PRIME MINISTER'S SCIENCE, ENGINEERING AND INNOVATION COUNCIL

FIRST MEETING, 29 May 1998

Canberra

OPPORTUNITIES TO PRODUCE A VIBRANT AUSTRALIAN SOFTWARE INDUSTRY

- REPORT OF THE SOFTWARE WORKING GROUP

Summary

The Australian market revenues for packaged software in 1997 were $2.67 billion, about 1.5% of the world market. Revenue from domestic production of this software was $821 million, and exports were $100 million. The Australian software industry is diverse, including not only producers who develop packaged software for general sale, but also those who custom build software. The industry has a number of opportunities and advantages, including broad expertise in small to medium enterprises; the chance to establish a sustainable commercial advantage in user industry applications; significant export or overseas development activity, dependent on building the necessary marketing an distribution; and opportunities to participate in development of basic operating systems and core desktop applications.

It is proposed that, in order to realise these advantages and opportunities, four key challenges need to be met:

- the Government should provide leadership and agree long term goals with the industry
- tax and investment policies need to be small and medium enterprises (SME) and technology business friendly
- a "Trust Australia" campaign should be mounted as an industry development and investment initiative to capture for Australia a major share of the Asia-Pacific region's new and emerging industries that will rely upon the development of "high trust" software systems and a "high trust" business and technical environment
- we need to increase the supply of skilled computer industry employees and encourage lifelong education and personal skills enhancement for both the computer industry workforce and computer users generally

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The presentation to PMSEIC was made by Dr John Webster, Chief Executive, The Institution of Engineers, Australia.

BACKGROUND

The working group was established at the December 1997 meeting of the Prime Minister's Science and Engineering Council. Its members are:

Dr John Webster, Chief Executive, The Institution of Engineers, Australia (Chair)
Mr Doug Campbell, Group Managing Director, Carrier Services, Telstra Corporation Ltd
Professor Bill Caelli, University of Queensland (co-opted member)
Mr Alfred Milgrom, Beam Software (co-opted member)

The terms of reference of the working group were to:

- assess Australia's strengths in this area
- identify problems related to capturing the full benefits from this science base
- make recommendations on how to improve the collaboration between the science base and industry

ACTIONS RECOMMENDED

The working group presented the following recommendations which, in large measure, are drawn from the software industry as discussed at an industry workshop on 14 April 1998.

1. Government provide leadership and agree long term goals with the industry

That the Government work with the Australian software industry to develop a vision to be delivered as part of the Information Industries Action Agenda. In particular, to support the proposal that 'Software Australia 2020' be formed as an industry-owned vehicle for cooperative international promotion, representation, facilitation of clustering, networking, joint tendering, and government/industry cooperation.

- ◊ suggest referral to the Minister for Industry, Science and Tourism, the Hon John Moore MP

2. Tax and investment policies to be SME and technology business friendly

That as part of its present review of the taxation system, the Government take account of the need in the software industry (and other advanced technology industries) for international best practice taxation and investment regimes, and note especially the impact of capital gains tax on incentives for patient capital investment in innovative small and medium sized enterprises (SMEs).

- ◊ suggest referral to the Treasurer, the Hon Peter Costello MP

3. A "Trust Australia" campaign be mounted as an industry development and investment initiative to capture for Australia a major share of the Asia-Pacific region's new and

emerging industries that will rely upon the development of "high trust" software systems and a "high trust" business and technical environment.

This initiative is one which Australia is exceedingly well placed to develop. When successful, it will create a differentiated position for Australian software and online businesses which few, if any, countries in this region could match.

◊ suggest referral to the Minister for Industry, Science and Tourism, the Hon John Moore MP

4. Increase the supply of skilled computer industry employees and encourage lifelong education and personal skills enhancement for both the computer industry workforce and computer users generally.

That the Government work with educational providers and the software industry to urgently increase the supply of trained and qualified computer industry professionals and technicians, and enhance opportunities for lifelong education in the industry. As first priorities, provide incentives for mature-age people, particularly those with high-level expertise in other industries, to acquire software development skills, and consider options for the expansion of cooperative education programs between industry and universities.

◊ suggest referral to the Minister for Employment, Education, Training and Youth Affairs, the Hon Dr David Kemp MP

THE AUSTRALIAN SOFTWARE INDUSTRY

Key global trends affecting the software industry in Australia

The following key drivers of economic development have particular relevance to the software industry's future growth path:

- globalisation of industries and commerce;
- rapid expansion of electronic connectivity;
- emergence of a "knowledge economy"; and
- acceleration of change and innovation.

Characteristics of the software industry in Australia

- global – an archetypal electronic business
- both an industry itself and a major enabler of other industries
- maturing
- price-taking
- strong research and skill base
- structure dominated by large global corporations
- large number of Australian SMEs
- Federal Government policy basically non-interventionist
  - ⇒ historically focussed on information technology and transfer (IT&T) trade deficit and attracting large global corporations
  - ⇒ Information Industries Action Agenda announced as part of *Investing for Growth*.

Size and performance of the Australian software industry

- Australian market revenues for packaged software in 1997: $2.67 billion

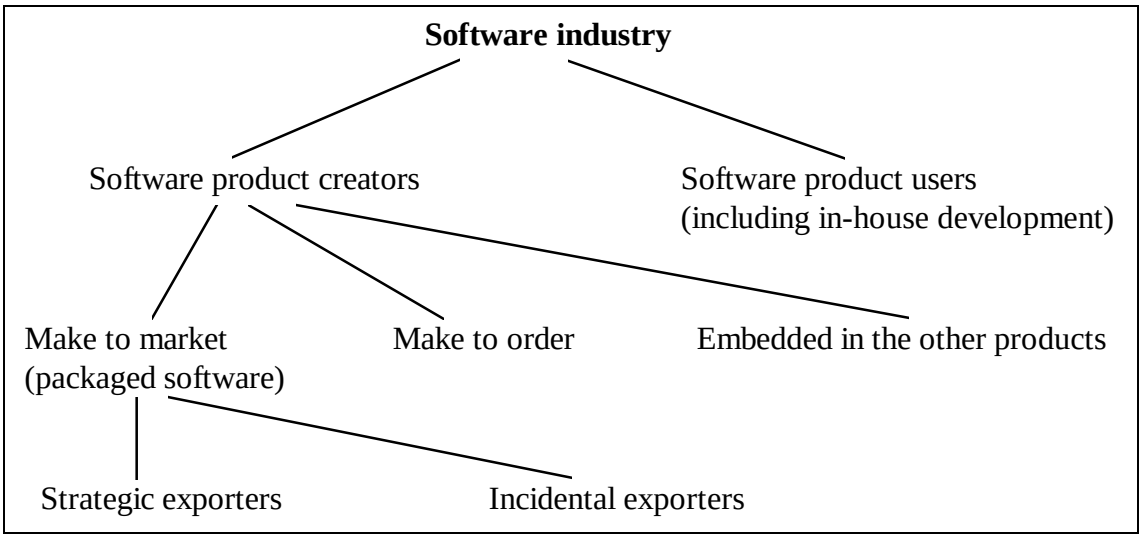
⇒ growing at over 14% per annum marginally ahead of world growth rate;
⇒ Australian market is approximately 1.5% of world market

- revenue from domestic production of packaged software in 1995/96: $821 million
- exports of packaged software in 1995/96: $100 million
- 55,000 people are employed in 9700 businesses in the computer services sector (which includes most software development):
  ⇒ over 9000 are employed in businesses with less than 9 employees
  ⇒ only 51 businesses employed more than 100 people.

Diversity of the software industry

The software industry is diverse. It includes not only the producers which develop packaged software for general sale (ie they "make for market"), but also those which custom build software. Some custom-built software is also developed in-house by user organisations. In addition, an increasing amount of software is embedded in other products such as motor vehicles, washing machines and now smartcards. The following figure depicts this diversity.

Figure 1: Diverse sectors of the software industry



Market barriers, failures and opportunities will vary across this diverse industry. Thus policy initiatives may also need to vary or be targeted at particular segments. For example, the strategic exporters – those businesses which earn more than 25% of their incomes from exports – are clearly trying to establish themselves and the Australian industry in global markets. They face very different pressures from, say, in-house software developers.

Opportunities

- Australian software industry SMEs have broad expertise
- Australian industry can establish a sustainable commercial advantage in user industry applications (eg. mining, agriculture, banking)
- marketing and distribution are the key to significant export/overseas development activity
- the basic operating systems and core desktop applications are becoming closer to commodities, but opportunities will remain for Australia to participate in their development, provided that open systems and not proprietary software interfaces become the norm

THE FOUR KEY CHALLENGES

To achieve a vibrant software industry the working group recommends that in addition to the Software Engineering Quality Centres initiative announced in *Investing for Growth*, that action is required on four key challenges. Each requires immediate attention by government and industry working together.

1. Government to provide leadership and agree long term goals with the industry

To encourage confidence in the industry and set it on a path to develop Australia's capabilities to the maximum, the Federal Government initiated the Information Industries Action Agenda in *Investing for Growth*. By extending this Agenda through a sub-component focussed on software, the industry and government together can achieve:

- Removal of barriers to growth - which need to be seen in the context of the existence of a few dominant global software companies and hence the resultant oligopoly power issues:
  - ⇒ intellectual property is a very important trading commodity;
  - ⇒ Australian software businesses will often create new intellectual property (IP) by working with customers in other industries to be first to market with solutions for difficult problems.

- Growth - Australia does not have a major global software player and our software industry is likely to remain a niche market player unless substantial unforeseen changes occur. Given this, an achievable scenario and target is to see Australia with a broad skill base (one million productive programmers) and hundreds, if not thousands, of SMEs exporting software.
  - ⇒ Australia can also be a major centre for software development by transnationals - a scenario that has already begun to emerge.

- Development opportunities from the emergence of a 'knowledge industry' - broader in scope than the present common understanding of the software industry. A new industry where location is irrelevant and connectivity is global.
  - ⇒ other key factors include developing a leading edge technical infrastructure, focussing on skills and knowledge, language services, intellectual property, the impact of Internet-based commerce and Web-based computing on patterns of trade and the nature of software products as actually sold and delivered.

- Greater exports and global recognition of Australia's software capabilities - through the concept of Software Australia 2020 - an industry suggestion to form an entity to be owned and funded by industry as a vehicle for cooperative international promotion, representation, facilitation of clustering, networking , joint tendering and government/industry cooperation.
  - ⇒ this initiative would provide one credible response to concerns that dominant global software providers will limit export opportunities for Australian software SMEs.
  - ⇒ in many respects, the functions of the new body would be similar to those of the Software Business Network established in the United Kingdom. However, Software Australia would have a much stronger element of industry-wide development and promotion. To that extent, parallels can be seen in the recent development of the

'concept car' by Australian automotive component companies and the collaborative work within the wine industry on its 2025 strategy.

2. Tax and investment policies to be SME and advanced technology business friendly

Innovation in business is critical and is affected by both the availability of patient capital and incentives for research and development (R&D). These issues extend well beyond the software industry; but are crucial to it. There are two changes in the taxation regime which will have a particular impact on this industry:

- rewarding patient capital by reducing or eliminating capital gains tax for venture investments held for a significant period (say 5 or 7 years); and
- removing impediments to off-shore venture capital coming into Australia;
  - ⇒ the problem is that tax-exempt US and UK funds become taxable in Australia; rather than investing directly, such funds generally invest through intermediate bodies; such entities are taxed as limited partnerships in Australia, and US and UK funds therefore prefer to channel their off-shore investments to other countries which offer reciprocity of tax treatment.

There is an urgent need for changes in taxation policies and in the treatment of investment capital to encourage and reward risk taking in the Australian software industry. The Federal Government's Innovation Investment Fund is a beginning. Tax reform, and especially capital gains tax reform, is also desperately needed if policies are to be truly encouraging of innovation. R&D assistance and export market development support are two other measures central to the development of an innovative and exports earning software industry.

3. A "Trust Australia" campaign be mounted as an industry development and investment initiative to capture for Australia a major share of the Asia-Pacific region's new and emerging industries that will rely upon the development of "high trust" software systems and a "high trust" business and technical environment.

This is an industry development and investment initiative which Australia is exceedingly well placed to develop. When successful, it will create a real and substantial differentiated position for Australian software and online businesses which few, if any, countries in this region could match.

- This initiative can be seen as similar to the "clean and green" campaign (under what is now the Supermarket to Asia initiative) which involved both overseas promotional activities and attention to refining the capability of the Australian industry to deliver well on the advertised claim of 'clean and green'. No one firm could mount this initiative alone and cooperation between industry and government is central to success.
- Australia can create a global competitive edge in this fast developing "high trust" segment of the software industry and in emerging new electronic commerce industries through this industry initiated concept. "Trust Australia - you can depend upon it."
- Government should also encourage the emergence of self-regulatory systems for the accreditation of software development companies and software engineering professionals.

This initiative would be underpinned by the online legal and regulatory framework currently being developed. Work would need to continue with urgency. It would need to encompass clear and reliable rules for electronic authorisation, certification and distribution of digital signatures, hardware and software standards for systems security, and strong intellectual property regimes for electronic intellectual property. Most of the necessary reform is already well under way, providing a firm base for this industry development and investment initiative.

4. Increase the supply of skilled computer industry employees and encourage lifelong education and personal skills enhancement for both the computer industry workforce and computer users generally

A current Australian strength in the information industries is our locally trained and experienced computer professionals. Moreover, our highly skilled people are competitively priced relative to those paid in most other developed countries. As in the USA, there are clear signs in Australia that demand is greater than the current supply for skills, and the gap is growing. Industry estimates that Australia will need a 12-15% per annum increase in graduates over the next five years, split equally between professional and technical skills.

To successfully tackle this issue will require innovation on the education front. This could, for example, include allowance for diverse entry points to the education system, in combination with the concept of lifetime training (which would make use of the skill base of the ever-growing number of over 50s, particularly those with high-level expertise in other industries), offering distinct opportunities to quickly build on our current strengths. Attention should be directed to options for the expansion of cooperative education programs between industry and universities.

Under current government policy, educational institutions should have the flexibility to respond rapidly and positively to this substantial increase in world demand for high value professional and technically skilled workers. This challenge must be accepted and government may need to facilitate initial actions.

If Australia can substantially increase the supply of trained and experienced workers in a sector in which Australia already has a world reputation for quality education, this will very likely become a major inducement for medium and large international corporations to establish in Australia new design, high value production and service operations.

OTHER IMPORTANT ISSUES

The Industry Workshop put forward a range of other important issues for consideration.

Purchasing policy¾ correcting unintended effects which limit the potential of SMEs

One major threat perceived by SME software companies is the potential unintended impact of government outsourcing on their ability to innovate and grow; perhaps even to survive. A focus on building a constructive and cooperative relationship between the government and local companies to ensure that Australian software companies have equal access to government business will counter a particular concern in the outsourcing of applications development. Local companies would benefit if the outsourcing of applications development remained on a project by project basis and allowed vendors ready access to the intellectual property created.

Research funding for industry consortia with a shorter life cycle than the existing CRCs

By developing the CRC concept to account for the dynamics of rapid change in the IT industry, public research could focus more efficiently on industry needs. These modified CRCs would respond to the rapid technological developments in the IT sector and keep the research effort close to market opportunities.

Maintenance of existing policies favouring open systems

Any Agenda to develop the Australian software industry must encourage the widespread availability of interconnection (or interface) standards which are open – that is, readily available to

Australian developers. Many computer industry interface standards are owned privately by leading market players which then have a disproportionate degree of control over access to the market. Thus the development, perhaps even survival, of the Australian software industry in the global marketplace will be dependent on government playing a crucial role in the maintenance of open systems.

The Federal Government, by adopting the policy of buying and using software and information processing systems which interface freely and where interface specifications are openly available to Australian software developers, will expand market opportunities for Australian developers. Further, where such specifications are denied, the Federal Government should permit reverse engineering to discover the necessary connectivity information wherever companies domiciled within the country of origin of the systems concerned would be entitled to gain access to such information, by reverse engineering or otherwise.