Circuits opened for signature in Washington. (CLRC 1993, p. 27)

By 1 January 1993, only Egypt had ratified the Treaty. However, signatories to the General Agreement on Tariffs and Trade (GATT) Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement are obliged to protect the

layout-designs of integrated circuits in accordance with Articles 2 through 7 (excluding paragraph 3 of Article 6) of the Washington Treaty.

In order to receive temporary protection for Australian integrated circuit layouts in the United States of America, the Commonwealth Government introduced the *Circuit Layouts Act 1989*. The measures adopted in this legislation reflect those acceded to in the GATT TRIPS Agreement (see below).

G.4 Agreement on Trade Related Aspects of Intellectual Property Rights

As part of the Uruguay Round of trade negotiations under GATT, Australia recently acceded to the Agreement on Trade-Related Aspects of Intellectual Property Rights. By acceding to this Agreement, Australia will:

> accord to the nationals of other member States treatment no less favourable than that it accords to its own nationals with regard to the protection of intellectual property, subject to the exceptions already provided in, respectively, the Paris Convention (1967), the Berne Convention (1971), the Rome Convention or the Treaty on Intellectual Property in Respect of Integrated Circuits [the Washington Treaty].
>
> With regard to the protection of intellectual property, any advantage, favour, privilege or immunity granted by a member to the nationals of any other country shall be accorded immediately and unconditionally to the nationals of all other Members. (GATT 1994, p. 322)

Articles relevant to the information technology and telecommunications industries are presented in the Annex to this appendix.

The negotiations also saw the establishment of a TRIPS Council. The Council is responsible for monitoring the operation of the Agreement, and in particular ensuring members comply with their obligations under the Agreement.

TRIPS will come into force on 1 June 1995.

Annex: Extract from Annex 1C, Agreement on Trade-Related Aspects of Intellectual Property Rights

Part II

SECTION 1: COPYRIGHT AND RELATED RIGHTS

Article 9
Relation to the Berne Convention

1. Members shall comply with Articles 1 through 21 of the *Berne Convention* (1971) and the Appendix thereto. Copyright protection shall extend to expressions and not to ideas, procedures, methods of operation or mathematical concepts [ie algorithms] as such.

Article 10
Computer Programs and Compilations of Data

1. Computer programs, whether in source or object code, shall be protected as literary works under the *Berne Convention* (1971).
2. Compilations of data or other material, whether in machine readable or other form, which by reason of the selection or arrangement of their contents constitute intellectual creations shall be protected as such. Such protection, which shall not extend to the data or material itself, shall be without prejudice to any copyright subsisting in the data or material itself.

Article 11
Rental Rights

In respect of at least computer programs and cinematographic works, a Member shall provide authors and their successors in title the right to authorise or to prohibit the commercial rental to the public of originals or copies of their copyright works. ... In respect of computer programs, this obligation does not apply to rentals where the program itself is not the essential object of the rental. [eg: motor vehicles which contain computer programs.]

Article 12
Term of protection

Whenever the term of protection of a work, other than a photographic work or a work of applied art, is calculated on a basis other than the life of a natural person, such term shall be no less than 50 years from the end of the calendar year of authorised publication, or, failing such authorised publication within 50 years from the making of the work, 50 years from the end of the calendar year of making.

SECTION 6: LAYOUT-DESIGNS (TOPOGRAPHIES) OF INTEGRATED CIRCUITS

Article 35
Relation to the IPIC Treaty

Members agree to provide protection to the layout-designs (topographies) of integrated circuits (referred to in this Agreement as 'layout designs') in accordance with Articles 2 through 7 (other than paragraph 3 of Article 6), Article 12 and paragraph 3 of Article 16 of the Treaty on Intellectual Property in Respect of Integrated Circuits and, in addition, to comply with the following provisions.

Article 36
Scope of the protection

Subject to the provisions of paragraph 1 of Article 37, Members shall consider unlawful the following acts if performed without the authorisation of the right holder: importing, selling, or otherwise distributing for commercial purposes a protected layout-design, an integrated circuit in which a protected layout-design is incorporated, or an article incorporating such an integrated circuit only in so far as it continues to contain an unlawfully reproduced layout-design.

Article 37
Acts not requiring the authorisation of the right holder

1. Notwithstanding Article 36, no Member shall consider unlawful the performance of any of the acts referred to in that Article in respect of an integrated circuit incorporating an unlawfully reproduced layout-design or any article incorporating such an integrated circuit where the person performing or ordering such acts did not know and had no reasonable ground to know, when acquiring the integrated circuit or article incorporating such an integrated circuit, that it incorporated an unlawfully reproduced layout-design. Members shall provide that, after the time that such person has received sufficient notice that the layout-design was unlawfully reproduced, that person may perform any of the acts with respect to the stock on hand or ordered before such time, but shall be liable to pay to the right holder a sum equivalent to a reasonable royalty such as would be payable under a freely negotiated licence in respect of such a layout-design.
2. The conditions set out in subparagraphs (a) through (k) of Article 31 shall apply *mutatis mutandis* in the event of any non-voluntary licensing of a layout-design or of its use by or for the government without the authorisation of the right holder.

Article 38
Term of Protection

1. In Members requiring registration as a condition of protection, the term of protection of layout-designs shall not end before the expiration of a period of 10 years counted from the date of filing an application for registration or from the first commercial exploitation wherever in the world it occurs.
2. In Members not requiring registration as a condition for protection, layout-designs shall be protected or a term of no less than 10 years from the date of filing an application for registration or from the first commercial exploitation wherever in the world it occurs.
3. Notwithstanding paragraphs 1 and 2, a Member may provide that protection shall lapse 15 years after the creation of the layout-design.

COMPUTER HARDWARE
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REFERENCES

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