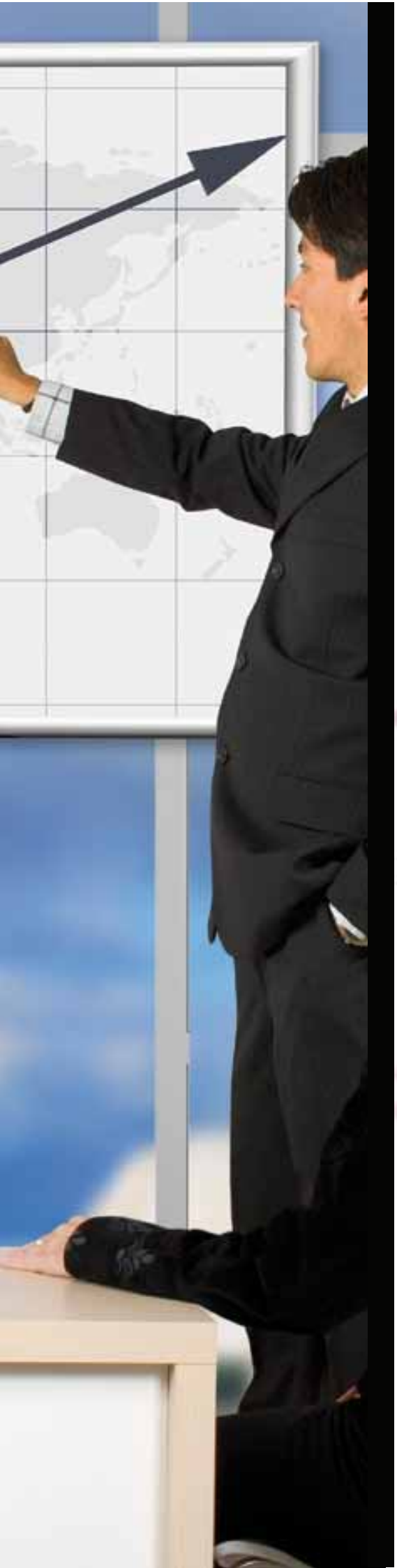


Australian ICT Trade Update 2009

www.acs.org.au/09icttradeupdate

AUSTRALIAN COMPUTER SOCIETY

ICT Professionals Shaping Our Future

About the Australian Computer Society

The ACS (Australian Computer Society) is the recognised professional association for those working in Information and Communications Technology, seeking to raise the standing of ICT professionals and represent their views to government, industry and the community.

A member of the Australian Council of Professions, the ACS is the guardian of professional ethics and standards in the ICT sector, committed to ensuring the beneficial use of ICT for all Australians.

It provides both members and non-members with opportunities for professional development, networking and certification, as well as enabling them to contribute to the growth of their profession. Visit www.acs.org.au for more information.

AUSTRALIAN COMPUTER SOCIETY

Level 3, 160 Clarence Street
Sydney NSW 2000
Tel: +61 2 9299 3666
Fax: +61 2 9299 3997
www.acs.org.au

Summary

Much of this decade has been one of a steady recovery from the 'Dot Com' downturn, but the last year has brought a global financial crisis.

The 'Dot Com' downturn triggered a new wave of globalisation in the information and communication technology (ICT) industries, which featured increasing specialisation along the value chain and the emergence of developing economies as both new production locations and new growth markets (e.g. China and India). In the early years of this decade, international investment flows focused on developing economies, on services rather than manufacturing and, in particular, on a range of IT and IT-enabled business services. As a result, a new international division of labour emerged, with the globalisation of services following a similar path to that previously seen in manufacturing.

To date, *the global financial crisis* has had surprisingly little effect on Australia's ICT trade, with strong growth in imports and exports throughout 2008. Preliminary analysis of ICT equipment trade data for the first quarter of 2009 reveals some evidence of slowing, but it is not suggestive of a sharp contraction. Trade in ICT services also continued to grow in the first quarter 2009, with both imports and exports up on first quarter 2008 (in current prices).

However, the global financial crisis has brought a marked slowing of risk-oriented seed and venture capital investment that may well have a negative impact on innovation. [1] Major multi-national firms may be able to draw on internal funds to continue to invest in bringing innovative new products and services to market, but smaller firms that have traditionally relied on seed and venture investments may be more severely affected. Hence, an immediate challenge for the Australian ICT industry is to find ways to minimise the impact of the global financial crisis on innovation and, thereby, on the future competitiveness of local firms.

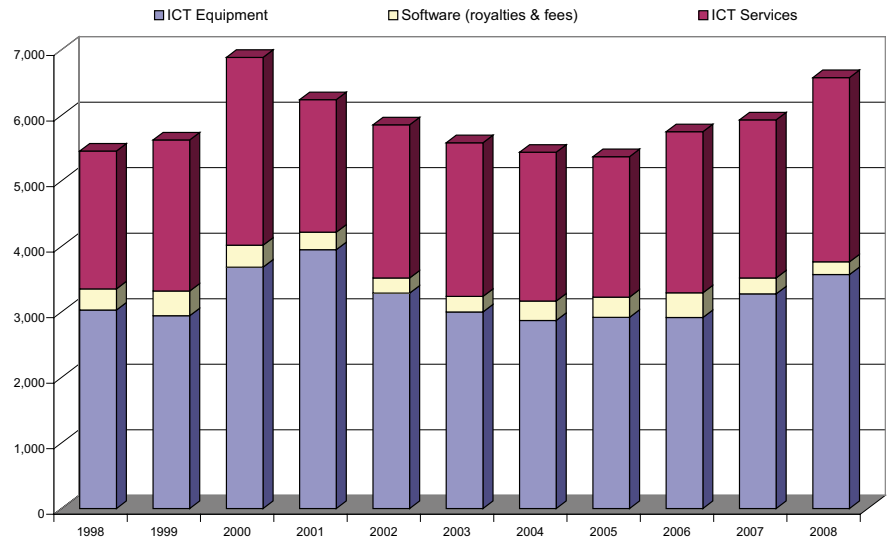
Placing recent developments in this context, this report presents a detailed statistical update on Australia's ICT trade over the decade 1998 to 2008 (inclusive). It explores the composition of ICT services, software, content and equipment trade, and identifies major export markets and import sources. It also examines ICT trade State-by-State.

ICT Trade

(Chapter 1)

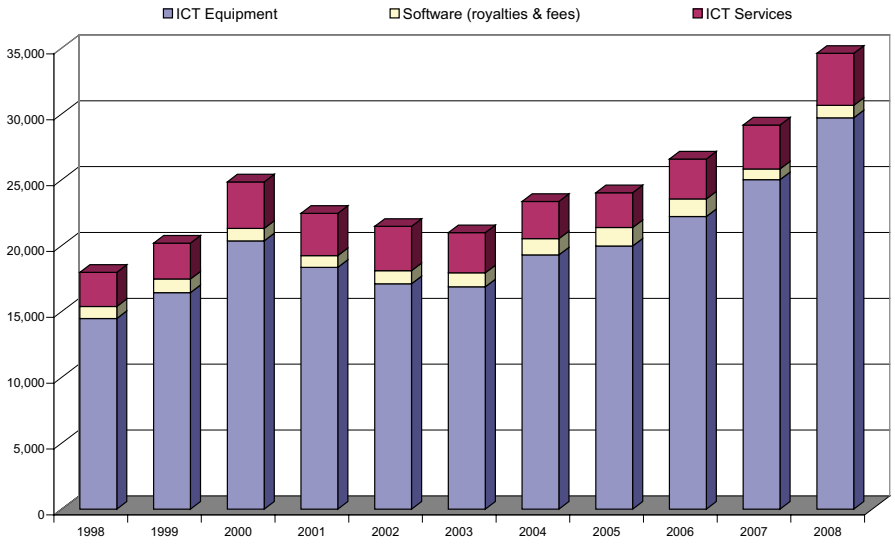
Despite the global economic downturn, 2008 saw a marked upturn in spending on ICT equipment and services imports.

Figure 1 Australia's ICT Exports, 1998 to 2008 (AUDm)



Note: Due to a customs reclassification there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

Figure 2 Australia's ICT Imports, 1998 to 2008 (AUDm)



Note: Computer and information services imports prior to 2000 are likely to be understated.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

ICT goods and services *exports* from Australia were worth almost $6.6 billion during 2008, only slightly below the peak of $6.9 billion reached during the boom in 2000 (Figure 1).

However, with increased spending ICT *imports* cost more than $34 billion (Figure 2). Consequently, Australia's ICT trade deficit reached $28 billion during 2008 – increasing by almost $5 billion during the year and exceeding the previous peak reached during the height of the 'Dot Com' boom.

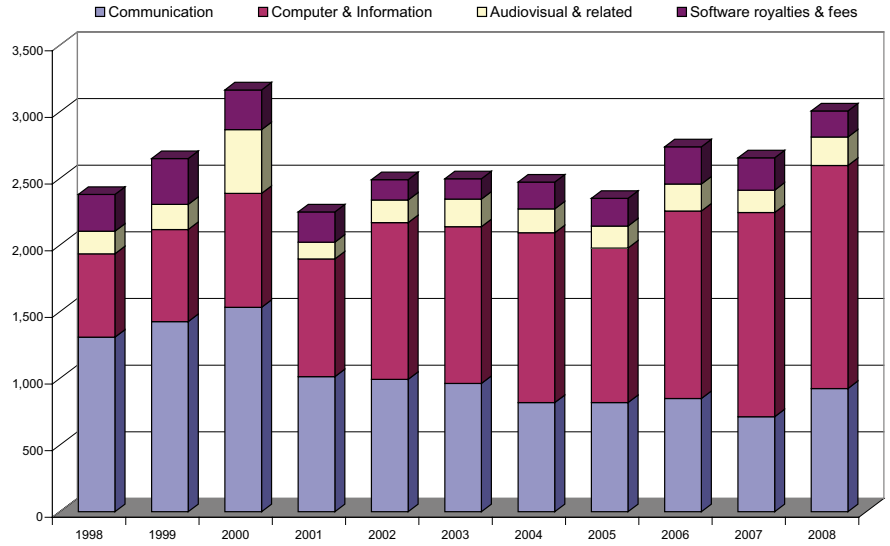
[1] OECD (2009) *Investing in Innovation for Long-Term Growth*, OECD, Paris, p7.

ICT Services Trade

(Chapter 2)

Australia's ICT *services exports* were worth $3 billion in 2008, and accounted for around 6% of total services exports. Computer and information services were the standout, being the largest and fastest growing category of ICT services exports – having increased nearly three-fold over the last decade and now accounting for more than 50% of all ICT services exports (Figure 3).

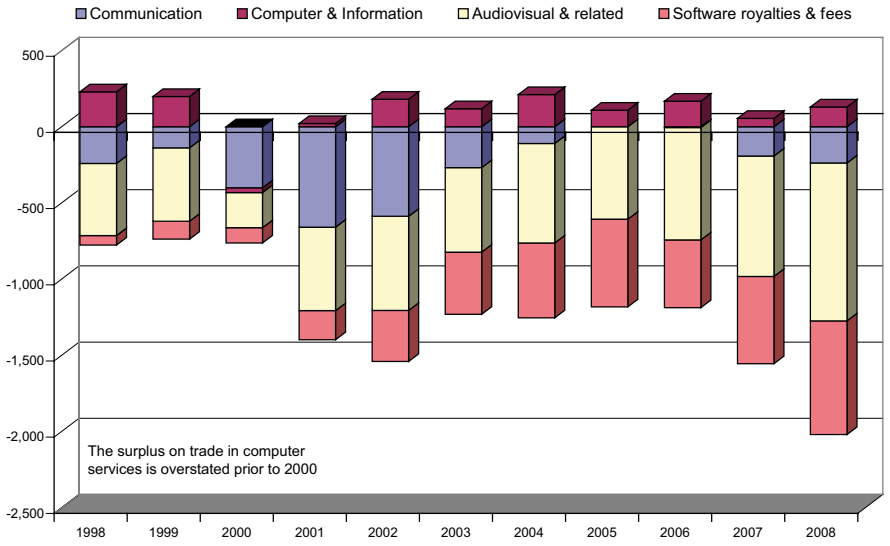
Figure 3 Australia's ICT Services Exports, 1998 to 2008 (AUDm)



Sources: ABS, CSES Analysis.

Australia's ICT *services imports* cost $4.9 billion in 2008, and accounted for around 9% of Australia's total services imports. Computer and information services accounted for 32%, audiovisual accounted for 26%, communication services accounted for 24%, and software royalties and license fees for around 19%. There was a deficit on trade in ICT services approaching $2 billion during 2008, but computer and information services standout, having traded in surplus since 2000 and being the only category of ICT goods or services to be in surplus (Figure 4).

Figure 4 Australia's ICT Services Trade Balance, 1998 to 2008 (AUDm)



Note: The surplus on trade in computer services is likely to be overstated prior to 2000, and the overall deficit understated.
Sources: ABS, CSES Analysis.

ICT Equipment Trade

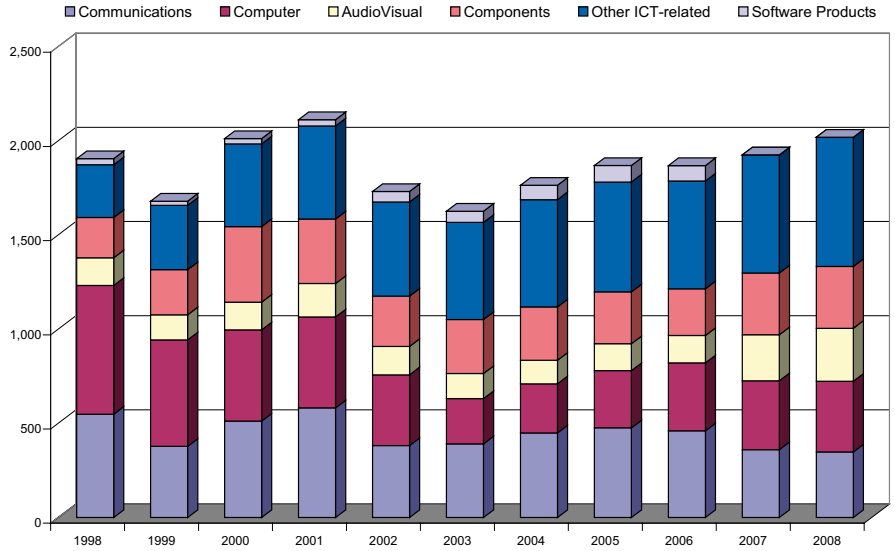
(Chapter 3)

While there are significant areas of export strength, Australia continues to source much of its ICT equipment from overseas, and increasingly from sources in Asia.

In 2008, ICT *equipment exports* from Australia were worth $3.6 billion – 1.3% of Australia's total goods exports. By comparison, Australia's gold exports accounted for around 5% of total goods exports and coal for 17%.

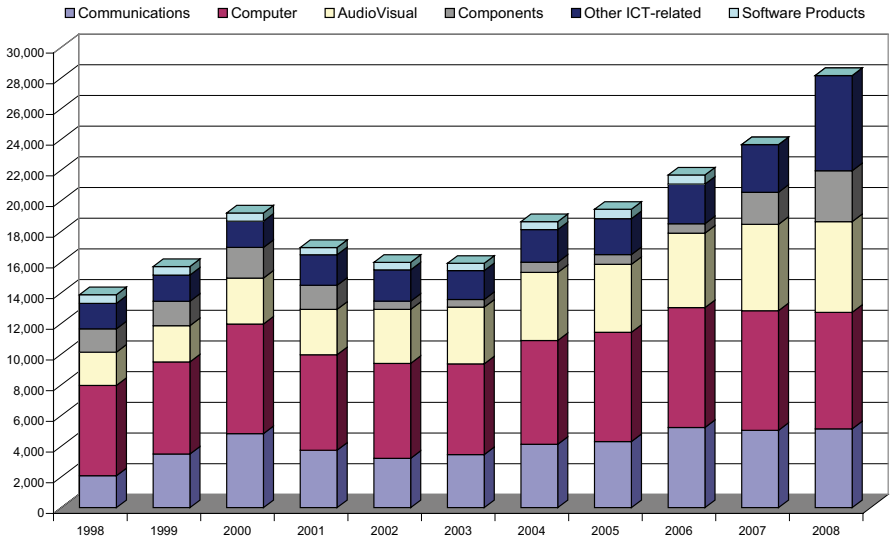
During 2008, re-exports (i.e. things brought into Australia and re-exported with little or no value added) accounted for just over $1.5 billion, or 43% of Australia's ICT equipment exports.

Figure 5 Locally Produced ICT Equipment Exports, 1998 to 2008 (AUDm)



Note: Due to a customs reclassification there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years, and it is no longer possible to track trade in software products.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 6 ICT Equipment Imports for Domestic Consumption, 1998 to 2008 (AUDm)



Note: Due to a customs reclassification there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years, and it is no longer possible to track trade in software products.
Source: TradeData (www.tradedata.net), CSES Analysis.

ICT Services Export Markets and Import Sources

(Chapter 4)

Locally produced equipment exports were worth $2 billion. Locally produced exports of audiovisual equipment, components and other ICT-related equipment have increased over the last decade, while locally produced computer and communications equipment exports have declined (Figure 5).

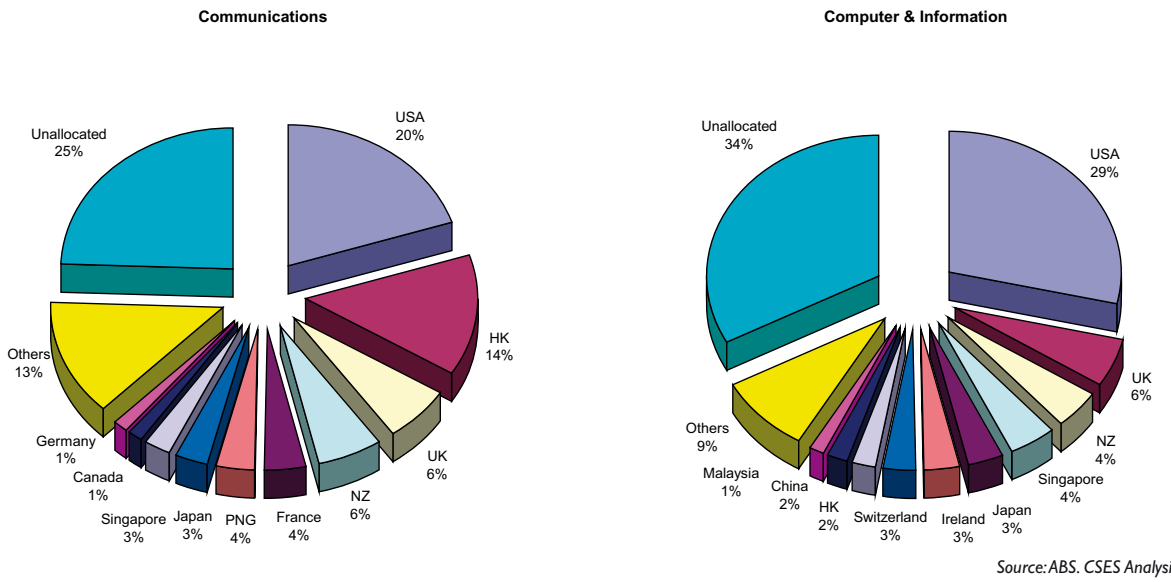
In the mid 1990s, locally produced exports of computer equipment were worth $790 million. By 2008, they had fallen to $375 million (in current prices).

ICT *equipment imports* into Australia cost almost $30 billion during 2008 – up from $15 billion a decade earlier and higher than the previous peak reached during the 'Dot Com' boom (in current prices). ICT equipment accounted for around 13% of Australia's total goods imports during 2008. In comparison, passenger motor vehicles accounted for 6.5%.

As noted, re-exports were worth more than $1.5 billion in 2008. Hence, imports of ICT equipment for domestic consumption cost around $28 billion during 2008, up from less than $14 billion a decade earlier. Computer equipment accounted for 28%, audiovisual equipment for 20% and communications equipment for 19% (Figure 6).

Bilateral services trade data are limited, but among reporting countries major markets for Australia's ICT *services exports* during 2008 included the United States, the United Kingdom, New Zealand, Japan, Singapore, Hong Kong and China (Figure 7).

Figure 7 Australia's ICT Services Export Markets, 2008 (per cent)



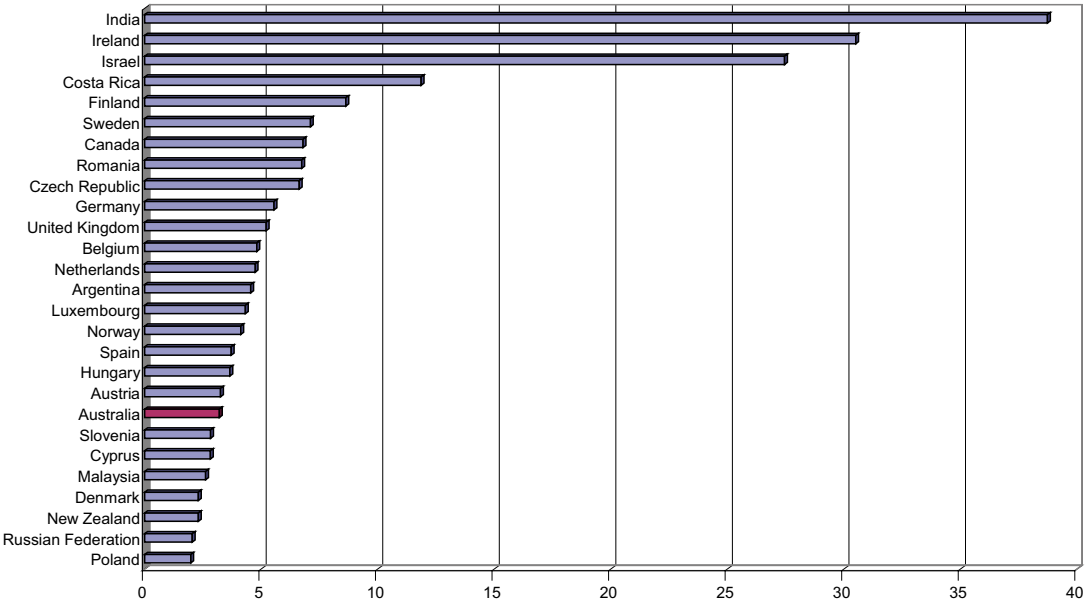
Source: ABS. CSES Analysis.

Among reporting countries, the major export growth market for *communications services* exports between 2000 and 2008 were France and Hong Kong, while for *computer and information* services the major export growth markets were India, Switzerland, China, Ireland and Malaysia.

Of the reporting countries, the United States was by far our largest single source for ICT services imports during 2008 at $784 million. The United Kingdom was the source of $256 million, Singapore $109 million, France $95 million, New Zealand $64 million and Germany $48 million.

Offshoring and trade in off-shored services involve both computer and information services (i.e. IT services) and a range of IT-enabled business services. In only four countries did computer and information services account for more than 10% of total services exports during 2006 – India, where they accounted for almost 40% (down from 50% in 2004), Ireland 31% (down from 39% in 2004), Israel 27% and Costa Rica 12% (Figure 8).

Figure 8 Share of IT Services in Total Services Exports, 2006 (per cent)



Source: UNCTAD, CSES analysis.

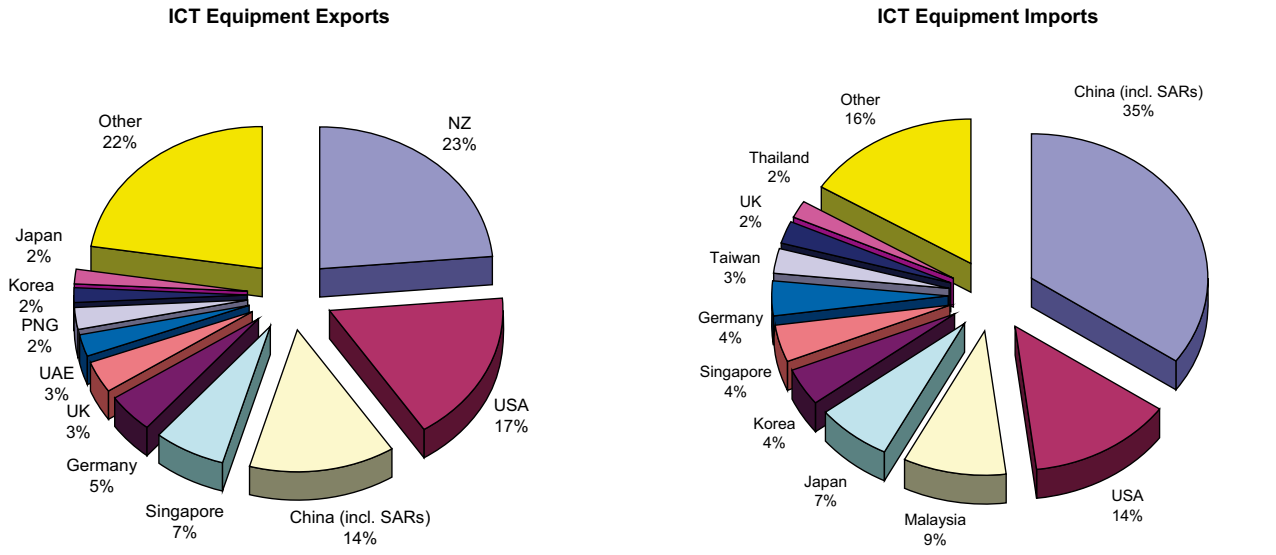
It is immediately apparent from these data that India, Ireland and Israel are major offshoring locations. The other countries listed in Figure 8 are also significant exporters of IT services, and *prima facie* have the potential to become major offshoring locations (including Australia).

ICT Equipment Export Markets and Import Sources

(Chapter 5)

Throughout the last decade New Zealand and the United States have been the largest markets for Australia's ICT *equipment exports*. In 2008, other major markets included China (incl. SARs), Singapore, Germany, the United Kingdom, Japan, the United Arab Emirates, Papua New Guinea and Korea (Figure 9). The United States, China (incl. SARs), New Zealand, Germany, Singapore and the United Kingdom were also the largest markets for our locally produced equipment exports.

Figure 9 Australia's ICT Export Markets and Import Sources, 2008 (per cent)



Note: Includes re-exports and re-imports.
Sources: ABS and TradeData (www.tradedata.net), CSES analysis.

A decade ago the United States and Japan were the two main sources of ICT *equipment imports* into Australia, but Asian countries, including China (incl. SARs), Malaysia, Japan, Korea, Singapore and Taiwan, are now major suppliers (Figure 9).

The biggest change has been in imports from China (incl. SARs), which is now the largest supplier – with ICT equipment exports to Australia in excess of $10 billion during 2008 (more than one-third of Australia's total ICT equipment imports).

ICT Trade State-By-State

(Chapter 6)

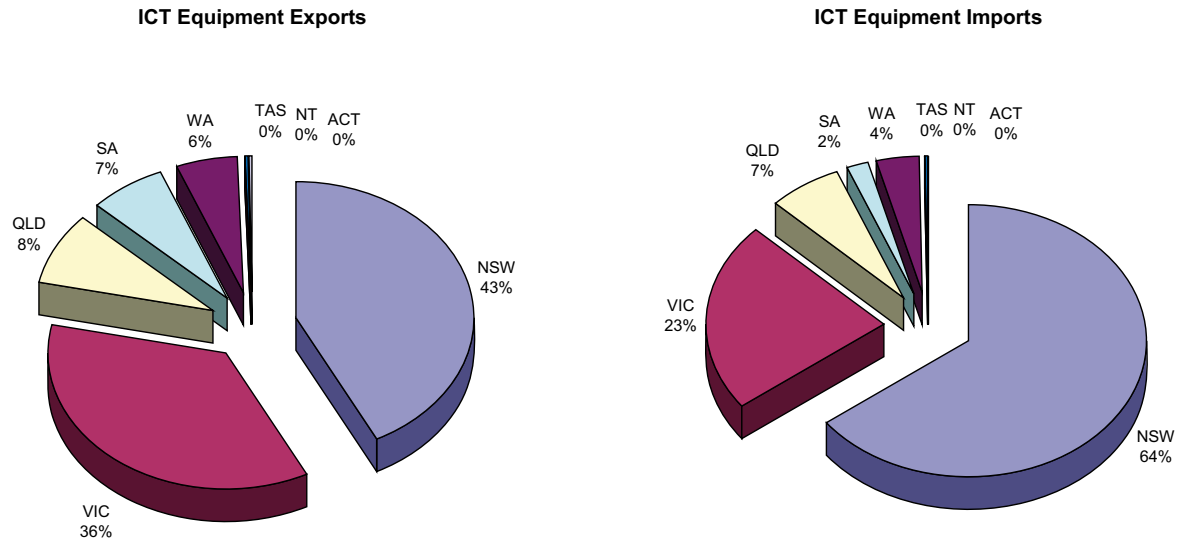
New South Wales and Victoria dominate ICT *equipment* exports and imports – with NSW being the largest exporter and importer of ICT and related equipment during 2008. In addition to Victoria, ICT equipment exports from Queensland, South Australia and Western Australia were also significant (Figure 10).

NSW attracted no less than 64% of all ICT *equipment imports* during 2008 – although $1.2 billion worth were re-exported, with Sydney acting as a regional distribution hub (Figure 10). NSW also accounted for 46% of Australia's State-attributed ICT *services exports* and 66% of ICT *services imports*.

During 2008, NSW exported $835 million worth of domestically produced ICT equipment, down from more than $1 billion in 1997. In contrast, Victoria exported $700 million worth, up marginally from $695 million a decade earlier (in current prices).

Queensland, South Australia and Western Australia each accounted for 6% to 8% of Australia's locally produced ICT equipment exports, while the contribution of the other States and Territories to ICT trade is relatively small.

Figure 10 State ICT Equipment Trade Shares, 2008 (per cent)



Note: Exports exclude re-exports, but imports include them.
Source: TradeData (www.tradedata.net), CSES Analysis.

During 2008, the major markets for locally produced ICT equipment exports from NSW were New Zealand, China (incl. SARs) and the United States, while for Victorian equipment exports the major markets were the United States, Germany, China (incl. SARs) and New Zealand.

Queensland's ICT equipment exports went primarily to the United States, China (incl. SARs), New Zealand, Singapore, the United Kingdom, New Caledonia and South Africa; South Australia's to the United States, China (incl. SARs), New Zealand, the United Kingdom, India and South Africa; and Western Australia's to China (incl. SARs), the United States, Singapore, the United Kingdom, New Zealand and South Africa.

The composition of the State's ICT equipment exports also varied. NSW accounted for 58% of computer equipment exports during 2008 and Victoria 24%, but just 48% of communications equipment exports compared to Victoria's 27%. Victoria accounted for more than 50% of all exports other ICT-related equipment, and Western Australia accounted for a relatively large 11% of all communications equipment exports.

Strengths, Weaknesses, Opportunities and Threats

Trade and specialisation are beneficial. Not all countries will have a comparative advantage in all areas of ICT production, but the ICT producing industries are highly diverse. Comparative and competitive advantages in areas like electronic equipment assembly are very different from those in such areas as consulting services. Given the enormous range of the ICT industries, and the diversity of their underlying inputs and cost structures, one could reasonably expect almost all countries to have strengths in some aspect of ICT production, and comparative advantage in some part of the ICT industries.

In Australia's case, strong export growth and surpluses on trade in computer services stand out. It is the only area of ICTs in which Australia has a surplus on trade and is clearly an important area of local strength. Despite the overall picture, there are also areas of electronics production in which Australia is competitive and actively participating in global production systems. The challenge is to build on these local strengths.

However, the global financial crisis has brought a more immediate challenge for the Australian ICT industry, with a marked slowing of risk-oriented seed and venture capital investment. Innovation is the key to recovery, so we must find ways to minimise the impact of the global financial crisis on innovation and, thereby, on the future competitiveness of local firms.

Table of Contents

List of Tables

List of Figures

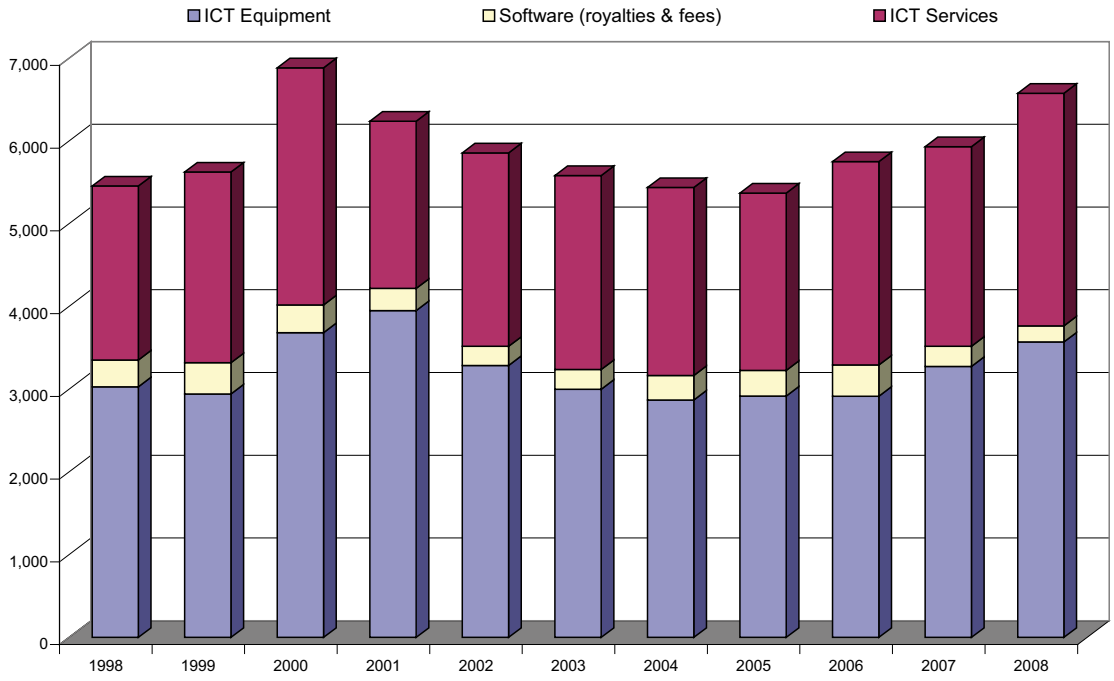
1 Australia's ICT Trade at a Glance

Bringing services, software and equipment trade together, this chapter presents a brief picture of Australia's ICT trade position. A more detailed and in-depth analysis of each element of Australia's ICT trade is presented in the subsequent chapters.

1.1 Australia's ICT Exports

During 2008, ICT goods and services exports from Australia were worth $6.6 billion, up from $5.5 billion in 1998 (in current prices). Together, ICT goods and services exports accounted for 2.3% of Australia's total exports earnings.

Figure 1.1 Australia's ICT Exports, 1998 to 2008 (AUDm)



Notes: See notes to table.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

ICT *equipment* exports accounted for almost $3.6 billion (55% of total ICT exports) and ICT related services accounted for the remaining $3 billion (45%) (Figure 1.1). It should be noted, however, that equipment re-exports (i.e. things brought into Australia and re-exported with little or no value added) were worth more than $1.5 billion, around 20% of total ICT exports. Hence, locally produced ICT exports were worth around $5 billion.

Total ICT exports increased 1.9% per annum over the period 1998 to 2008 (in current prices), with ICT services exports growing by 2.4% per annum over the period and ICT equipment exports by 1.5% per annum. Australian domestically produced ICT equipment exports increased by only 0.6% per annum, with re-exports growing faster rate than locally produced exports.

Table 1.1 Australia's Total ICT Exports, 1998 to 2008 (AUDm)

	1998	2000	2002	2004	2006	2008
Equipment						
Re-exports	1,172	1,710	1,635	1,202	1,146	1,552
Local Exports	1,905	2,011	1,730	1,763	1,868	2,019
Communications	722	1,193	579	596	587	697
Computer	1,396	1,206	1,480	978	1,007	1,058
Audiovisual	200	222	229	246	253	410
Components	298	493	342	353	350	521
Other ICT-related	413	571	657	697	719	885
Software Products	47	37	78	95	98	..
Total ICT Equipment	***3,076***	***3,721***	***3,365***	***2,965***	***3,014***	***3,571***
Services						
Communications	1,309	1,533	992	818	849	924
Computer & Information	626	855	1,176	1,275	1,406	1,673
Audiovisual & related	169	478	170	178	203	214
Software royalties & fees	276	298	153	202	279	195
Total ICT Services	***2,380***	***3,164***	***2,491***	***2,473***	***2,737***	***3,006***
Total						
Total ICT Exports	**5,456**	**6,885**	**5,856**	**5,438**	**5,751**	**6,577**
Australian ICT Exports	**4,285**	**5,175**	**4,221**	**4,236**	**4,605**	**5,025**

Notes: Total includes re-exports, while the Australian total excludes them. All data are current prices. Due to a customs reclassification in 2007 there is a break in the time series for ICT equipment and data from 2007 onwards are not strictly comparable with earlier years. Consequently, ICT equipment trade growth rates are no more than indicative.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

It is clear from these data that growth has been strong during the last two years, despite the global downturn (Figure 1.1). Total ICT exports grew by 11% during 2008, ICT equipment by 9% and ICT services by 13%, and ICT exports during the first quarter of 2009 appear to be holding up well. [2]

[2] However, it should be noted that due to a customs reclassification in 2007 there is a break in the time series for ICT equipment and data from 2007 onwards are not strictly comparable with earlier years. Consequently, ICT equipment trade growth rates are no more than indicative.

1.2 Australia's ICT Imports

Australia's ICT imports cost more than $34 billion during 2008, up from nearly $18 billion in 1998 (in current prices). During 2008, ICT goods and services imports accounted for around 13% of Australia's total import debits.

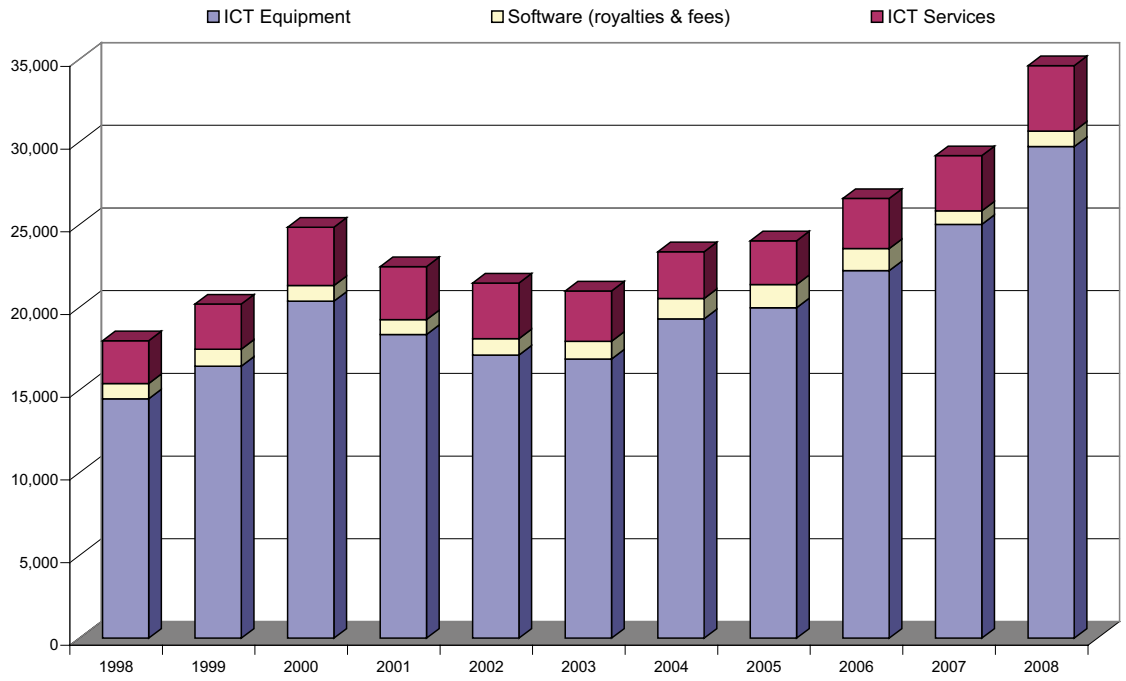
Table 1.2 Australia's Total ICT Imports, 1998 to 2008 (AUDm)

	1998	2000	2002	2004	2006	2008
Equipment						
Re-imports	51	57	80	70	93	125
Foreign Equipment Imports	15,005	20,865	17,546	19,777	22,737	29,594
Communications	2,254	5,505	3,416	4,276	5,357	5,485
Computer	6,603	7,868	7,288	7,482	8,454	8,276
Audiovisual	2,221	3,073	3,596	4,560	4,965	6,047
Components	1,607	2,084	612	739	714	3,511
Other ICT-related	1,792	1,843	2,206	2,250	2,730	6,402
Software Products	579	550	508	540	610	..
Total ICT Equipment	***15,056***	***20,923***	***17,626***	***19,847***	***22,830***	***29,719***
Services						
Communications	1,550	1,934	1,580	928	855	1,162
Computer & Information	397	886	995	1,064	1,238	1,543
Audiovisual & related	642	709	787	831	940	1,250
Software royalties & fees	339	398	488	693	724	941
Total ICT Services	***2,928***	***3,927***	***3,850***	***3,516***	***3,757***	***4,896***
Total						
Total ICT Imports	**..**	**24,850**	**21,476**	**23,363**	**26,587**	**34,615**
Foreign ICT Imports	**17,932**	**24,792**	**21,396**	**23,293**	**26,494**	**34,490**

Notes: All data are current prices. Equipment imports include re-imports and re-exports. Computer and information services imports, and related totals, prior to 2000 are understated (and have been omitted). Due to a customs reclassification in 2007 there is a break in the time series for ICT equipment and data from 2007 onwards are not strictly comparable with earlier years.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

[2] However, it should be noted that due to a customs reclassification in 2007 there is a break in the time series for ICT equipment and data from 2007 onwards are not strictly comparable with earlier years. Consequently, ICT equipment trade growth rates are no more than indicative.

Figure 1.2 Australia's ICT Imports, 1998 to 2008 (AUDm)



Notes: See notes to table.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis

ICT *equipment* imports accounted for 86% of this total ($30 billion) and ICT related *services* for the remaining 14% ($4.9 billion). ICT *equipment* imports increased by around 7% per annum between 1998 and 2008 (in current prices) and services imports by 5.3%. During 2008 ICT imports increased by around 18%, despite the global downturn. First quarter 2009 imports of ICT equipment appear to be continuing that strong growth, reflecting Australia's relatively strong performance in the downturn, to date.

1.3 Australia's ICT Trade Balance

Australia's deficit on ICT trade stood at $28 billion in 2008 (Figure 1.3), more than $4.5 billion (20%) higher than it had been in the previous year. The deficit on trade in ICT *equipment* reached $26 billion in 2008, while the deficit on ICT *services* reached $1.9 billion.

Table 1.3 Australia's ICT Trade Balance, 1998 to 2008 (AUDm)

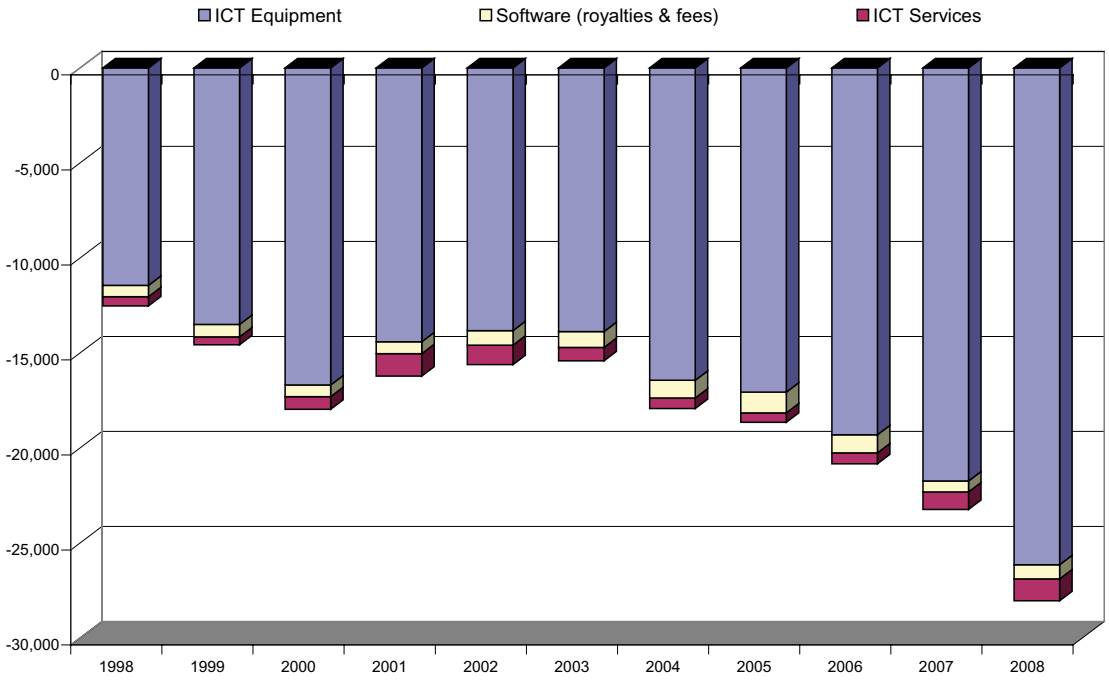
	1998	2000	2002	2004	2006	2008
Equipment						
Re-imports minus re-exports	-1,121	-1,653	-1,555	-1,131	-1,052	-1,427
Production 'Balance'	-13,100	-18,854	-15,816	-18,014	-20,869	-27,576
Communications	-1,532	-4,312	-2,837	-3,680	-4,770	-4,788
Computer	-5,207	-6,662	-5,808	-6,504	-7,447	-7,218
Audiovisual	-2,020	-2,852	-3,367	-4,314	-4,712	-5,637
Components	-1,309	-1,591	-270	-386	-364	-2,990
Other ICT-related	-1,379	-1,272	-1,548	-1,553	-2,012	-5,516
Software Products	-532	-513	-430	-445	-512	..
Total ICT Equipment	***-11,979***	***-17,202***	***-14,261***	***-16,882***	***-19,816***	***-26,149***
Services						
Communications	-241	-401	-588	-110	-6	-238
Computer & Information	229	-31	181	211	168	130
Audiovisual & related	-473	-231	-617	-653	-737	-1,036
Software royalties & fees	-63	-100	-335	-491	-445	-746
Total ICT Services	***-548***	***-763***	***-1,359***	***-1,043***	***-1,020***	***-1,890***
Total						
Total ICT Balance (Deficit)	**..**	**-17,965**	**-15,620**	**-17,925**	**-20,836**	**-28,039**
'ICT Production Deficit'	**..**	**-19,617**	**-17,175**	**-19,057**	**-21,889**	**-34,490**

Notes: The 'Production Balance' is the difference between domestically produced exports and foreign produced imports. See notes to previous tables.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

Excluding re-exports and re-imports gives a clearer picture of what Australian ICT producers export and what Australia imports from overseas for local consumption – the difference between them can be thought of as the '*deficit on production*'. Because re-exports are significantly larger than re-imports, Australia's ICT production deficit is larger than its trade deficit. During 2008, the difference between locally produced exports and foreign produced imports was more than $34 billion.

Recent *surpluses* on trade in computer and information services and growth in exports stand out as a bright spot. In 2008, Australia exported almost $1.7 billion worth of computer and information services, while importing just over $1.5 billion. It is the only area of ICTs in which Australia runs a surplus on trade.

Figure 1.3 Australia's ICT Trade Balance, 1998 to 2008 (AUDm)



Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

1.4 Australia's ICT Export Markets

Over the last decade New Zealand and the United States have traditionally been the largest markets for Australia's ICT *equipment exports*. In 1998, New Zealand took nearly 20% of our ICT equipment exports and the United States 17%. A decade later in 2008, New Zealand took $824 million (24%) and the United States took $611 million (17%). However it is China (incl. SARs) that has shown the strongest growth – increasing from less than 10% in 1998 to 14% ($477 million) in 2008 (Figure 1.4).

New Zealand was also by far the largest market for ICT equipment re-exports from Australia in 2008, taking 36% of all re-exports (Figure 1.4). Other major markets for *re-exports* included the United States, China (incl. SARs) and Singapore. These data suggest that Australia acts as an ICT equipment distribution hub for the local region (e.g. New Zealand) and participates in international manufacturing supply chains (e.g. the United States, China (incl. SARs) and Singapore). [3]

Box 1.1 What Does the ICT Deficit Show?

ICT imports underpin productivity gains, but realising the benefits of being a user of ICTs should not blind us to the potential benefits of being a producer. Strong productivity increases have been realised by countries that are ICT producers and by the ICT producing industries. The OECD's Pilat and Wolfl (2004) concluded that: "In Finland, Ireland and Korea, close to 1 percentage point of aggregate labour productivity growth over the 1995-2001 period was due to the strong productivity performance of the ICT manufacturing sector. In the United States, Japan and Sweden, the ICT-producing sector also contributed significantly to productivity growth." [4] Productivity in ICT production has been a significant driver of overall productivity growth in many developed countries, it does not depend upon ICT consumption alone.

Indeed, a growing ICT deficit can be seen as an indicator of decline in the local ICT industry and a sign of declining international competitiveness in ICT production. This has implications for ICT using as well as the ICT producing industries. The Future Framework report stated that: "World-class ICT capabilities (e.g. in terms of skills and innovation) are fundamental to the ability to apply ICT in other industries and achieve broader national economic and social goals. A significant ICT production capability in the economy creates a symbiotic relationship between users and producers such that the level of sophistication of users is enhanced by the presence of producers of ICT goods and services. Without an industry producing such products and services, it would be more difficult for Australia to keep up internationally in terms of their adoption and use." [5]

Many of the same factors underpin ICT production for market and in-house production and application. The concern is not so much, or not primarily, about the deficit per se, but rather about what a large and growing deficit indicates about Australia's underlying ICT capabilities.

Source: Houghton, J.W. (2007) Australian ICT Trade Update 2007, Australian Computer Society, Sydney.

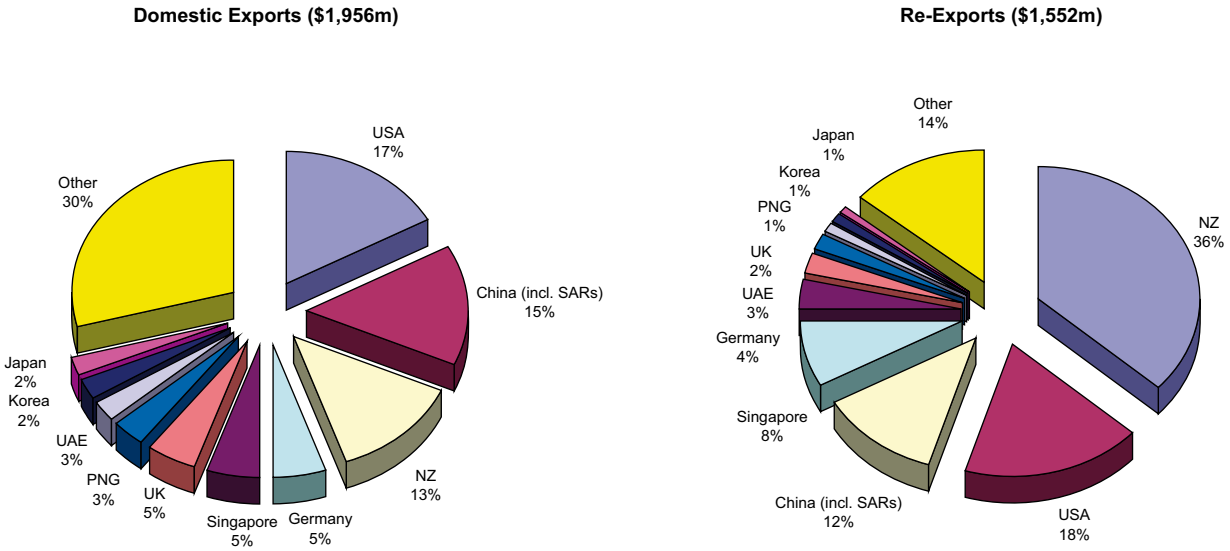
Perhaps more interestingly, these data also reveal that locally produced exports of ICT equipment from Australia found their largest markets in the United States (17%), China (incl. SARs) (15%), New Zealand (13%), Germany, Singapore and the United Kingdom (5%) (Figure 1.4).

[3] Minor differences in the totals by country are due to trade with no recorded country source or destination.

[4] Pilat, D. and Wolfl, A. (2004) 'ICT Production and ICT Use: What Role in Aggregate Productivity Growth?' in OECD (2004) The Economic Impact of ICTs: Measurement, Evidence and Implications, OECD, Paris.

[5] Framework for the Future Steering Committee (2003) Enabling Our Future: A framework for the information and communication technology industry, DCITA, Canberra, p19.

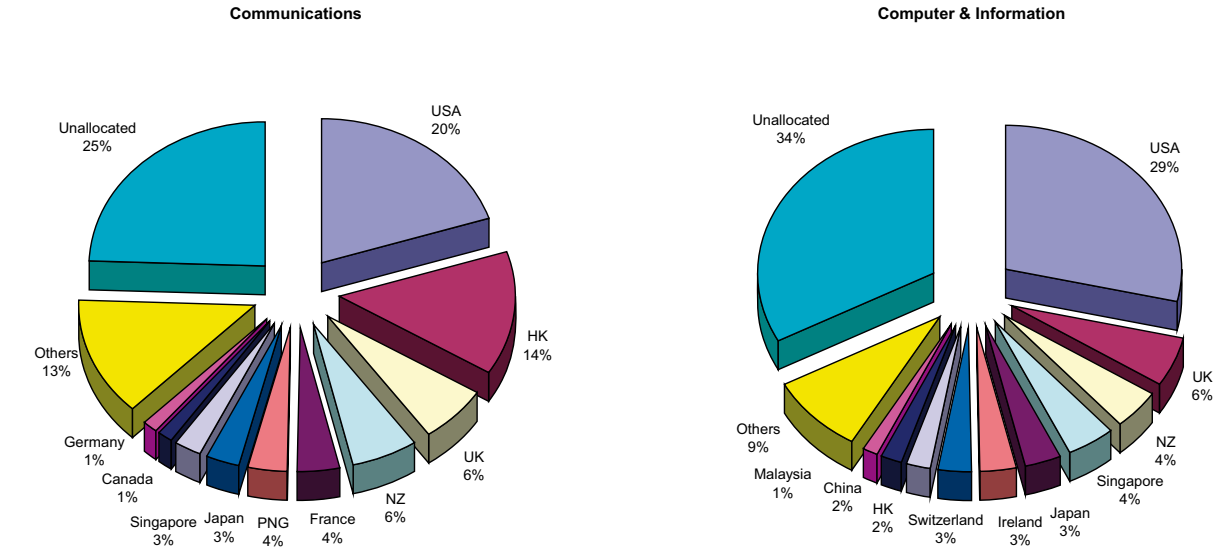
Figure 1.4 Top 10 Markets for Australia's ICT Equipment Exports, 2008 (per cent)



Source: TradeData (www.tradedata.net), CSES Analysis.

Thirty per cent of the exports of combined communications services and computer and information services from Australia during 2008 could not be traced to a specific country. Hence, data on the direction of trade in services are far from complete, analysis is limited to the reporting countries only and should be interpreted with caution.

Figure 1.5 Australia's ICT Services Export Markets, 2008 (per cent)



Source: ABS. CSES Analysis.

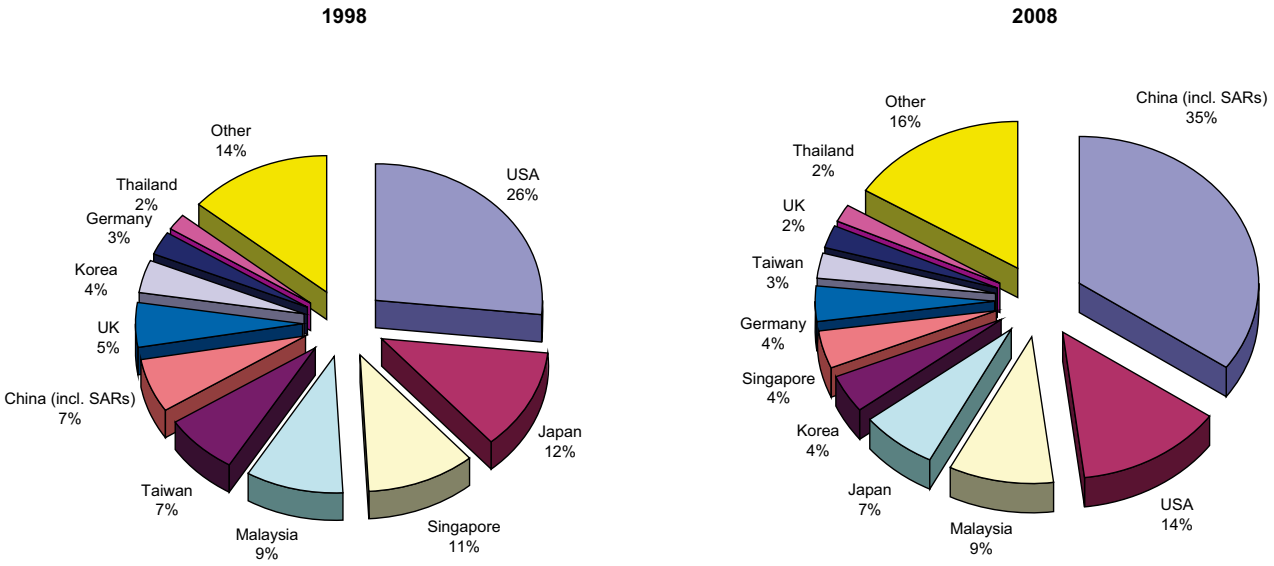
Regionally, however, APEC economies took nearly $1.4 billion of Australia's ICT services exports during 2008, OECD countries $1.3 billion, European Union countries $306 million, and ASEAN economies $196 million. Of those countries reporting, the United States was by far our largest single customer for ICT services exports during 2008, taking $663 million. Hong Kong took $166 million, the United Kingdom $154 million, New Zealand $131 million, Singapore $96 million and Japan $84 million – $44 million went to China (excl. SARs, more than $210 million incl. SARs) and $35 million to India (Figure 1.5).

1.5 Australia's ICT Import Sources

Australia draws ICT *equipment imports* from a somewhat wider range of sources than it did a decade ago. Reflecting the globalisation of ICT manufacturing. However, the Top 10 share of imports is significantly larger than the Top 10 share of exports.

A decade ago the United States, Japan and Singapore were the three main sources of ICT equipment imports into Australia, supplying $4 billion (27%), $1.8 billion (12%) and $1.6 billion (11%), respectively. Japan has fallen down the rankings of suppliers from second to fourth, and by 2008 supplied just 7% of Australia's ICT equipment imports, Singapore now supplies 4% of imports while the United States now supplies less than 14%. Asian countries, including China (incl. SARs), Malaysia, Korea, Taiwan and Thailand, are now major suppliers (Figure 1.6).

Figure 1.6 Top 10 Sources of Australia's ICT Equipment Imports, 1998 and 2008 (per cent)

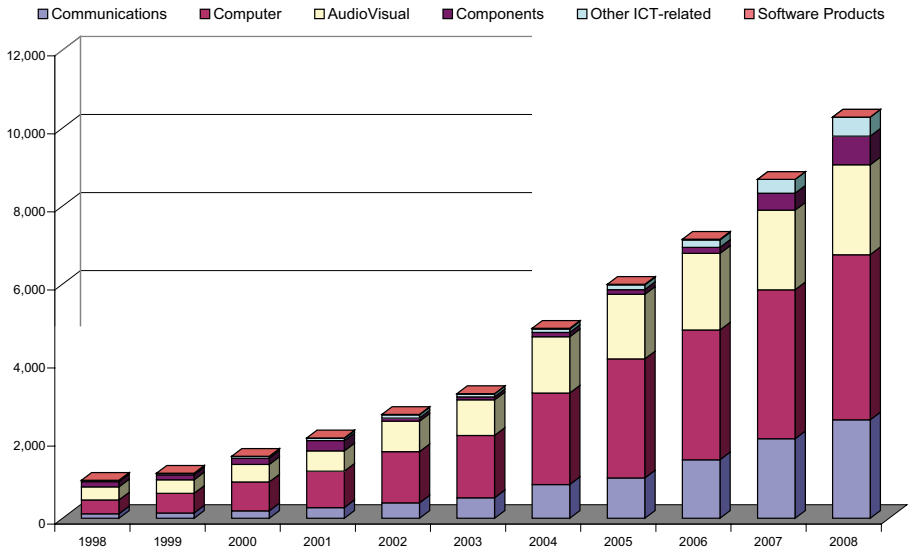


Source: TradeData (www.tradedata.net), CSES Analysis.

The big change is in imports from China (incl. SARs), which accounted for 7% of Australia's ICT equipment imports in 1998, but is now the largest supplier with exports to Australia in excess of $10 billion in 2008 – more than one-third of Australia's total ICT equipment imports. Australia's ICT equipment imports from China (incl. SARs) increased by more than 26% per annum between 2000 and 2008 (Figure 1.7).

These data reflect the rise of Asia as a location for ICT manufacturing and assembly, the shift of Japanese ICT equipment manufacturing offshore and the rapid development of China (incl. SARs) as a base for electronics manufacturing.

Figure 1.7 ICT Equipment Imports from China (incl. SARs), 1998 to 2008 (AUDm)

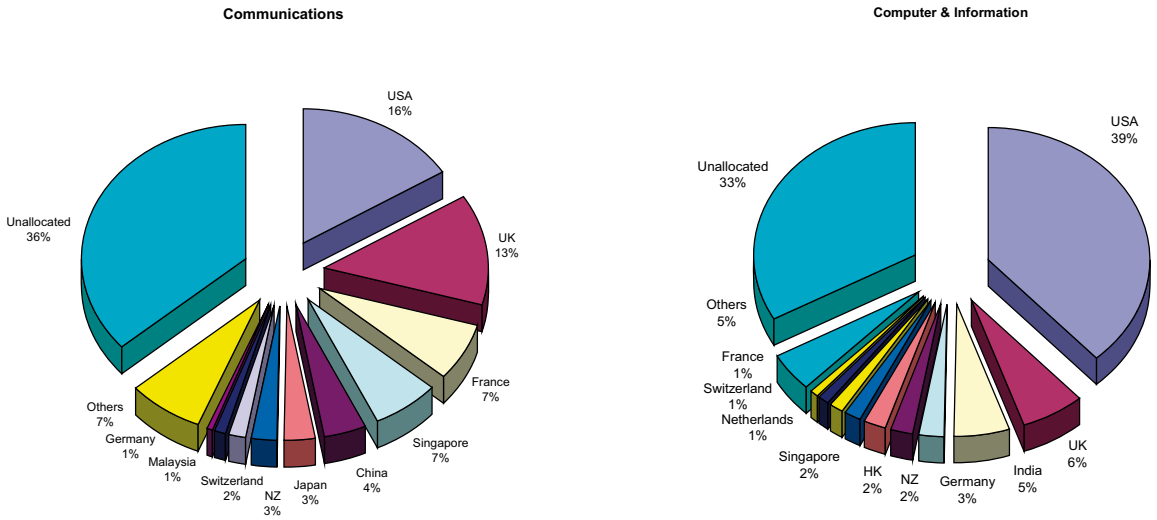


Note: Due to a customs reclassification there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Consequently, growth rates are no more than indicative. Moreover, there are no data for software products for 2007 and 2008.
Source: TradeData (www.tradedata.net), CSES Analysis.

Thirty-five per cent of the combined communications services and computer and information services imports into Australia during 2008 could not be traced to a specific country source. Hence, data on the sources of services imports are far from complete, analysis is limited to the reporting countries only and should be interpreted with caution.

Regionally, however, APEC economies were the source of $1.4 billion of Australia's *ICT services imports* during 2008, OECD countries $1,5 billion, European Union countries $498 million, and ASEAN economies $187 million. Of the few reporting countries, the United States was by far our largest single source for ICT services imports during 2008, at $784 million. The United Kingdom was the source of $256 million, Singapore $109 million, France $95 million, New Zealand $64 million and Germany $48 million (Figure 1.8).

Figure 1.8 Australia's ICT Services Import Sources, 2008 (per cent)



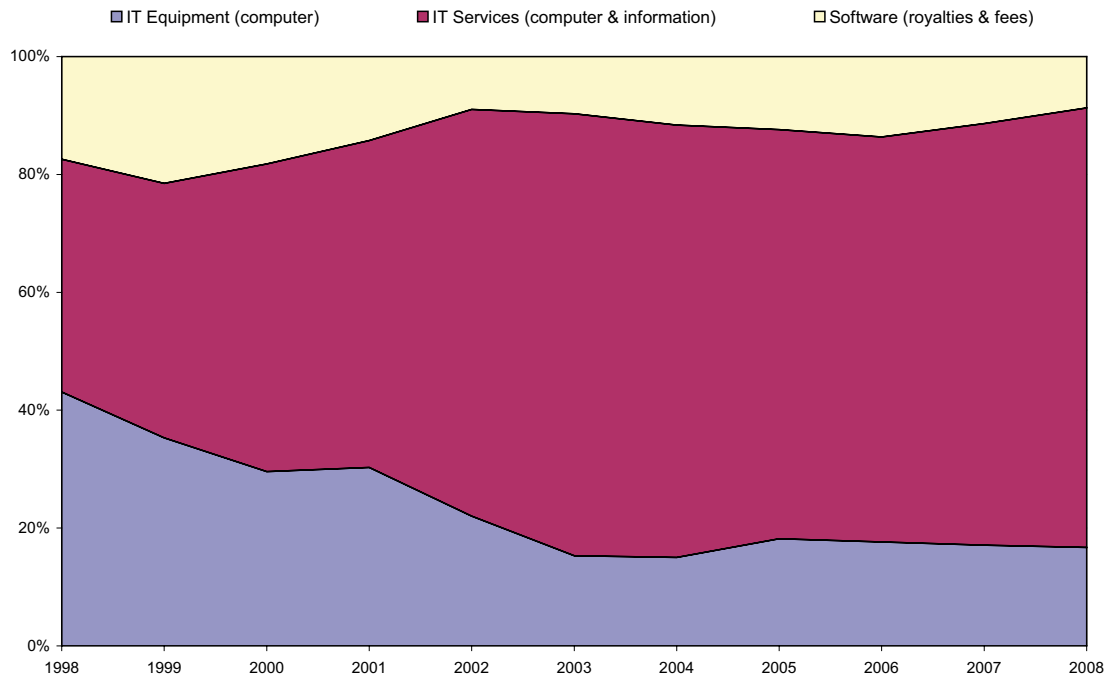
Source: ABS. CSES Analysis.

1.6 Australia's ICT Export Composition Trends

Partly because of increased value-adding and partly because of relative price changes, ICT software and services expenditures have been increasing more rapidly than have hardware expenditures. Together with the continued globalisation and international rationalisation of ICT equipment manufacturing, these trends are clearly evident in Australia's ICT export performance.

In 1998, locally produced ICT equipment accounted for 44% of all ICT exports from Australia and ICT services accounted for 56%. A decade later ICT services had increased to account for 60% of ICT exports. [6] This trend is all the more evident when one considers IT (i.e. computer) equipment and computer and information services exports alone (Figure 1.13). [7]

Figure 1.9 Australia's IT Export Shares, 1998 to 2008 (per cent)



Note: Excludes re-exports.
Source: ABS and TradeData (www.tradedata.net). CSES Analysis.

In 1998, locally produced computer equipment accounted for 43% of IT exports, computer and information services accounted for 39%. A decade later the situation had reversed, with computer and information services accounting for 75% of IT exports during 2008, and locally produced computer equipment accounting for just 17%. This reflects a marked shift in the composition of Australia's IT exports from hardware to services.

[6] Includes ICT and related equipment, services and software exports – broadly defined. It includes all domestically produced exports of (i) computer, telecommunications, broadcasting and related equipment, components and parts; (ii) audiovisual, communications, computer and information services; and (iii) software royalties, license fees and media.

[7] Includes domestically produced exports of (i) computer equipment and parts; (ii) computer and information services; and (iii) software (i.e. excludes communications and broadcasting equipment, content and services).

2 Australian ICT Services Trade

This chapter begins the detailed analysis by presenting an update on Australia's ICT services trade, exploring the composition of that trade and trends in exports (credits), imports (debits) and trade balances for the period 1998 to 2008. [8]

2.1 ICT Services Exports

Australia's ICT related services exports were worth $3 billion in 2008, up from $2.4 billion in 1998 (in current prices). They accounted for around 6% of total services exports – down from highs of around 9% in the late 1990s. Computer and information services exports were worth almost $1.7 billion in 2008 (56% of all ICT services exports), communications services exports were worth $924 million (31%), audiovisual and related services exports $214 million (7%), and software royalties and license fees were worth $195 million (6%).

Table 2.1 Australia's ICT Services Exports, 1998 to 2008 (AUDm)

	1998	2000	2002	2004	2006	2008
Communication	**1,309**	**1,533**	**992**	**818**	**849**	**924**
- Postal & Courier	*..*	*294*	*289*	*308*	*450*	*621*
- Telecommunication	*..*	*1,239*	*703*	*510*	*399*	*303*
Computer & Information	**626**	**855**	**1,176**	**1,275**	**1,406**	**1,673**
- Computer & Consulting	*..*	*855*	*1,152*	*1,259*	*1,381*	*1,646*
- Information & Subscription	*..*	*np*	*24*	*16*	*24*	*28*
Audiovisual & Related	169	478	170	178	203	214
Software Royalties & fees	276	298	153	202	279	195
Total ICT Services	**2,380**	**3,164**	**2,491**	**2,473**	**2,737**	**3,006**

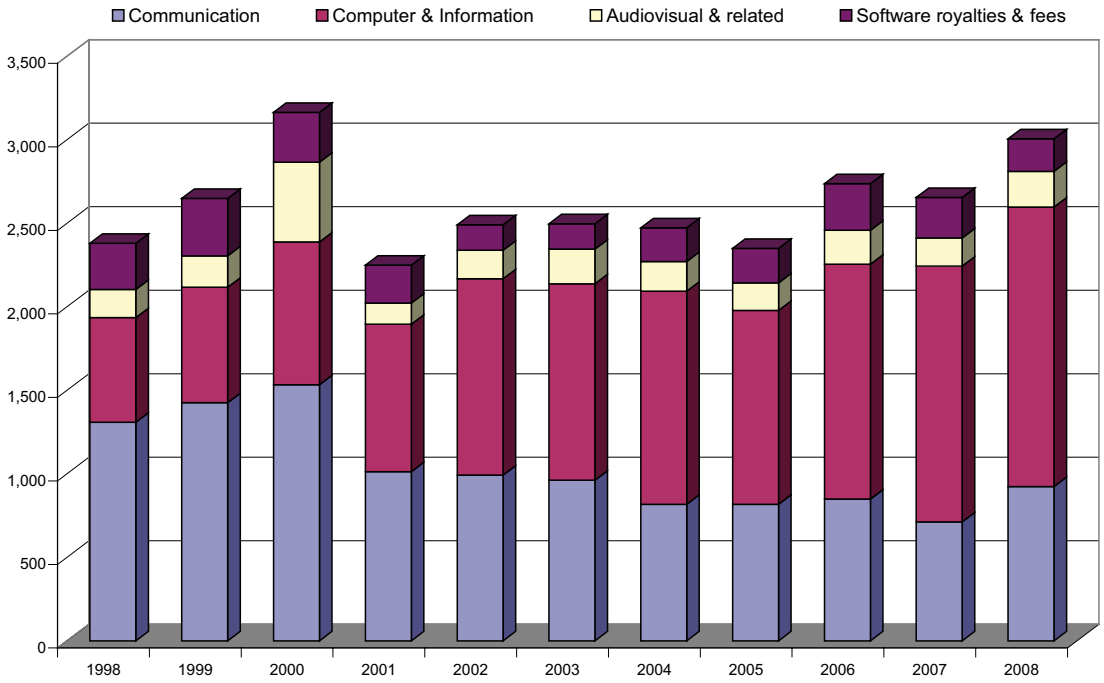
Notes: All data are current prices. Np is not published, .. is no data.
Source: ABS, CSES Analysis.

[8] ICTs exhibit rapid technological development and consequent price changes that are unlike consumer prices. The complexity of available ICT price deflators and differences between them and CPI deflators render attempts to adjust prices extremely difficult. As a result, it is standard practice to present ICT trade data in current prices (i.e. unadjusted for price changes over time).

Exports of ICT services have grown at a slower rate (2.4% per annum) over the last decade than have services exports generally (6.9% per annum), although strong growth was recorded in consultancy and implementation services exports, with information and database services exports also growing strongly. As a result, computer and information services exports have grown by 10% per annum over the last 10 years – a notable highlight in Australia's overall ICT trade performance.

Since the peak of 2000, total ICT services exports have fallen by 0.6% per annum, due in part to large falls in audiovisual and related services following the peak exports relating to the Sydney Olympics. During 2008, ICT services exports grew by 13%, due to strong growth in audiovisual and communication services exports as well as computer and information services exports.

Figure 2.1 Australia's ICT Services Exports, 1998 to 2008 (AUDm)



Note: Excludes the one-off impact of payments for TV rights to the Sydney Olympics on audiovisual services during 2000. Nevertheless, there was strong Olympics related interest in Australian audiovisual content at that time.
Sources: ABS, CSES Analysis.

Figure 2.1 shows trends in the composition of ICT related services exports. It reveals that after growing throughout the late 1990s Australia's ICT services exports declined during 2001, before recovering during 2002. This reflects the general 'Dot Com' downturn in ICTs, from which recovery was slow. A decline in communications and audiovisual services exports resulted in an overall decline in total ICT services exports for the next four years, with computer and information services exports steady at around $1.2 billion per annum over the period. As noted, 2008 saw a strong recovery with growth in all categories of ICT services exports except software royalties & fees.

2.2 ICT Services Imports

In late 2003, The Australian Bureau of Statistics (ABS) discovered a reporting error relating to computer and information services imports into Australia. Attempts to correct the error resulted in a substantial revision of computer services imports data reported in the December Quarterly Balance of Payments. The effect of the revision was to *increase* previously reported computer services imports by approximately $430 million for 2000-01 and 2001-02, and by $360 million for 2002-03. As a result there is a break in the historical series, with data prior to 2000 likely to reflect a substantial understatement of computer services imports and, thereby, an understatement of Australia's overall ICT trade deficit.

Australia's ICT related services imports cost almost $4.9 billion in 2008 – accounting for around 9% of all services imports. Computer and information services imports were the largest category, costing $1.5 billion (32% of total ICT services imports). Audiovisual and related services imports cost $1.3 billion (26%), communications services imports $1.2 billion (24%), and software royalties and license fees cost $941 million (19%).

Table 2.2 Australia's ICT Services Imports, 1998 to 2008 (AUDm)

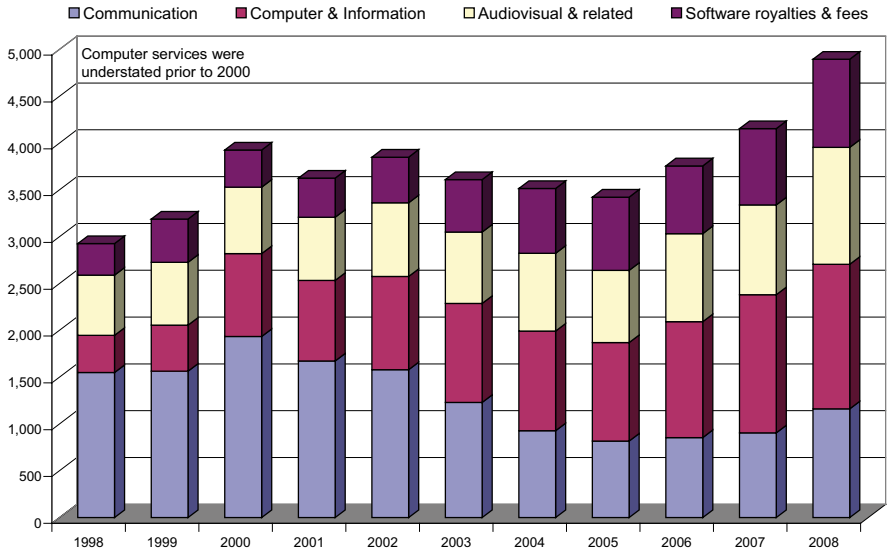
	1998	2000	2002	2004	2006	2008
Communication	**1,550**	**1,934**	**1,580**	**928**	**855**	**1,162**
- Postal & Courier	*..*	*275*	*277*	*305*	*320*	*629*
- Telecommunication	*..*	*1,659*	*1,303*	*623*	*535*	*532*
Computer & Information	**..**	**886**	**995**	**1,064**	**1,238**	**1,543**
- Computer & Consulting	*..*	*855*	*948*	*1,046*	*1,215*	*1,502*
- Information & Subscription	*..*	*31*	*47*	*18*	*23*	*42*
Audiovisual & Related	642	709	787	831	940	1,250
Software Royalties & fees	339	398	488	693	724	941
Total ICT Services	**..**	**3,927**	**3,850**	**3,516**	**3,757**	**4,896**

Notes: All data are current prices. .. is no data.
Source: ABS, CSES Analysis.

Because of the data revision little can be said about long-term growth trends. Nevertheless, since the peak in 2000 ICT services imports have grown (in current prices), and remained within the $3.5 billion to $3.8 billion range until 2008 when imports increased by 18% to almost $4.9 billion (Figure 2.2). Between 2000 and 2008 ICT services imports grew by an annual average of 2.8% but by contrast, overall services imports have grown by more than 6% per annum.

Areas of strong import growth have included software royalties and license fees, computer and information services and audiovisual services. Communication services imports have declined since the peak in 2000. However, all categories of ICT services imports grew during 2008 – driven by strong growth of communication services and audiovisual and related services imports.

Figure 2.2 Australia's ICT Services Imports, 1998 to 2008 (AUDm)



Sources: ABS, CSES Analysis.

2.3 Balance of Trade in ICT Services

In 2008, there was a deficit on trade in ICT related services approaching $2 billion. The largest deficit was on trade in audiovisual content and related services, at $1 billion. The deficit on software royalties and licensing fees reached $746 million (Table 2.3).

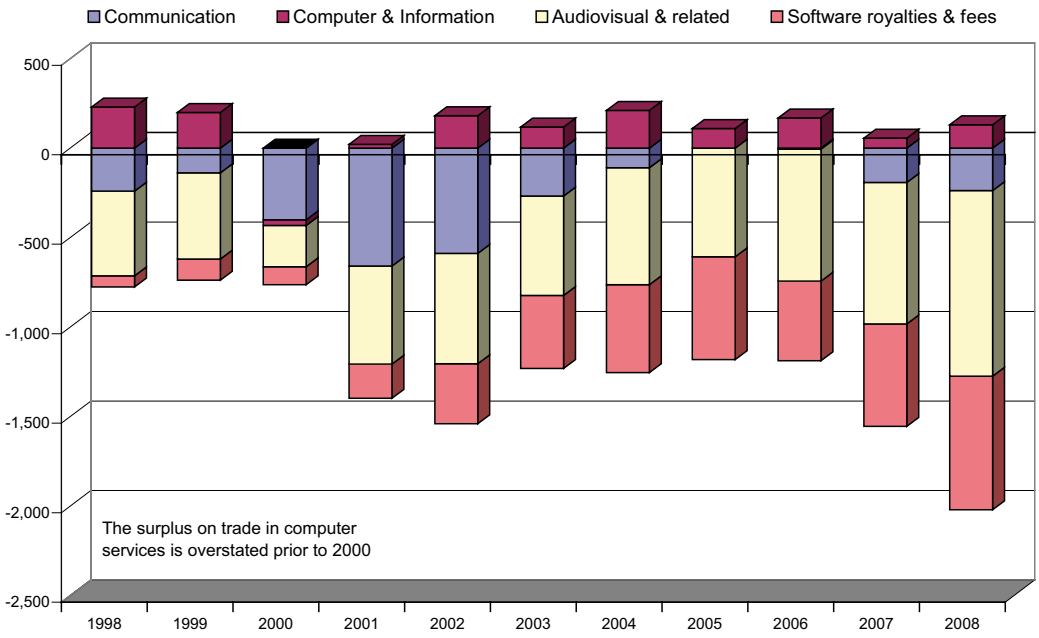
Table 2.3 Australia's ICT Services Trade Balance, 1998 to 2008 (AUDm)

	1998	2000	2002	2004	2006	2008
Communication	**-241**	**-401**	**-588**	**-110**	**-6**	**-238**
- Postal & Courier	..	*19*	*12*	*3*	*130*	*-8*
- Telecommunication	..	*-420*	*-600*	*-113*	*-136*	*-229*
Computer & Information	**..**	**-31**	**181**	**211**	**168**	**130**
- Computer & Consulting	..	..	*204*	*213*	*167*	*144*
- Information & Subscription	..	*-31*	*-23*	-2	2	*-14*
Audiovisual & Related	-473	-231	-617	-653	-737	-1,036
Software Royalties & fees	-63	-100	-335	-491	-445	-746
Total ICT Services	**..**	**-763**	**-1,359**	**-1,043**	**-1,020**	**-1,890**

Notes: All data are current prices. .. is no data.
Sources: ABS, CSES Analysis.

Computer and information services are the best performing area, having traded in surplus since 2002 – being in surplus by $181 million in 2002, rising to around $211 million in 2004, but falling to $130 million during 2008. It is the only area of ICT trade in which Australia has a surplus (Figure 2.3).

Figure 2.3 Australia's ICT Services Trade Balance, 1998 to 2008 (AUDm)



Sources: ABS, CSES Analysis.

2.4 Software Trade

There are many problems associated with tracking software trade. The approach used in previous editions has been to track trade in the physical supports for software (e.g. magnetic discs, tapes and other recorded media) and payments made in respect to software related royalties and license fees.

Tracking the physical supports for software (i.e. software products) has had many limitations. First, as border valuations are based on the physical support media, the value of the software traded is likely to be significantly understated. Second, the bundling of software with hardware leads to substantial mis-measurement (i.e. likely overstating equipment trade and understating software trade). Third, trade statistics do not measure the value of copyright works sold in foreign markets (i.e. the 'gold master' problem). Fourth, trade statistics do not capture emerging business models for software delivery, in that they do not measure the value of software electronically transmitted across borders, nor do they capture software delivered as a service, by, for example, applications services providers. [9] There is also a recent trend towards a greater blurring of the distinctions between media products, with software and data of various types supported by a wider range of media than hitherto.

Tracking software related royalty and license fee payments complemented software products trade statistics, as some of the elements of the trade missed in commodity trade statistics are captured in royalty and license fee payments (e.g. embedded software). While far from perfect, taken together, trade in software products and payments of software related royalties and license fees provided a window on Australia's software trade.

Unfortunately, due to the customs revisions of 2007 it is no longer possible to track software media products with any accuracy, and analysis is now limited to software-related royalties and license fees.

[9] OECD (2008) Information Technology Outlook 2008, Organisation for Economic Cooperation and Development, Paris.

Table 2.4 Australian Cross-Border Software Trade, 1998 to 2008 (AUDm)

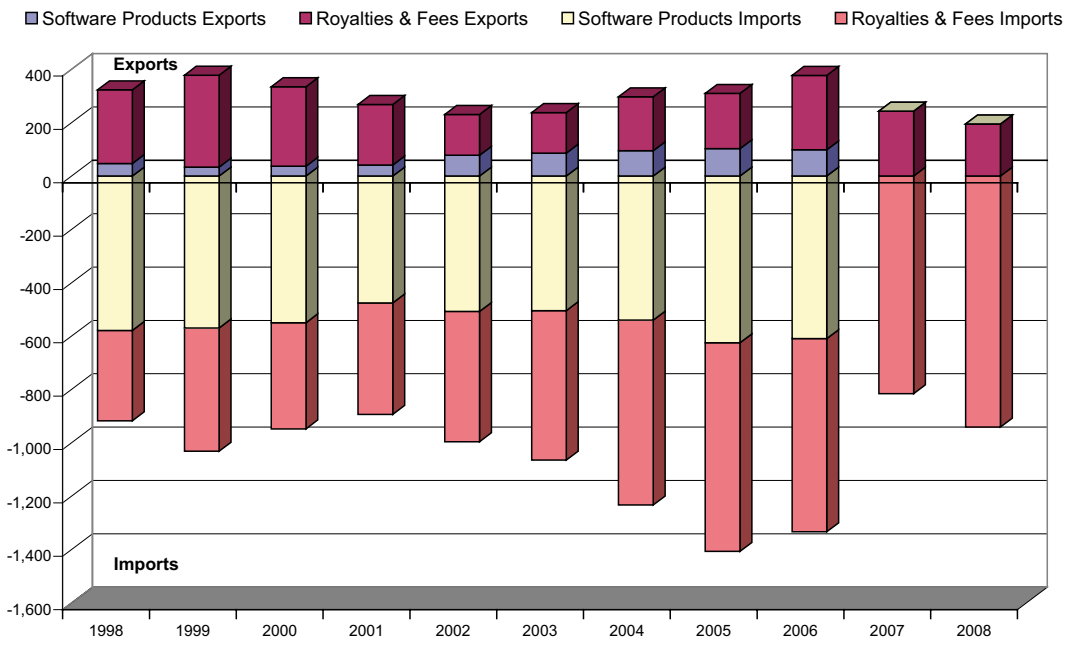
	1998	2000	2002	2004	2006	2008
Exports						
Software Products	47	37	78	95	98	..
Software royalties & fees	276	298	153	202	279	195
Exports	*323*	*335*	*231*	*297*	*377*	..
Imports						
Software Products	579	550	508	540	610	..
Royalties & fees	339	398	488	693	724	941
Imports	*917*	*948*	*996*	*1,233*	*1,334*	..
Balance						
Software Products	-532	-513	-430	-445	-512	..
Royalties & fees	-63	-100	-335	-491	-445	-746
Balance	*-595*	*-613*	*-765*	*-936*	*-957*	..

Notes: Software products include recorded and recordable media of the types suitable for software, and include re-exports and re-imports. All data are current prices.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

Table 2.4 shows reported Australian software related imports, exports and the balance on trade for the years 1998 through 2008. It reveals that software exports have been more-or-less stable over the decade, while software imports have grown. Hence the deficit on software-related trade has increased (Figure 2.4). The last two years have witnessed a significant decline in software royalty and license payments earnings, while imports grew strongly.

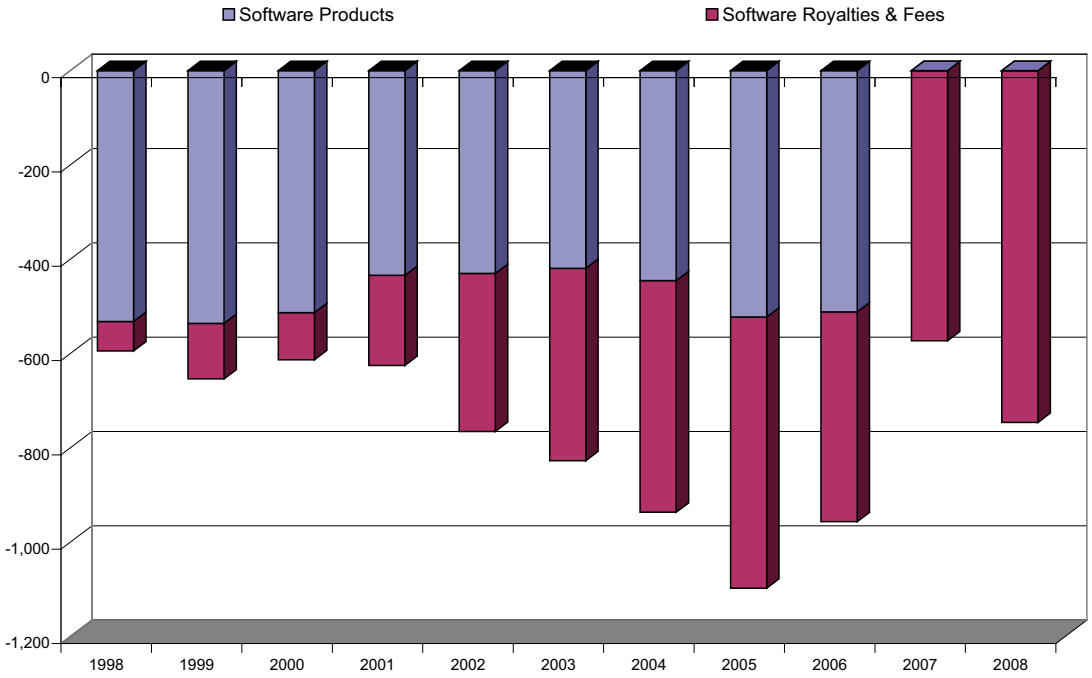
There has been a deficit on trade in software throughout the last decade, ranging from a low of $595 million during 1998 to an estimated high of $957 million during 2006 (in current prices). Both software products and royalties and license fees have been in deficit throughout the last decade, although the deficit on royalties and license fees has been growing at twice the rate of that on software products (Figure 2.5).

Figure 2.4 Software Imports and Exports, 1998 to 2008 (AUDm)



Note: See notes to Table 2.4.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

Figure 2.5 Software Trade Balance, 1998 to 2008 (AUDm)



Note: See notes to Table 2.4.
Sources: ABS and TradeData (www.tradedata.net), CSES Analysis.

3 The Direction of ICT Services Trade

This chapter focuses on the direction of trade in ICT services (i.e. our export markets and import sources). Services data are more limited than goods trade data, and there is a break in the time series due to the major revision to computer and information services import data noted above. Hence, analysis of Australia's bilateral trade in ICT services is restricted to reporting countries and to the period 2000 through 2008. Subsequent sections explore developments in the global sourcing of IT and IT-enabled business services (i.e. offshoring) through the prism of international services trade.

3.1 Australia's Major ICT Services Export Markets

Some 30% of the exports of combined communications services and computer & information services from Australia during 2008 could not be traced to a specific country. Hence, data are far from complete and bilateral analysis is limited to reporting countries and should be interpreted with caution.

Regionally, however, APEC economies took nearly $1.4 billion of Australia's ICT services exports during 2008, OECD countries more than $1.2 billion, European Union countries $306 million and ASEAN economies $196 million (Table 3.1). Of those countries reporting, the United States was by far our largest single customer for ICT services exports from Australia during 2008, taking $663 million. Hong Kong took $166 million, the United Kingdom $154 million, New Zealand $131 million, Singapore $96 million and Japan $84 million, while $44 million went to China (excl. SARs).

Markets for the two major services categories varied (Figure 3.1). The major recorded markets for *communications services* exports during 2008 included: the United States $185 million, Hong Kong $128 million, the United Kingdom $59 million, New Zealand $56 million, France $37 million, Papua New Guinea $34 million, Japan $26 million and Singapore $25 million. The major recorded markets for *computer and information services* exports during 2008 included: the United States $478 million, the United Kingdom $95 million, New Zealand $75 million, Singapore $71 million, Japan $58 million, Ireland $56 million, Switzerland $49 million, Hong Kong $38 million and China (excl. SARs) $32 million.

Regionally, communications services exports were down, while computer and information services exports increased to all regions – most notably to ASEAN and the European Union. Among reporting countries, the only growth markets for *communications services exports* between 2000 and 2008 were France, Hong Kong and Papua New Guinea. For *computer and information services*, the major growth markets were India (48% per annum), Switzerland (37% per annum), China (excl. SARs) (34% per annum), Ireland (30% per annum) and Malaysia (25% per annum).

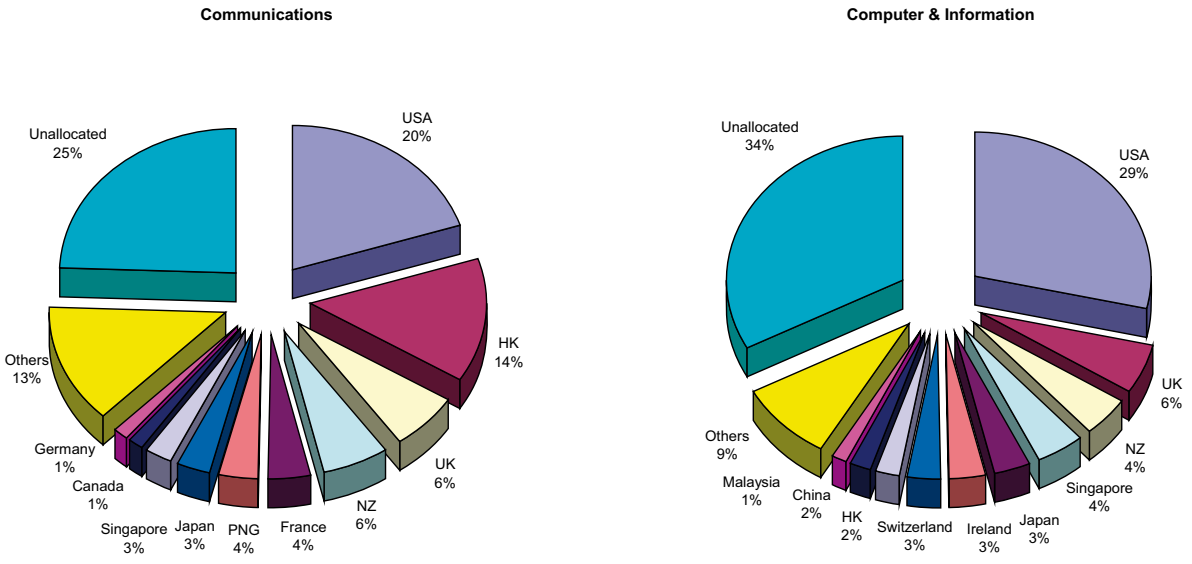
Table 3.1 ICT and Related Services Trade, 2008 (AUDm)

Country/Region	Comms		IT		Business		Royalties	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Belgium & Luxembourg	np	np	np	2	np	np	-	5
Brunei Darussalam	-	0	-	0	-	0	-	0
Canada	13	4	np	10	56	128	15	7
Central America & Caribbean	np	38	np	np	29	227	-	np
Chile	-	0	np	0	np	np	np	0
China (excl. SARs)	12	49	32	np	122	78	17	np
Fiji	np	np	1	0	12	np	np	0
France	37	82	6	13	60	73	7	50
Germany	13	8	3	40	58	49	30	169

Country/Region	Comms		IT		Business		Royalties	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Greece	np	np	np	0	np	np	-	0
Hong Kong	128	np	38	33	91	np	np	np
India	12	np	23	85	45	np	np	1
Indonesia	np	np	13	np	96	38	33	0
Ireland	np	3	56	np	63	np	np	166
Italy	5	np	np	np	19	23	np	38
Japan	26	36	58	9	173	np	14	np
Korea	7	np	2	2	26	69	2	np
Malaysia	np	11	24	4	143	54	20	6
Mexico	-	0	np	0	np	2	np	0
Netherlands	np	5	6	15	23	177	59	199
New Zealand	56	30	75	34	484	181	np	25
Norway	np	np	np	5	9	np	np	1
Papua New Guinea	34	np	10	1	61	32	np	0
Peru	-	0	-	0	7	np	-	np
Philippines	np	np	14	5	31	np	3	0
Russian Federation	np	0	np	0	10	np	np	np
Singapore	25	79	71	30	877	397	np	39
South Africa	4	1	np	2	111	86	9	0
Sweden	np	0	np	np	np	9	np	45
Switzerland	np	19	49	21	192	56	3	329
Taiwan	np	5	2	np	6	3	np	np
Thailand	np	5	5	0	60	128	4	0
United Kingdom	59	155	95	101	668	947	49	285
United States of America	185	188	478	596	2,022	2,711	314	1,650
Vietnam	np	np	-	np	28	np	np	0
Africa nes	-	0	np	13	293	78	np	0
America nes	np	np	11	0	37	np	6	0
Asia nes	16	10	np	np	np	np	6	0
Europe nes	12	2	46	10	87	177	80	76
Oceania nes	np	1	4	0	63	29	-	0
International capital markets	-	0	-	0	-	0	-	0
International institutions	-	0	-	0	-	0	-	0
Unallocated	277	427	549	514	1,588	1,619	145	462
Total all countries	**924**	**1,162**	**1,673**	**1,544**	**7,651**	**7,371**	**816**	**3,554**
APEC	538	677	826	742	4,391	4,410	482	2,094
ASEAN	71	148	125	39	1,266	666	65	44
EU	134	272	172	226	1,011	1,344	165	1,027
OECD	423	589	839	903	3,965	4,952	558	3,313

Notes: np is not published, .. is no data available, nes is not elsewhere specified.
Source: ABS. CSES Analysis.

Figure 3.1 Australia's ICT Services Export Markets, 2008 (per cent)



Source: ABS. CSES Analysis.

3.2 Australia's Major ICT Services Import Sources

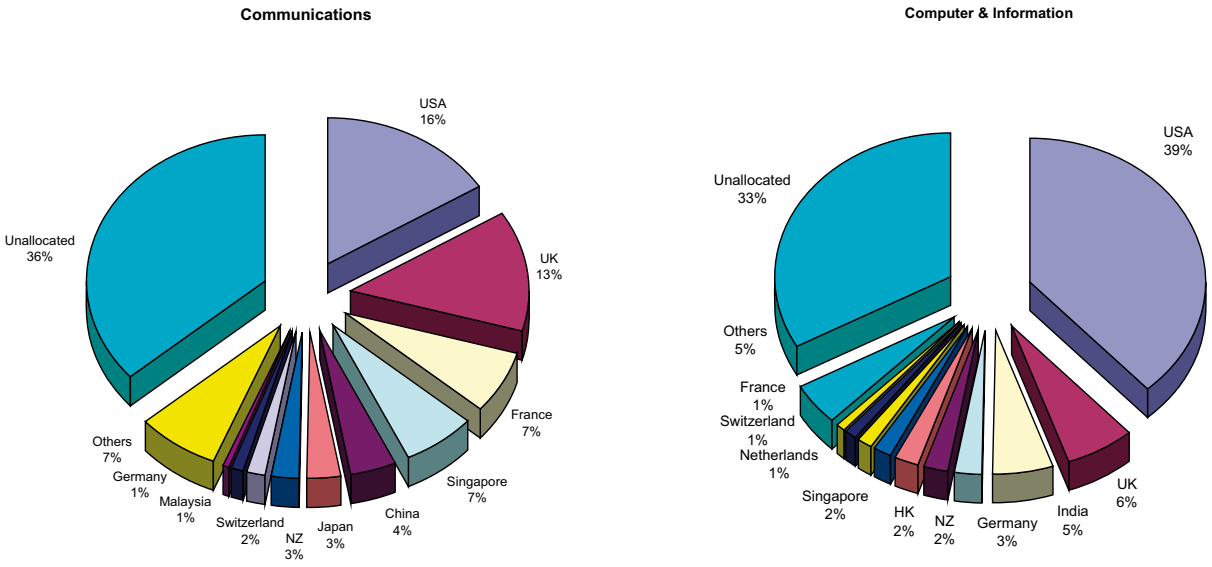
Some 35% of the combined communications services and computer & information services imports into Australia during 2008 could not be traced to a specific country source. Hence, data on the sources of services imports are also far from complete and bilateral analysis is limited to the reporting countries and should be interpreted with caution.

Regionally, however, APEC economies were the source of $1.4 billion of Australia's ICT services imports during 2008, OECD countries $1.5 billion, European Union countries $498 million, and ASEAN economies $187 million (Table 3.1). Of the few reporting countries, the United States was by far our largest single source for ICT services imports during 2008, at $784 million. The United Kingdom was the source of $256 million, Singapore $109 million, France $95 million, New Zealand $64 million and Germany $48 million. Unfortunately, India did not report communication services but was the source of $85 million of computer and information services imports.

Sources of the two major services categories varied (Figure 3.2). The largest recorded sources of *communications services* imports during 2008 included: the United States $188 million, the United Kingdom $155 million, France $82 million, Singapore $79 million and China (excl. SARs) $49 million. The largest recorded sources of *computer and information services* imports during 2008 included: the United States $596 million, the United Kingdom $101 million, India $85 million, Germany $40 million, New Zealand $34 million, Hong Kong $33 million and Singapore $30 million.

All sources for *communications services* imports declined between 2000 and 2008 except for Singapore, while for *computer and information services* the growth came primarily from Germany, India, New Zealand, Canada, Norway, the United States and Singapore.

Figure 3.2 Australia's ICT Services Import Sources, 2008 (per cent)



Source: ABS. CSES Analysis.

Among reporting countries, Australia had a positive balance on trade in *communications services* during 2008 with New Zealand, Canada, Germany and South Africa; and a deficit on trade with the United States of only $3 million. Australia had a positive balance on trade in *computer and information services* during 2008 with Japan, New Zealand, Singapore, Switzerland and Malaysia; and a deficit on trade with the United States, India and Germany.

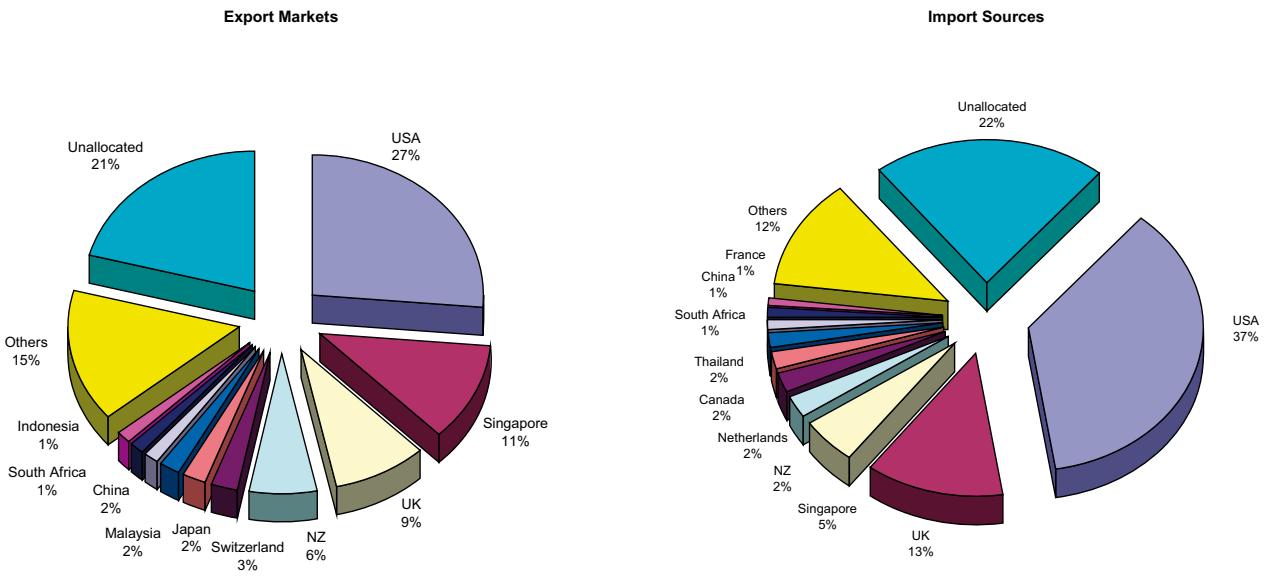
3.3 Offshoring and Australia's Trade in IT-Enabled Services

Offshoring and trade in offshored services involves computer and information services (i.e. IT services) and a range of IT-enabled business services that are captured in large part under the statistical category of 'other business services'. Hence, while not strictly ICT services, it is interesting to explore Australia's trade in these IT-enabled 'other business services' as a window onto the offshoring phenomenon.

During 2008, Australia *exported* around $7.7 billion of these 'other business services', of which almost $4.4 billion went to APEC economies, $4 billion to OECD countries, $1.2 billion to ASEAN economies and $1 billion to European Union countries (Table 3.1).

Of reporting countries, the largest markets for 'other business services' exports from Australia during 2008 included: the United States $2 billion, Singapore $877 million, the United Kingdom $668 million, New Zealand $484 million, Switzerland $192 million, Japan $173 million, Malaysia $143 million, China (excl. SARs) $122 million and South Africa $111 million (Figure 3.3). The major growth markets for exports between 2000 and 2008 included: South Africa (41% per annum), Canada (35% per annum), India (32% per annum) and Singapore (20% per annum).

Figure 3.3 Markets and Sources of IT-Enabled Business Services, 2008 (per cent)



Source: ABS. CSES Analysis.

During 2008, Australia *imported* almost $7.4 billion of these 'other business services', of which $5 billion came from OECD countries, $4.4 billion from APEC economies, $1.3 billion from European Union countries, and $666 million from ASEAN member countries (Table 3.1).

Of reporting countries, the largest suppliers of these 'other business services' imports into Australia during 2008 included: the United States $2.7 billion, the United Kingdom $947 million, Singapore $397 million, New Zealand $181 million, the Netherlands $177 million, Canada and Thailand $128 million, South Africa $86 million and China (excl. SARs) $78 million (Figure 3.3). The major growth suppliers of these 'other business services' services imports into Australia between 2000 and 2008 were: South Africa (60% per annum), Thailand (50% per annum), Papua New Guinea (34% per annum), Malaysia (30% per annum), Canada (25% per annum), Indonesia, Singapore and the United States (18% per annum), the United Kingdom (14% per annum) and New Zealand (13% per annum). These countries are a mix of those building exports from a very low base (e.g. PNG) and those that are already major offshored services providers (e.g. Singapore and Canada).

Australia had a positive balance on trade in these IT-enabled 'other business services' during 2008 with Singapore, New Zealand, Switzerland, Malaysia, Indonesia, China (excl. SARs) and South Africa; and a deficit on trade with the United States, United Kingdom, Netherlands, Canada, Thailand and Korea.

3.4 Offshoring IT and IT-Enabled Services

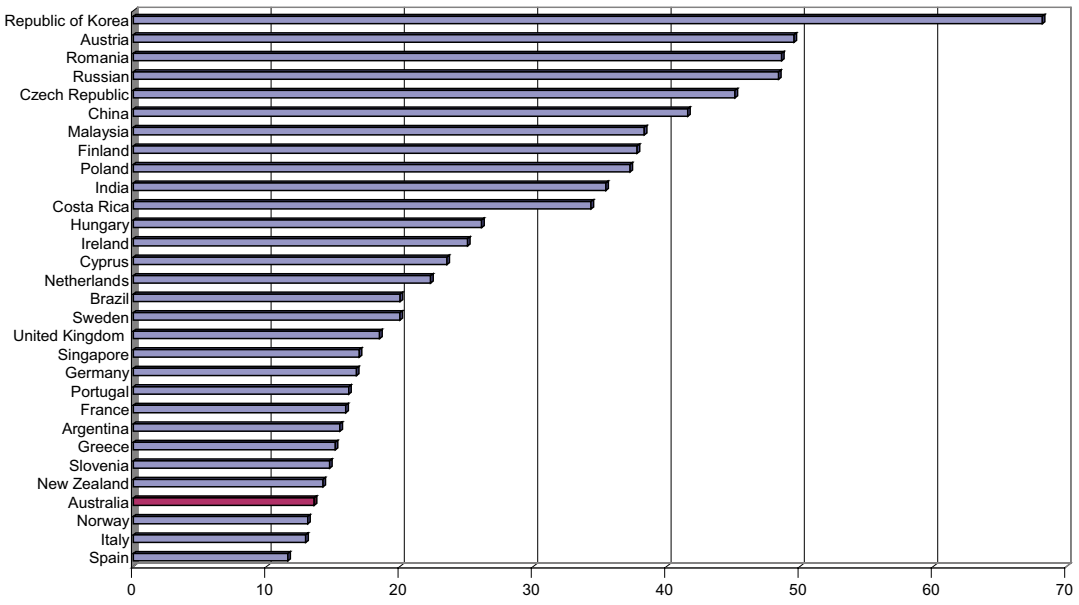
Those countries with extensive and rapidly growing exports of IT and IT-enabled services are likely to be the major providers of offshored services. The more so, if such services account for a relatively large share of total services exports. In this section we explore world trade in services in order to identify major offshoring locations and global trends. [10]

3.4.1 IT Services

The World's largest exporters of computer and information services (i.e. IT services) during 2006 included India and Ireland, which exported more than USD 20 billion worth, and the United Kingdom, with exports of more than USD 10 billion. [11] Other major exporters included: Germany, the United States, Israel, Canada, Spain, the Netherlands, Sweden, China (incl. SARs), Belgium and Luxembourg (in descending order), which all exported between USD 2 billion and USD 9 billion worth of IT services during the year.

Of those countries exporting more than USD 100 million worth of computer and information services during 2006, the fastest export growth over the 2000 to 2006 period was enjoyed by Korea (68% per annum), Austria (50% per annum), Romania (49% per annum), the Russian Federation (48% per annum), the Czech Republic (45% per annum) and China (42% per annum). Some of the biggest exporters also enjoyed strong export growth, most notably India, Ireland, the United Kingdom, the Netherlands, Sweden, Germany, France and Spain. Australia also enjoyed strong IT services export growth (Figure 3.4).

Figure 3.4 Annual Growth of Computer and Information Services Exports, 2000-2006 (per cent)



Note: Includes those countries exporting more than USD 100 million in computer and information services during 2006 and experiencing annual export growth of 10% or more over the period 2000 to 2006.
Source: UNCTAD, CSES analysis.

[10] These data are sourced from UNCTAD. Values are expressed in US dollars (USD), in current prices. Because of exchange rate and reporting differences there may be minor differences between locally sourced and these internationally sourced data.

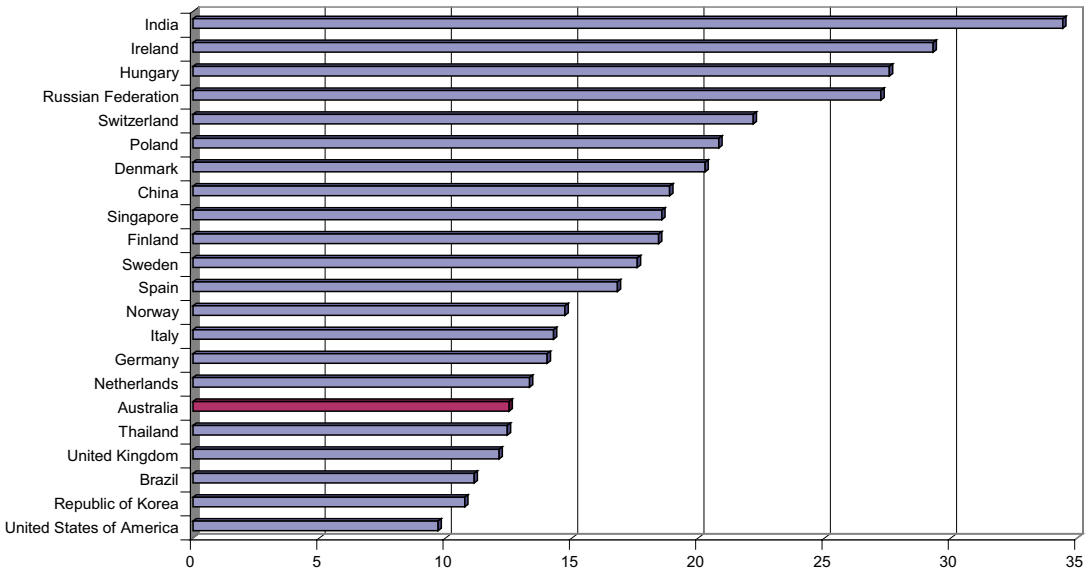
[11] It should be noted that countries vary somewhat in their reporting, with, for example, some including software royalties and licence fees in IT services (e.g. Ireland) and most not doing so.

3.4.2 IT-Enabled Services

Offshoring also involves a range of IT-enabled business services (e.g. a range of business, professional and technical services). The World's largest exporters of these 'other business services' include: the United States, China (incl. SARs), the United Kingdom, Germany, the Netherlands, Italy and Japan, which all exported more than USD 30 billion worth during 2006. France, India, Singapore, Spain, Ireland, Sweden, Belgium and Switzerland were among those exporting between USD 15 billion and USD 25 billion worth of 'other business services' during the year.

Of those countries exporting more than USD 1 billion worth of these 'other business services', the fastest export growth over the 2000 to 2006 period was enjoyed by Morocco (43% per annum), Ireland (36% per annum), Argentina and Romania (34% per cent), India (33% per annum), Hungary (28% per annum) and the Russian Federation (26% per annum). Australia also enjoyed double-digit growth (Figure 3.5).

Figure 3.5 Annual Growth of 'Other Business Services' Exports, 2000-2006 (per cent)



Note: Includes those countries exporting more than USD 1 billion in computer and information services during 2006 and experiencing annual export growth of 10% or more over the period 2000 to 2006.
Source: UNCTAD, CSES analysis.

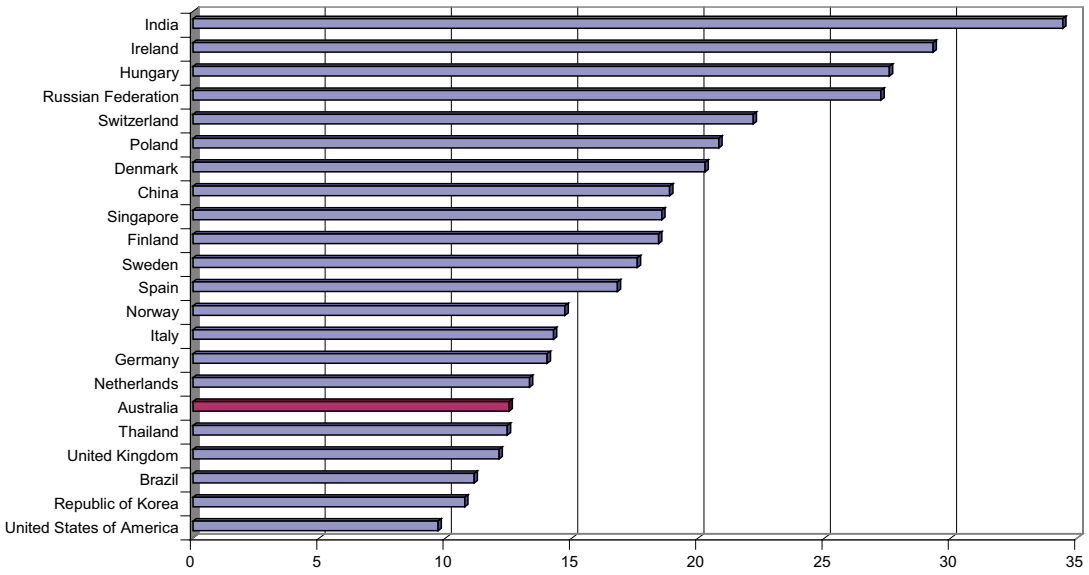
3.4.3 IT and IT-Enabled Services

Combining IT services and IT-enabled business services exports (i.e. computer & information services and other business services), gives a clearer picture of the offshoring phenomenon.

The largest exporters of combined IT and IT-enabled business services in 2006 included: the United States, the United Kingdom, China (incl. SARs), Germany, India, Ireland, the Netherlands, Italy, Japan, France and Spain, which all exported more than USD 25 billion worth during 2006. Australia ranked 30th among the world's largest exporters.

Among those countries exporting more than USD 3 billion worth of combined IT and IT-enabled services, those enjoying the fastest average annual growth since 2000 included: India, Ireland, Hungary, the Russian Federation, Switzerland, Poland, Denmark, China (incl. SARs), Singapore, Finland, Sweden and Spain which all achieved annual growth of 15% or more (Figure 3.6). Australia experienced combined IT and IT-enabled services export growth of around 13% per annum.

Figure 3.6 Average Annual Growth of IT and IT-Enabled Services Exports, 2000-2006 (per cent)



Note: Includes those countries exporting more than USD 3 billion in computer and information services during 2006.
Source: UNCTAD, CSES analysis.

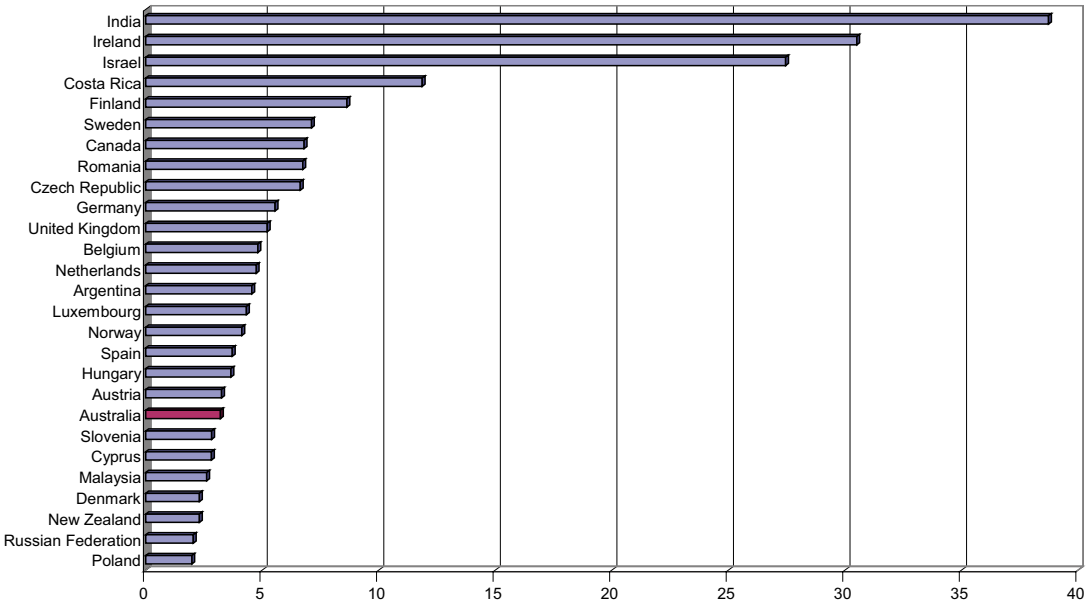
3.4.4 IT Services Offshoring Intensity

Another important indicator of the level of offshoring activity is the intensity of computer and information services exporting (i.e. the share of IT services exports in total services exports).

In only four countries did computer and information services account for more than 10% of total services exports during 2006 – India, where they accounted for almost 40% (down from 50% in 2004), Ireland 31% (down from 39% in 2004), Israel 27% and Costa Rica 12%.

It is immediately apparent from these data that India, Ireland and Israel are major offshoring locations. The other countries listed in Figure 3.7 are also significant exporters of IT services, and prima facie have the potential to become major offshoring locations (including Australia). [12]

Figure 3.7 Share of IT Services in Total Services Exports, 2006 (per cent)



Source: UNCTAD, CSES analysis.

[12] It should be noted that the apparent IT services intensity of various countries will be affected by their practices regarding the inclusion or exclusion of software related royalty payments and license fees in 'computer services' versus 'royalties and license fees' (e.g. Ireland does the former, whereas Australia does the latter).

4 Australian ICT Equipment Trade

This chapter presents a detailed update on Australia's ICT *equipment* trade. It explores the composition of trade and trends in exports, imports and trade balances for the decade 1998 to 2008. [13] Analysis is presented in terms of value in current prices, free-on-board (fob) in the case of exports and cost-insurance-freight (cif) in the case of imports.

In late 2003, the OECD Working Party on Indicators for the Information Society (WPIIS) released a proposal for a new classification of ICT goods that was commodity-based rather than industry-based. [14] In order to reflect international developments and maintain comparability, the *Australian ICT Trade Updates* have used the OECD classification (with a few very minor amendments). However, due to a customs reclassification there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Hence, growth rates should be interpreted with caution. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media) with any accuracy.

4.1 ICT Equipment Exports

This section examines the composition of *ICT equipment exports* and recent export trends. It also explores the issue of re-exports and examines the differences between locally produced exports and re-exports in order to shed light on the export performance of local manufacturers.

4.1.1 The Composition of ICT Equipment Exports

In 2008, total ICT equipment exports from Australia (including re-exports) were worth almost $3.6 billion – up from $3 billion a decade earlier (Table 4.1). They accounted for around 1.3% of Australia's total goods exports during the year. By comparison, Australia's gold exports accounted for around 5% of total goods exports and coal for 17%.

During 2008, computer equipment was the largest category of ICT equipment exports, worth just over $1 billion. Other ICT-related equipment exports were worth $885 million, communications equipment exports $697 million, components (i.e. parts and sub-assemblies) exports $521 million and audiovisual equipment exports $410 million. Computer equipment accounted for 30% of total ICT equipment exports, other ICT-related equipment for 25%, communications equipment for 20%, components for 15%, audiovisual equipment for 12%.

[13] ICTs exhibit rapid technological development and consequent price changes that are unlike consumer prices. The complexity of available ICT price deflators and differences between them and CPI deflators render attempts to adjust prices extremely difficult. As a result, it is standard practice to present ICT trade data in current prices (i.e. unadjusted for price changes over time).

[14] Details can be found in OECD (2003) A Proposed Classification of ICT Goods, OECD, Paris. See Appendix I.

Table 4.1 ICT Equipment Exports, 1998 to 2008 (AUDm)

	1998	2000	2002	2004	2006	2008
Domestic Exports						
Communications	548	511	382	449	460	348
Computer	683	484	375	261	361	375
Audiovisual	147	147	151	125	145	281
Components	214	401	267	284	248	328
Other ICT-related	280	439	500	569	572	687
Software Products	32	28	56	76	82	..
Total	*1,905*	*2,011*	*1,730*	*1,763*	*1,868*	*2,019*
Re-Exports						
Communications	174	682	197	147	128	349
Computer	713	722	1,105	717	646	683
Audiovisual	53	74	78	122	108	129
Components	84	91	76	69	102	193
Other ICT-related	133	132	158	128	147	199
Software Products	14	9	22	19	16	..
Total	*1,172*	*1,710*	*1,635*	*1,202*	*1,146*	*1,552*
Total Exports						
Communications	722	1,193	579	596	587	697
Computer	1,396	1,206	1,480	978	1,007	1,058
Audiovisual	200	222	229	246	253	410
Components	298	493	342	353	350	521
Other ICT-related	413	571	657	697	719	885
Software Products	47	37	78	95	98	..
Total	**3,076**	**3,721**	**3,365**	**2,965**	**3,014**	**3,571**

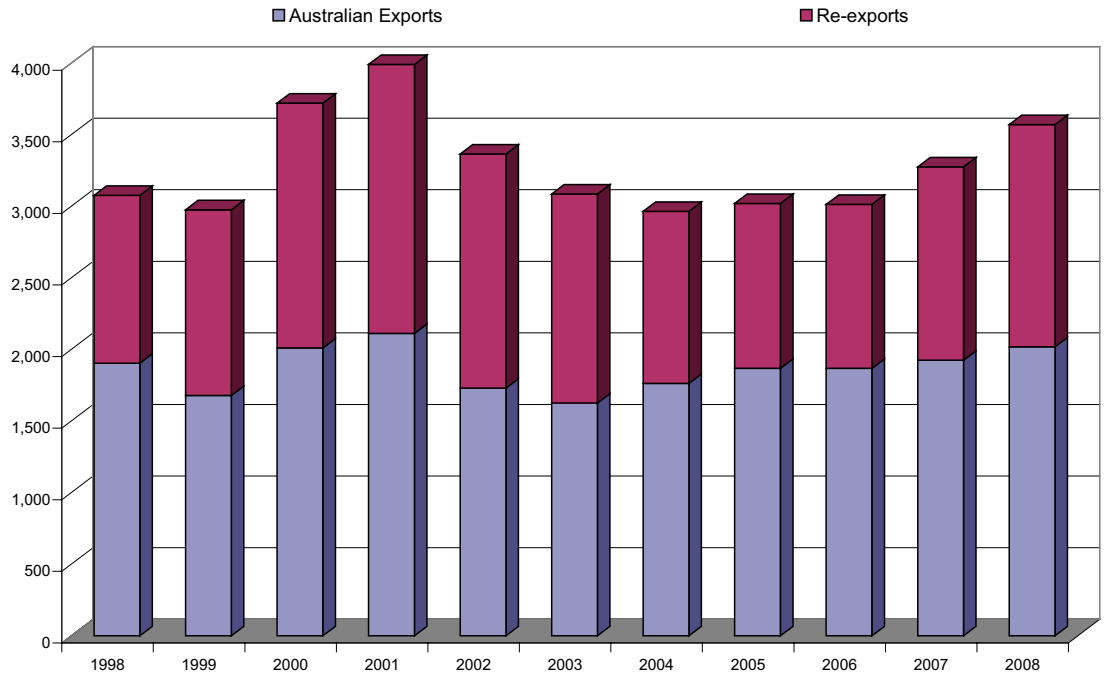
Notes: All data are in current prices, fob. Due to a customs reclassification there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media).
Source: TradeData (www.tradedata.net), CSES Analysis.

4.1.2 Locally Produced ICT Equipment Exports and Re-Exports

Re-exports (i.e. things brought into Australia and then re-exported with little or no value-added) account for a significant share of Australia's ICT exports. In 2008, re-exports of ICT equipment were worth more than $1.5 billion, 43% of total ICT equipment exports (Figure 4.1).

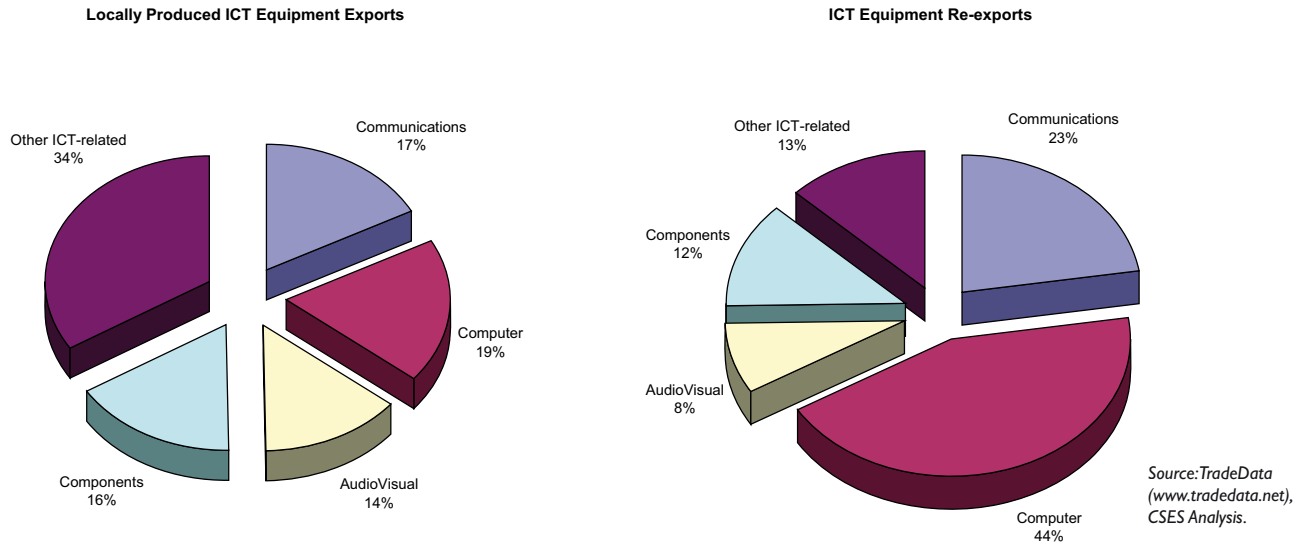
Re-exports of computer equipment were the most significant, amounting to $683 million, re-exports of communications equipment were worth $349 million, re-exports of other ICT-related equipment amounted to $199 million, re-exports of components $193 million and re-exports of audiovisual equipment $129 million (Figure 4.2).

Figure 4.1 Australian Produced and Re-Export Shares of Total ICT Equipment Exports, 1998 to 2008 (AUDm)



Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 4.2 Composition of ICT Equipment Exports, 2008 (per cent)

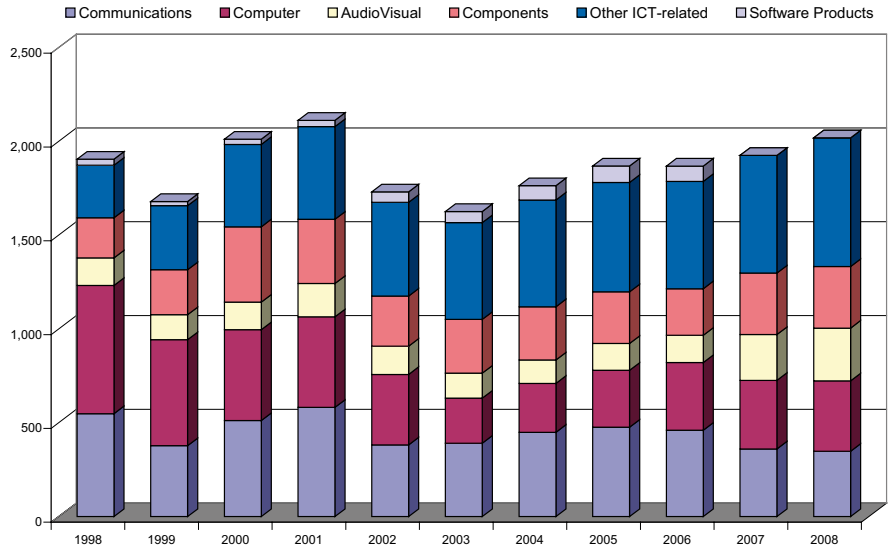


Source: TradeData (www.tradedata.net), CSES Analysis.

Hence, re-exports accounted for 22% of other ICT-related equipment exports, 50% of communications equipment exports, 37% of components exports, 31% of audiovisual equipment exports, and no less than 65% of computer equipment exports.

Australian produced exports (i.e. total exports minus re-exports) are a better indicator of the ability of Australian-based ICT equipment manufacturers to compete in export markets. In 2008, around 57% of Australia's ICT equipment exports were produced locally. They were worth $2 billion – just $114 million more that they had been worth a decade earlier (Figure 4.3).

Figure 4.3 Australian Produced ICT Equipment Exports, 1998 to 2008 (AUDm)



Source: TradeData (www.tradedata.net), CSES Analysis.

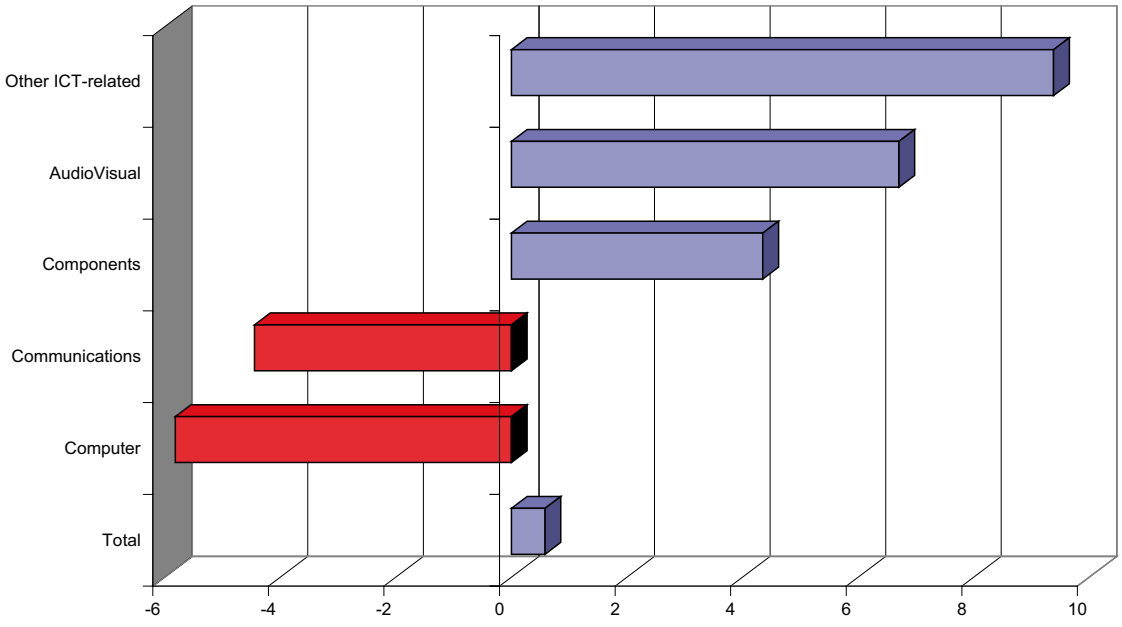
Reflecting Australia's lack of specialisation in core ICT equipment manufacturing, other ICT-related equipment was the largest category of Australian produced exports, worth $687 million in 2008. Australian produced exports of computer equipment were worth $375 million, Australian produced communications equipment exports $348 million, Australian produced exports of components (including parts and sub-assemblies) $328 million and Australian produced exports of audiovisual equipment $281 million (Figures 4.2 and 4.3).

4.1.3 ICT Equipment Export Trends

The value of total ICT equipment exports from Australia increased by 1.5% per annum over the decade 1998 to 2008 (in current prices), from $3 billion to $3.6 billion. Exports of other ICT-related equipment grew fastest over the decade, with relatively strong growth also shown in exports of audiovisual equipment and components. Exports of communications equipment declined by 0.4% per annum while computer equipment exports have declined substantially since the mid 1990s (i.e. by 2.7% per annum since 1998).

Unfortunately, on trend, re-exports have been growing somewhat faster than locally produced exports – at 2.8% per annum over the last decade, compared with 0.6% per annum (in current prices). Australian produced exports of other ICT-related equipment, audiovisual equipment and components increased over the decade, while locally produced computer equipment exports have declined by almost 6% per annum (Figure 4.4). A decade ago locally produced exports of computer equipment were worth $683 million. By 2008, they had fallen to just $375 million.

Figure 4.4 Australian ICT Equipment Export Growth, 1998 to 2008 (per cent per annum)



Source: TradeData (www.tradedata.net), CSES Analysis.

Total ICT equipment exports from Australia peaked at $4 billion in 2001, and declined for several years before increasing during 2007 and 2008 (Figure 4.1). Locally produced exports also peaked in 2001 at $2.1 billion, and also declined before increasing again from 2006 onwards (Figure 4.3). Some part of these overall trends can be explained by the 'Dot Com' downturn and by the process of globalisation. There is no doubt that the immediate post-'Dot Com' years were difficult for ICT equipment exporters. Nevertheless, over the last decade, locally produced exports have grown more slowly than total exports, suggesting a loss of competitiveness by local producers in markets that are being served from Australia. Nevertheless, export performance during 2008 and into first quarter 2009 belies the global downturn.

4.2 ICT Equipment Imports

This section examines the composition of trade and trends in *ICT equipment imports* over the last decade. It also explores the composition of imports for domestic consumption in order to shed light on what is being imported for local use.

4.2.1 The Composition of ICT Equipment Imports

Total imports of ICT equipment into Australia (including re-exports and re-imports) cost almost $30 billion in 2008 – up from $15 billion a decade earlier and higher than they have been at any time. During 2008, ICT equipment accounted for around 13% of Australia's total merchandise imports. In comparison, passenger motor vehicles accounted for 6.5% and crude petroleum 7.9%.

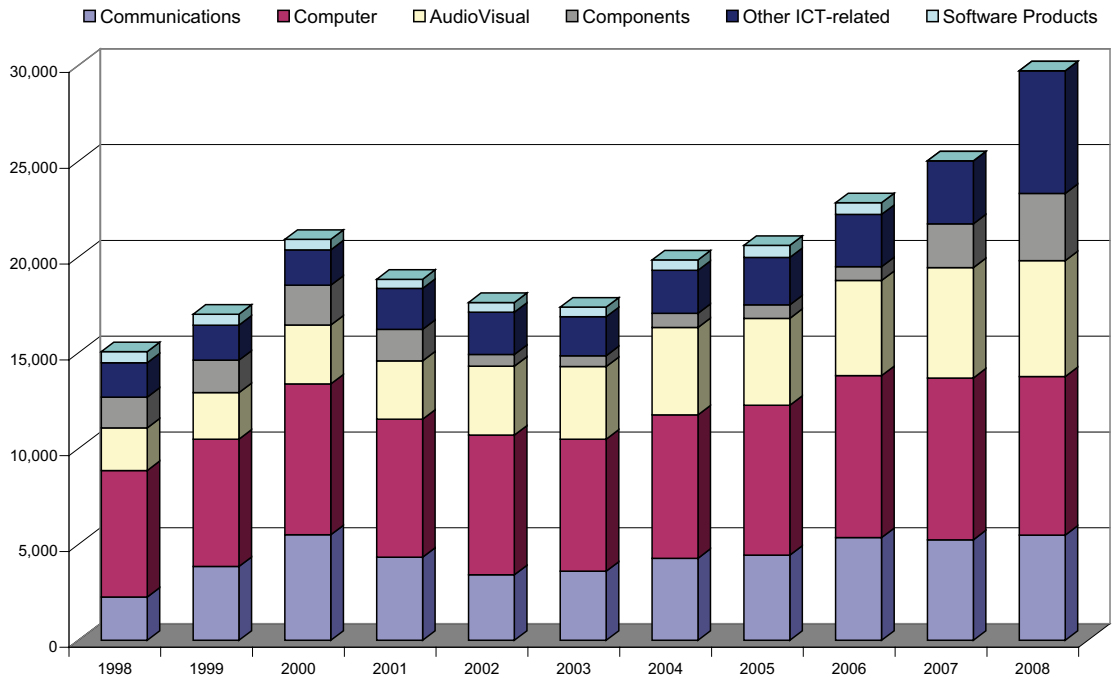
Table 4.2 Australia's ICT Equipment Imports, 1998 to 2008 (AUDm)

	1998	2000	2002	2004	2006	2008
Total Imports						
Communications	2,254	5,505	3,416	4,276	5,357	5,485
Computer	6,603	7,868	7,288	7,482	8,454	8,276
Audiovisual	2,221	3,073	3,596	4,560	4,965	6,047
Components	1,607	2,084	612	739	714	3,511
Other ICT-related	1,792	1,843	2,206	2,250	2,730	6,402
Software Products	579	550	508	540	610	..
Total	*15,056*	*20,923*	*17,626*	*19,847*	*22,830*	*29,719*
Re-imports	*51*	*57*	*80*	*70*	*93*	*125*
Foreign Imports	15,005	20,865	17,546	19,777	22,737	29,594
Imports for Consumption						
Communications	2,080	4,823	3,219	4,129	5,229	5,136
Computer	5,890	7,147	6,184	6,765	7,808	7,593
Audiovisual	2,167	2,999	3,518	4,439	4,857	5,918
Components	1,523	1,992	537	670	612	3,318
Other ICT-related	1,659	1,711	2,048	2,122	2,584	6,203
Software Products	564	541	486	522	593	..
Total	**13,884**	**19,213**	**15,991**	**18,645**	**21,684**	**28,168**

Notes: All data are current prices, cif. Total imports include re-exports, while imports for domestic consumption exclude them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Source: TradeData (www.tradedata.net), CSES Analysis.

Computer equipment was the largest category of ICT equipment imports into Australia, costing almost $8.3 billion in 2008 (Figure 4.5). Other ICT-related equipment imports cost $6.4 billion, audiovisual equipment imports $6 billion, communications equipment imports cost $5.5 billion and components imports (including parts and sub-assemblies) cost $3.5 billion.

Figure 4.5 Total ICT Equipment Imports, 1998 To 2008 (AUDm)



Note: Including re-exports. There are no data for software products in 2007-2008.
Source: TradeData (www.tradedata.net), CSES Analysis.

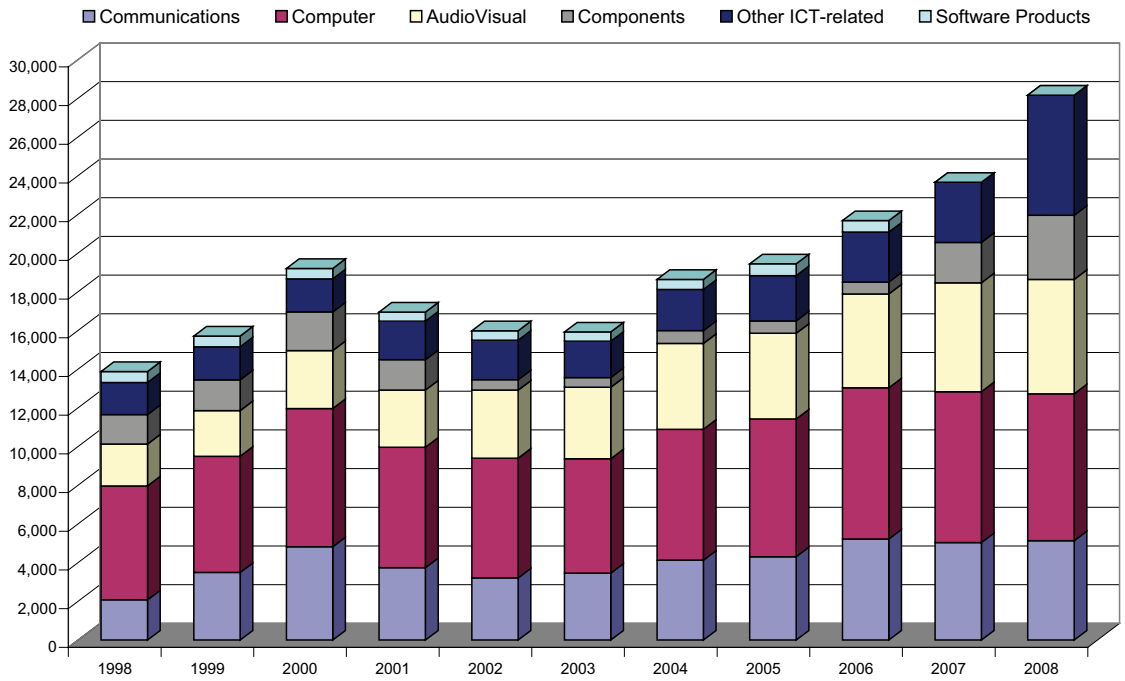
While computer equipment remains the largest category of ICT equipment imports, its share has been falling – accounting for 28% of ICT equipment imports in 2008, compared with 44% during 1998. Components import shares have remained constant over the decade. The categories to have increased their import shares over the last decade are communications and audiovisual equipment (evidence of the internet and communications revolutions) and other ICT-related equipment.

4.2.2 ICT Equipment Imports for Domestic Consumption

Because some of the equipment imported is subsequently re-exported, total imports of ICT equipment do not accurately reflect what is imported for domestic Australian consumption. To calculate what is imported for local consumption it is necessary to subtract re-exports from total imports. Doing so reveals that imports of ICT equipment for domestic consumption cost $28 billion in 2008, up from almost $14 billion a decade earlier (Figure 4.6).

There was a marked resurgence of imports of ICT equipment for domestic consumption during 2004, which continued through to 2008 – with imports during the last four years exceeding the previous peak reached during the height of the 'Dot Com' boom.

Figure 4.6 ICT Equipment Imports for Domestic Consumption, 1998 to 2008 (AUDm)



Note: Excluding re-exports. There are no data for software products for 2007-2008.
Source: TradeData (www.tradedata.net), CSES Analysis.

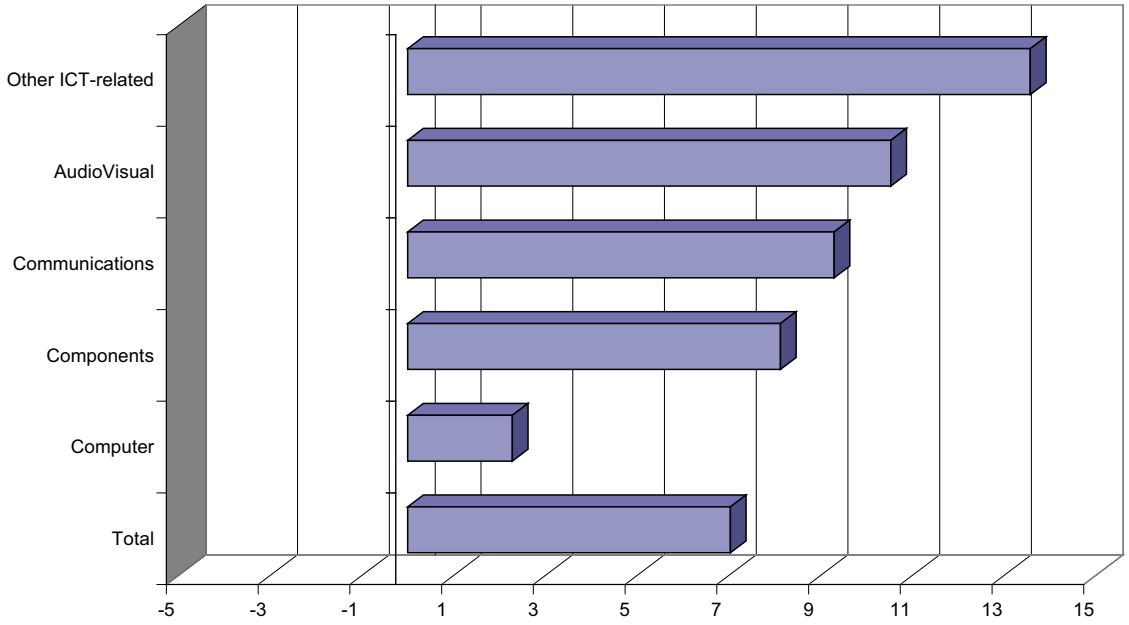
The composition of ICT equipment imports for domestic consumption varies slightly from that of total imports – computer equipment accounted for 27% of ICT equipment imports for domestic consumption in 2008, other ICT-related equipment for 22%, audiovisual equipment for 21%, communications equipment for 18% and components for around 12%.

4.2.3 ICT Equipment Import Trends

Total ICT equipment imports have grown 7% per annum over the decade 1998 to 2008 (in current prices) reflecting the reduction of local manufacturing. Computer equipment imports have increased more slowly than other categories over the decade, while much stronger growth has been seen in imports of other ICT-related, audiovisual and communications equipment – with Other ICT-related equipment, audiovisual and communications equipment imports increasing by 13.6%, 10.5% and 9.3% per annum, respectively (Figure 4.7).

Imports for domestic consumption have increased at the slightly higher rate of 7.3% per annum over the last decade (in current prices). Computer imports increased steadily, while imports of other ICT-related equipment, audiovisual and communications equipment increased more strongly.

Figure 4.7 Australian ICT Equipment Import Growth, 1998-2008 (per cent per annum)



Note: Including re-exports
Source: TradeData (www.tradedata.net), CSES Analysis

These figures reflect the impacts of the communications revolution and the growth of the internet – with total imports of audiovisual equipment rising from $2.2 billion to $6 billion and imports of communications equipment from $2.3 billion in 1998 to $5.5 billion in 2008. Locally consumed communications, computer and audiovisual equipment imports exhibited similar trends. Australia's relatively strong performance in the global downturn is reflected in these ICT equipment import trends, with strong growth during 2008 (almost 19% per annum) continuing into the first quarter of 2009.

4.3 The Balance of Trade in ICT Equipment

Australia runs a large and increasing deficit on trade in ICT equipment. In 2008, it amounted to more than $26 billion – up from $12 billion a decade ago and higher than at any other time during the last decade (Figure 4.8). The most notable feature is the resurgence of growth in the ICT deficit, with the ICT equipment deficit increasing by $4.4 billion during 2008 alone.

Australia's trade deficit in computer equipment was $7.2 billion in 2008, up from $5.2 billion a decade earlier. The deficit on trade in audiovisual equipment reached $5.6 billion, up from $2 billion; the deficit on trade in other ICT-related equipment reached $5.5 billion, more than doubling over the last decade; the deficit on trade in communications equipment reached almost $4.8 billion, up from $1.5 billion; and the deficit on trade in components reached $3 billion.

Table 4.3 Australia's ICT Equipment Trade Balance, 1998 to 2008 (AUDm)

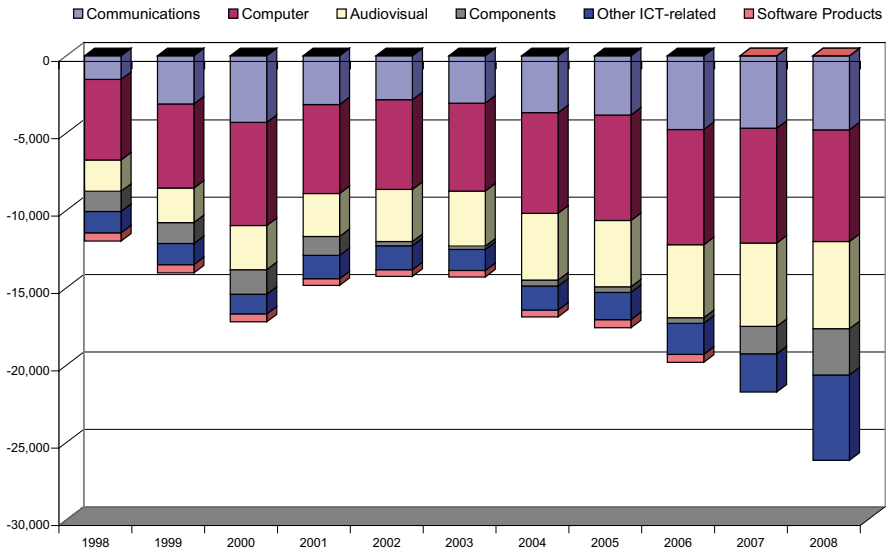
	1998	2000	2002	2004	2006	2008
Balance of trade						
Communications	-1,532	-4,312	-2,837	-3,680	-4,770	-4,788
Computer	-5,207	-6,662	-5,808	-6,504	-7,447	-7,218
Audiovisual	-2,020	-2,852	-3,367	-4,314	-4,712	-5,637
Components	-1,309	-1,591	-270	-386	-364	-2,990
Other ICT-related	-1,379	-1,272	-1,548	-1,553	-2,012	-5,516
Software Products	-532	-513	-430	-445	-512	..
Total	-11,979	-17,202	-14,261	-16,882	-19,816	-26,149
Difference between domestic exports and foreign imports						
Communications	-1,696	-4,984	-3,012	-3,813	-4,882	-5,121
Computer	-5,909	-7,373	-6,901	-7,203	-8,073	-7,886
Audiovisual	-2,072	-2,924	-3,441	-4,431	-4,813	-5,754
Components	-1,389	-1,679	-344	-450	-460	-3,177
Other ICT-related	-1,489	-1,374	-1,668	-1,654	-2,114	-5,637
Software Products	-546	-521	-451	-463	-527	..
Total	-13,100	-18,854	-15,816	-18,014	-20,869	-27,576
Software Products	564	541	486	522	593	..
Total	**13,884**	**19,213**	**15,991**	**18,645**	**21,684**	**28,168**

Notes: All data are current prices, imports cif and exports fob. Due to a customs reclassification in 2007 there is a break in the time series and data from 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media).
Source: TradeData (www.tradedata.net), CSES Analysis.

The deficit on trade in ICT equipment grew 8.1% per annum over the decade to 2008 (in current prices). The deficit on trade in other ICT related equipment grew by 15% per annum, while the deficits on trade for audiovisual and communications equipment have increased by 12% and 11% per annum, respectively. Again, this reflects the internet and communications revolution.

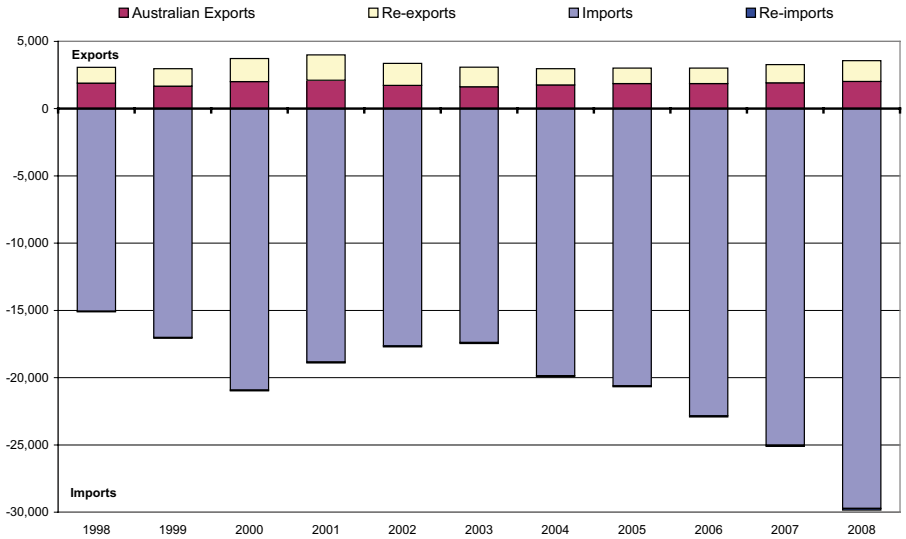
The high level of re-exports in Australia's ICT equipment trade clouds some issues. For example, the balance of trade shows neither the extent nor composition of what Australia produces for export or what is imported for domestic consumption. In 2008, the difference between domestically produced exports and foreign produced imports (i.e. what might be called the '*deficit on production*') exceeded $27 billion – up from $13 billion in 1998 (Table 4.3). Figure 4.9 shows Australia's deficit on trade in ICT equipment, highlighting the scale of Australian exports relative to imports.

Figure 4.8 Composition of Australia's ICT Equipment Trade Deficit, 1998 to 2008 (AUDm)



Note: There are no data for software products for 2007-2008.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 4.9 Australia's ICT Equipment Trade, 1998 to 2008 (AUDm)

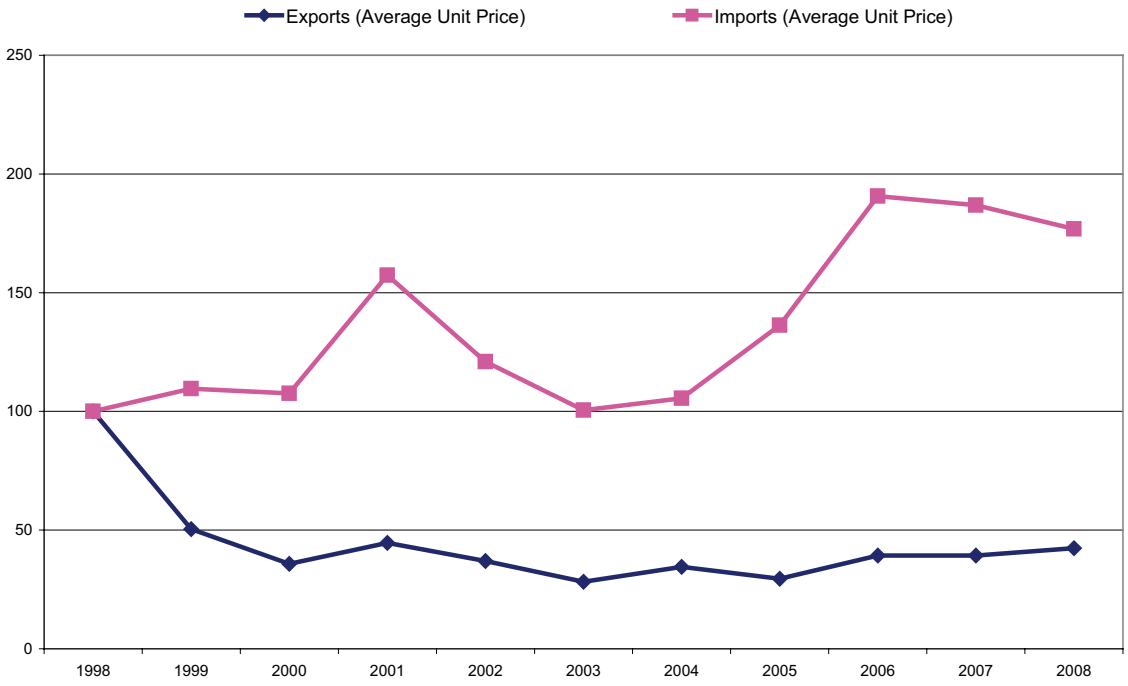


Source: TradeData (www.tradedata.net), CSES Analysis.

4.4 ICT Equipment Trade Values and Volumes

Price changes can have a significant impact of apparent trade trends and performance. In recent years, for example, there has been a commodity boom, with commodity prices rising rapidly. At the same time, many ICT equipment prices have continued to fall – dramatically in terms of price performance (i.e. hedonic prices). As a result, with analysis focusing primarily on values, the relative performance of ICT equipment in world trade tends to be understated. For example, the recent boom in the value of world trade in energy and minerals is largely a value-based phenomenon, with world trade volumes initially exhibiting relatively limited expansion. Conversely, relatively slower growth in worldwide ICT equipment trade values disguises relatively strong growth in trade volumes. Hence, it is interesting to compare Australia's ICT equipment trade values and volumes.

Figure 4.10 Average Unit Prices for ICT Equipment Exports and Imports, 1998 to 2008 (Indexed, 1998 = 100)



Source: TradeData (www.tradedata.net), CSES Analysis.

ICT equipment trade 'volumes' are recorded in various ways, if at all. For most of the ICT equipment categories for which a trade volume is recorded the unit is numbers (i.e. the number of units shipped). However, in some cases the unit is length (e.g. kilometres of optical fibre cable), and in others the unit is weight (e.g. tonnes of insulated wire). The analysis presented in this section focuses on units shipped, and compares units shipped with the value of trade in those items for which unit volumes were recorded. In order to focus on ICT equipment unit price trends, values are free-on-board for both imports and exports (i.e. excluding the insurance and freight costs on imports). [15]

Adding value implies that unit prices increase (relative to world prices), so comparing trends in average unit prices of ICT equipment exports and imports reveals something of Australian ICT manufacturing performance. Ideally, the average unit price of ICT equipment exports would be increasing faster (or falling more slowly) than the average unit price of imports as low value manufacturing activities move to lower wage locations and higher value activities remain (i.e. as local ICT manufacturers move up the value chain). Unfortunately, the opposite is the case – with the average unit price of Australia's ICT equipment exports *falling* by 8% per annum over the last decade, while the average unit price of ICT equipment imports increased by 6% per annum (Figure 4.10).

[15] *Both imports and exports include re-exports.*

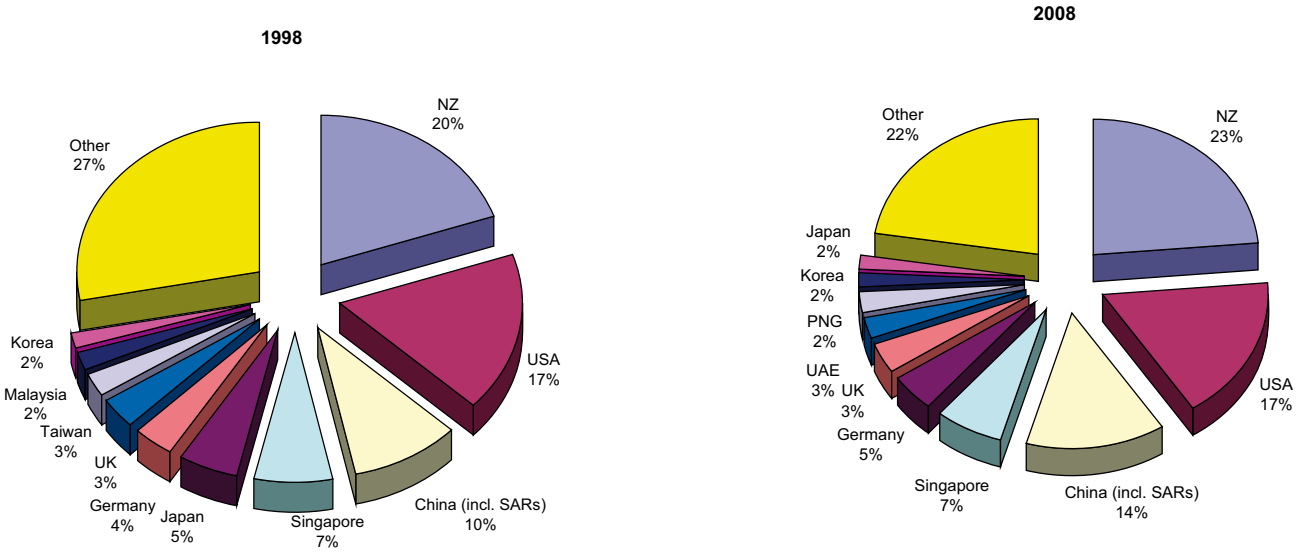
5 The Direction of ICT Equipment Trade

This chapter focuses on the direction of trade in *ICT equipment* (i.e. our export markets and import sources), comparing the current situation with that of a decade ago. It also examines the extraordinary emergence of China as a location for electronics manufacturing and as an exporter of ICT equipment.

5.1 Australia's ICT Equipment Export Markets

Over the last decade New Zealand and the United States have been the largest markets for Australia's ICT equipment exports. In 1998, New Zealand took $604 million worth of our ICT equipment exports (20%) and the United States took $532 million (17%). In 2008, New Zealand took $824 million (23%) and the United States took $611 million (17%) (Figure 5.1). The overall share of ICT equipment exports taken by the Top 10 markets increased from 72% in 1998 to 78% in 2008. [16]

Figure 5.1 Top 10 Markets for Australia's ICT Equipment Exports, 1998 and 2008 (per cent)



Source: TradeData (www.tradedata.net), CSES Analysis.

[16] *Some items go to 'international waters' (e.g. trans-ocean fibre optic cable) or to unknown destinations, while others come from unknown sources.*

As a destination market for our ICT equipment exports, Japan has fallen in the rankings from 5th in 1998 (taking 5% of total ICT equipment exports) to 10th in 2008 (taking 2%). In part, this reflects the end of IBM's manufacturing in Australia. China (incl. SARs) and Singapore have been good markets for Australian ICT equipment throughout the last decade. In 1998, China (incl. SARs) took $298 million (10%) of our ICT equipment exports, and Singapore took $219 million (7%). In 2008, China (incl. SARs) took $477 million (14%), while Singapore took $228 million (7%). Other major ICT equipment export markets during 2008 included Germany ($162 million) and the United Kingdom ($122 million).

Table 5.1 Australia's Top 10 ICT Equipment Export Markets, 1998 and 2008 (AUDm & Share)

		1998			2008
	AUDm	Share %		AUDm	Share %
NZ	604	19.6	NZ	824	23.5
USA	532	17.3	USA	611	17.4
China (incl. SARs)	298	9.7	China (incl. SARs)	477	13.6
Singapore	219	7.1	Singapore	228	6.5
Japan	158	5.1	Germany	162	4.6
Germany	108	3.5	UK	122	3.5
UK	106	3.5	UAE	90	2.6
Taiwan	78	2.5	PNG	86	2.4
Malaysia	59	1.9	Korea	64	1.8
Korea	50	1.6	Japan	58	1.7
Total Top 10	**2,212**	**71.9**	**Total Top 10**	**2,722**	**77.6**

Note: All data are current prices, fob. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years.
Source: TradeData (www.tradedata.net), CSES Analysis

Re-exports account for a significant share of total ICT equipment exports, so it is interesting to examine separately the destination markets for re-exports and locally produced exports. The markets for ICT equipment *re-exports* from Australia reveal something of the ICT supply and distribution chains in which Australia is involved, while the destination markets for *locally produced* ICT equipment reveal the markets to which Australian manufacturers export domestically produced ICT equipment.

In 2008, New Zealand was by far the largest market for ICT equipment re-exports from Australia, taking almost 37% of all re-exports (Figure 5.2). Other major markets for re-exports included the United States, China (incl. SARs) and Singapore. These data suggest that Australia acts as an ICT equipment distribution hub for the local region (e.g. New Zealand), and participates in international manufacturing supply chains (e.g. the United States, China (incl. SARs) and Singapore).

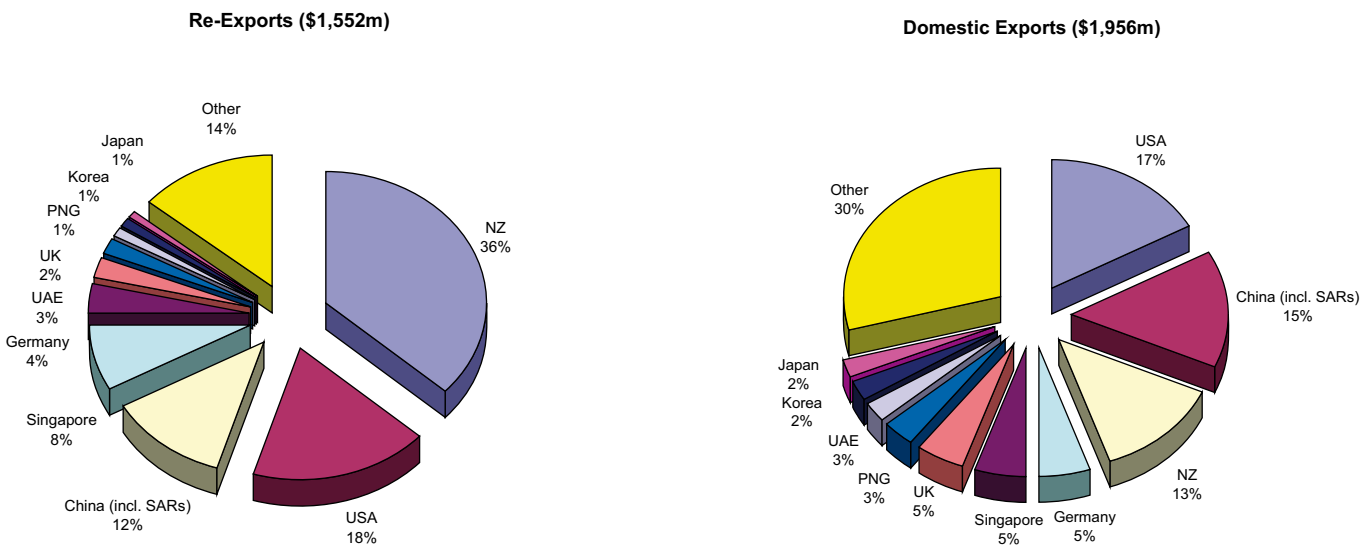
Perhaps more interestingly, these data also reveal that *locally produced exports* of ICT equipment from Australia found their largest markets in the United States (17%), China (incl. SARs) (15%), New Zealand (13%), Germany, Singapore and the United Kingdom (5%), with PNG, UAE, Korea and Japan making up the Top 10 markets for our locally produced ICT equipment exports during 2008.

Table 5.2 Australia's Top 10 ICT Equipment Re-Export and Domestic Export Markets, 2008

Re-Exports	AUDm	Share %	Domestic Exports	AUDm	Share %
NZ	569	37%	USA	333	17%
USA	278	18%	China (incl. SARs)	285	15%
China (incl. SARs)	193	12%	NZ	255	13%
Singapore	124	8%	Germany	107	5%
Germany	55	4%	Singapore	104	5%
United Arab Emirates	41	3%	UK	94	5%
UK	28	2%	PNG	66	3%
PNG	20	1%	United Arab Emirates	49	3%
Korea	15	1%	Korea	49	2%
Japan	14	1%	Japan	44	2%
Other	215	14%	Other	571	29%
Top 10	*1,337*	*86%*	*Top 10*	*1,385*	*71%*
Total	**1,552**	**100%**	**Total**	**1,956**	**100%**

Note: All data are current prices, fob. Due to a customs reclassification in 2007 there is a break in the time series and data from 2007 onwards are not strictly comparable with earlier years.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 5.2 Top 10 Markets for Australia's ICT Equipment Exports, 2008 (per cent)



Source: TradeData (www.tradedata.net), CSES Analysis.

5.2 Australia's Major ICT Equipment Import Sources

Australia draws ICT equipment imports from a somewhat wider range of sources than it did a decade ago. Reflecting globalisation and increasing specialisation in ICT manufacturing, the Top 10 share of imports is greater than the Top 10 share of exports.

Table 5.3 Australia's Top 10 ICT Equipment Import Sources, 1998 and 2008 (AUDm)

	1998	
	AUDm	**Share %**
USA	3,990	26.7
Japan	1,761	11.8
Singapore	1,588	10.6
Malaysia	1,398	9.4
Taiwan	1,084	7.3
China (incl. SARs)	976	6.5
UK	761	5.1
Korea	598	4.0
Germany	399	2.7
Thailand	295	2.0
Total Top 10	**12,849**	**86.0**

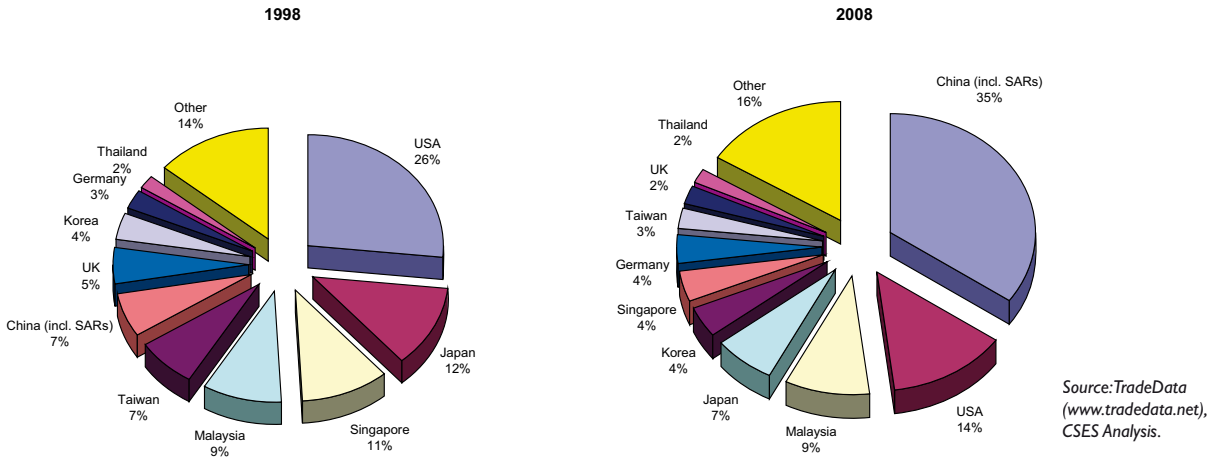
	1998	
	AUDm	**Share %**
China (incl. SARs)	10,280	34.6
USA	4,032	13.6
Malaysia	2,764	9.3
Japan	2,115	7.1
Korea	1,220	4.1
Singapore	1,181	4.0
Germany	1,180	4.0
Taiwan	879	3.0
UK	732	2.5
Thailand	562	1.9
Total Top 10	**24,944**	**83.9**

Note: All data are current prices, cif. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Source: TradeData (www.tradedata.net), CSES Analysis.

A decade ago the United States and Japan were the two main sources of ICT equipment imports into Australia – supplying $4 billion (27%) and $1.8 billion (12%), respectively (Table 5.3). Japan has fallen down the rankings of suppliers, from 2nd to 4th, and by 2008 supplied just 7% of Australia's ICT equipment imports, while the United States now supplies less than 14%. Asian countries, including China (incl. SARs), Malaysia, Korea, Singapore, Taiwan and Thailand, are now major suppliers.

The big change is in imports from China (incl. SARs), which accounted for 6.5% of Australia's ICT equipment imports in 1998, but is now the largest supplier – with exports to Australia in excess of $10 billion in 2008, some 35% of Australia's total ICT equipment imports. These data reflect the rise of Asia as a location for ICT manufacturing and assembly, the shift of Japanese ICT equipment manufacturing offshore and the rapid development of China (incl. SARs) as a base for electronics manufacturing.

Figure 5.3 Top 10 Sources of Australia's ICT Eequipment Imports, 1998 and 2008 (per cent share)



Source: TradeData (www.tradedata.net), CSES Analysis.

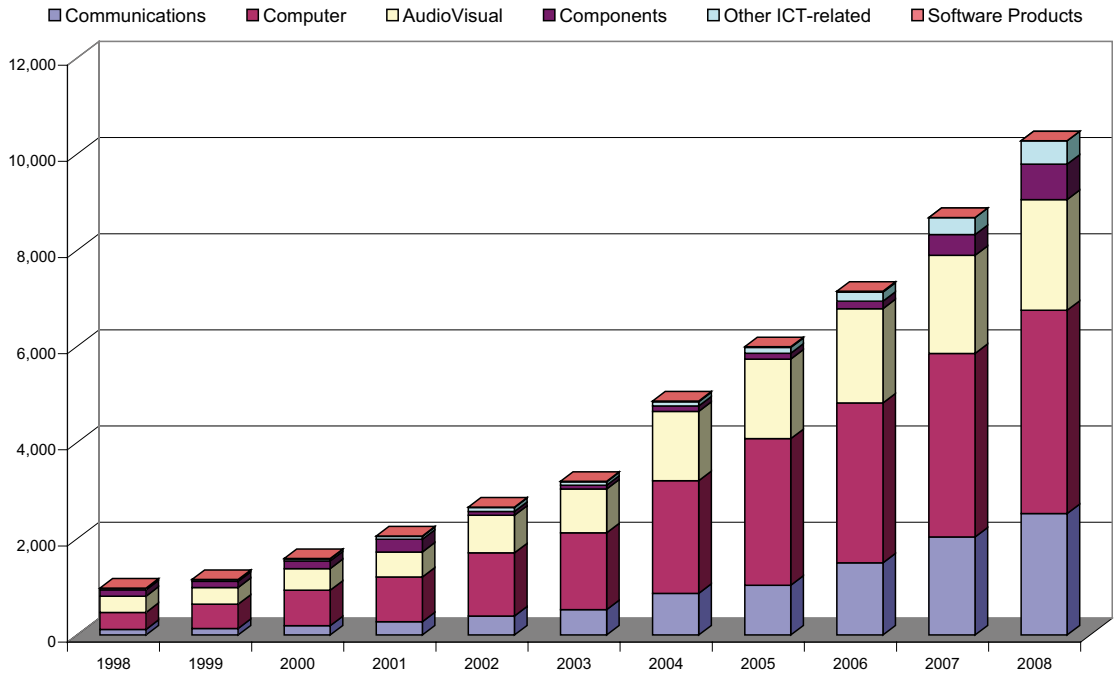
5.3 The China Phenomenon

During 2002-03, China (including the Hong Kong and Macao SARs) became the largest supplier of ICT equipment imports into Australia – taking over the number one spot from the United States. Indeed, China (incl. SARs) is now the world's largest exporter of ICT equipment, eclipsing the United States and Japan during 2004. Australia's ICT equipment imports from China (incl. SARs) increased by more than 26% per annum between 2000 and 2008, with the post-'Dot Com' era exhibiting quite different ICT trade patterns to the preceding boom period (Figure 5.4).

In 2008, computer equipment was by far the largest category of ICT imports from China (incl. SARs), worth $4.2 billion. Communications equipment imports from China (incl. SARs) cost $2.5 billion, audiovisual equipment imports $2.3 billion during 2008, components imports $735 million and other ICT-related equipment imports $487 million (Figure 5.5).

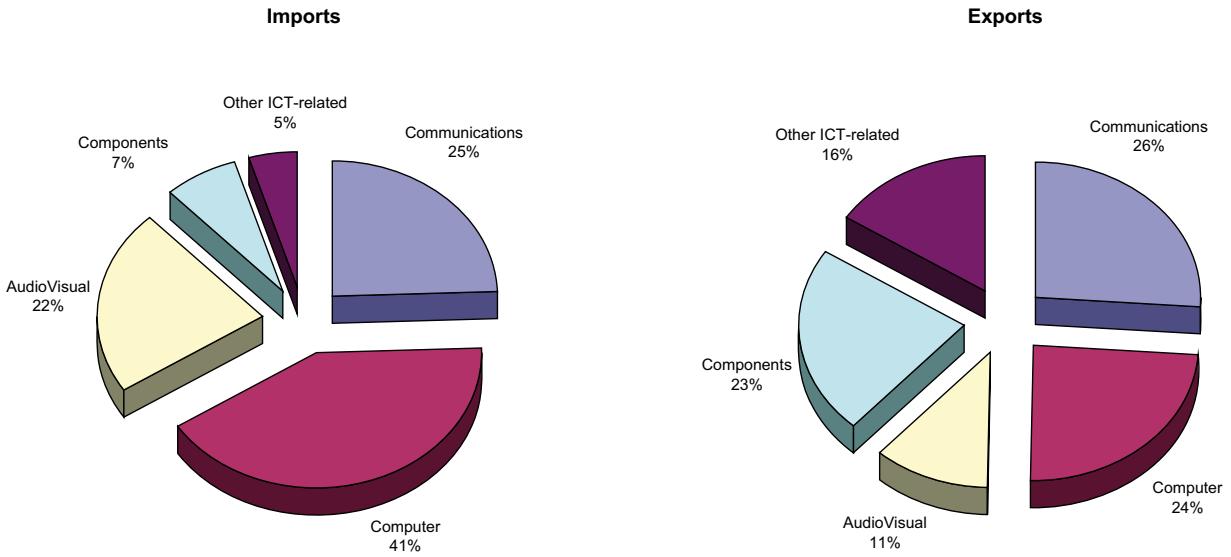
Communications equipment was the largest category of Australian ICT equipment exports to China (incl. SARs) during 2008, at $124 million. Computer equipment exports to China (incl. SARs) were worth $115 million, components exports $108 million, other ICT related equipment exports $75 million and audiovisual equipment exports $54 million (Figure 5.5).

Figure 5.4 ICT Equipment Imports from China (incl. SARs), 1998 to 2008 (AUDm)



Note: There are no data for software products for 2007-2008.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 5.5 ICT Equipment Trade With China (incl. SARs), 2008 (per cent shares)



Source: TradeData (www.tradedata.net), CSES Analysis.

Australia's deficit on trade in ICT equipment with China (incl. SARs) reached almost $10 billion in 2008, and accounted for no less than 37% of the total deficit on trade in ICT equipment – up from $680 million or 6% of the total ICT equipment deficit in 1998.

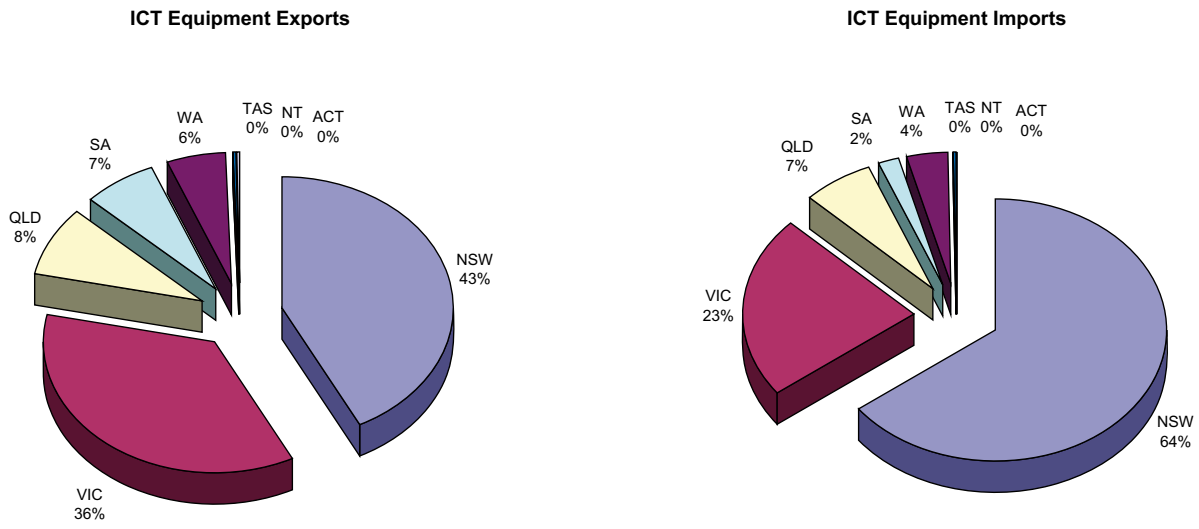
6 ICT Trade State-By-State

This chapter examines ICT equipment and services trade State-by-State. It includes a detailed analysis of ICT equipment and services exports and imports for all States and Territories. [17]

6.1 Comparative State Performance

New South Wales and Victoria dominate ICT equipment exports and imports, with NSW the largest exporter of ICT equipment in 2008 (Figure 6.1). ICT equipment exports from Queensland, South Australia and Western Australia were also significant. During 2008, NSW also attracted some 64% of all ICT equipment imports, although almost $1.2 billion worth were subsequently re-exported – with Sydney acting as a regional distribution hub.

Figure 6.1 State ICT Equipment Trade Shares, 2008 (per cent)



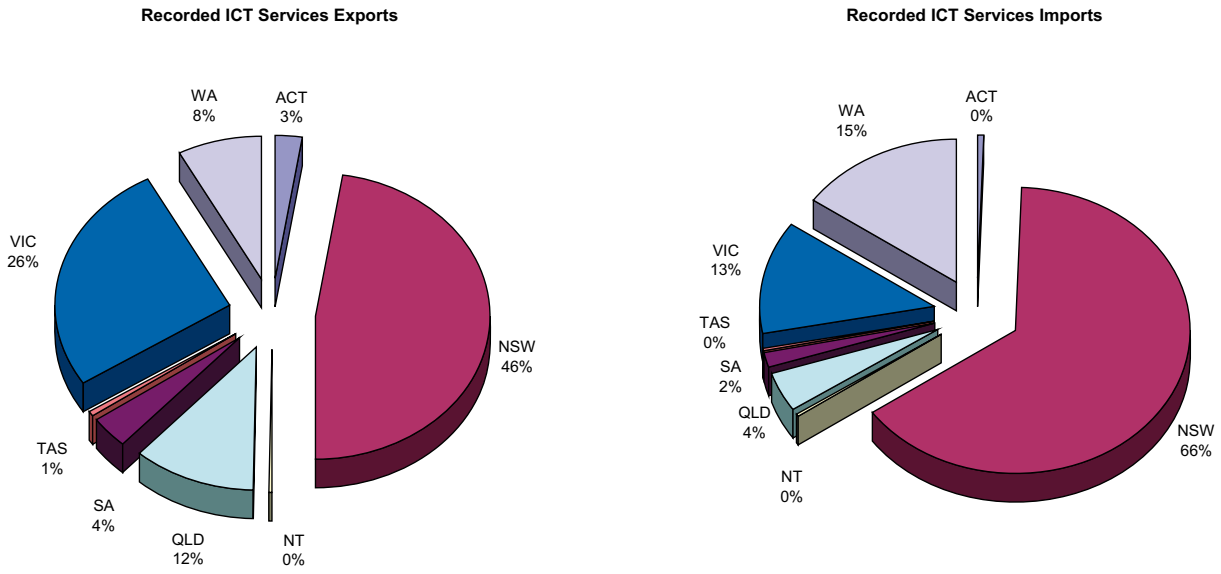
Note: Exports exclude re-exports, but imports include them.
Source: TradeData (www.tradedata.net), CSES Analysis.

[17] *Equipment:* It should be noted that there are cases in which either the State of origination or destination of goods is not known, and cases in which returns are incorrectly filed – with, for example, the head office address given as origin/destination instead of the address of the branch or office that is the ultimate origin/destination. Imported equipment may also be purchased by a distributor in one state and subsequently sold in another state.

Services: Services data by State are limited, and are derived from ABS estimates. Consequently, State-based data are subject to a degree of error and should be interpreted with caution. Moreover, because of these data limitations totals may not be the same as those presented in the previous chapters.

New South Wales' position is more dominant when it comes to ICT related services, with NSW accounting for 46% of total state recorded exports (credits) during 2008 and 66% of imports (debits) (Figure 6.2). At 26%, Victoria's share of ICT services exports was significantly smaller. However, uneven reporting of services trade data means that caution should be exercised when interpreting these data – with that for the smaller states being understated, hence the shares of the larger states are typically overstated.

Figure 6.2 State ICT Services Trade Shares, 2008 (per cent)



Note: Limited data mean that these shares should be interpreted with caution.
Source: ABS. CSES Analysis.

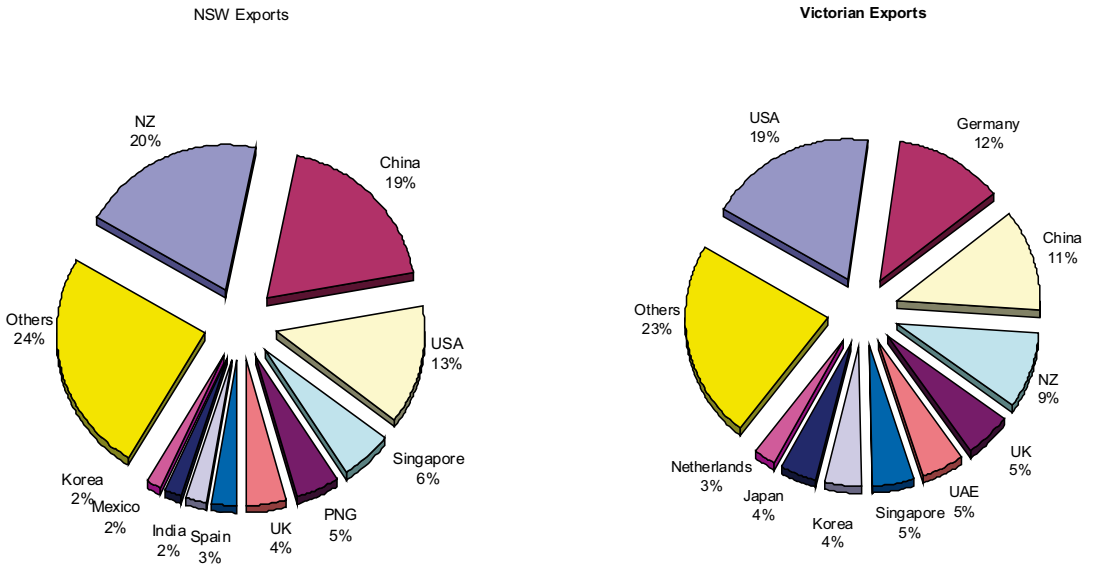
While there are data limitations, Figures 6.1 and 6.2 reveal something of the relative performance of the States and of their contribution to Australia's overall trade position. For example, where a State makes a higher percentage contribution to exports than to imports it is making a relatively positive contribution, and vice-versa (e.g. Victoria's ICT equipment and services trade vis-à-vis that of NSW).

6.2 State Export Markets

During 2008, the major markets for locally produced ICT equipment exports from NSW were: New Zealand, which took $168 million, China (incl. SARs) took $157 million, and the United States $108 million. The United Kingdom, Singapore, PNG, Spain and India were also substantial markets for equipment exports from NSW (Figure 6.3).

The major markets for locally produced ICT equipment exports from Victoria were: the United States which took $133 million, Germany $84 million, China (incl. SARs) $80 million, New Zealand $62 million and the United Kingdom $38 million. The United Arab Emirates, Singapore, Korea, Japan and the Netherlands were also substantial markets for equipment exports from Victoria (Figure 6.3).

Figure 6.3 NSW and Victorian ICT Equipment Export Markets, 2008 (per cent)



Note: Exports exclude re-exports.
Source: TradeData (www.tradedata.net), CSES Analysis.

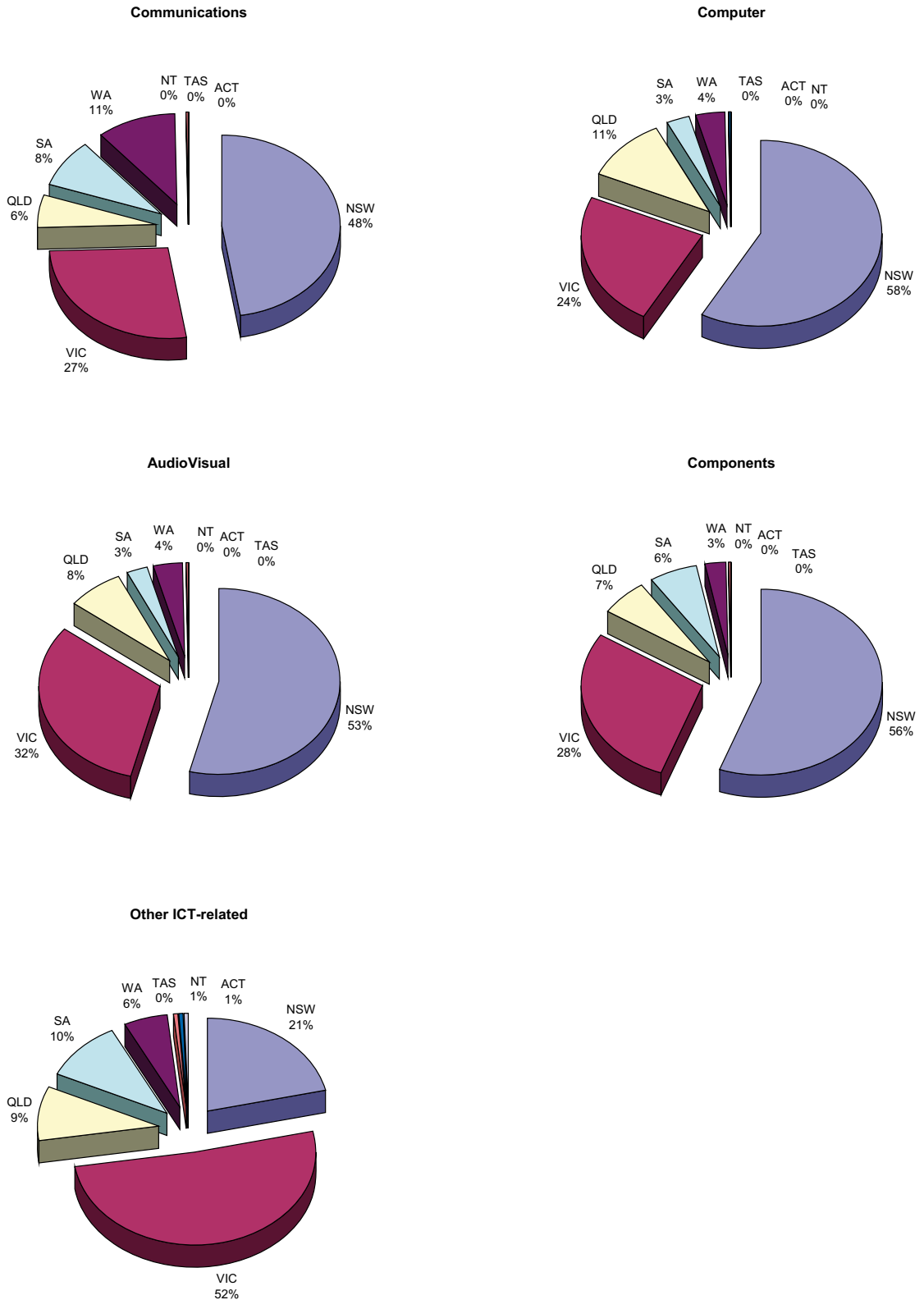
Queensland's ICT equipment exports during 2008 went primarily to the United States, China (incl. SARs), Papua New Guinea, New Zealand, Singapore and the United Kingdom, although there were another 20 countries that took more than $1 million worth.

South Australia's ICT equipment exports went primarily to the United States, China (incl. SARs), New Zealand, the United Kingdom, India and South Africa, and another 13 countries took more than $1 million worth.

Western Australia's ICT equipment exports went primarily to China (incl. SARs), the United States, Singapore, the United Kingdom, New Zealand and South Africa. Another 21 countries took more than $1 million worth, including India, Canada, Tanzania, Papua New Guinea and Brazil. Export markets for the smaller States and Territories tend to vary from year to year.

Figure 6.4 shows the State-by-State contributions to exports of the various categories of ICT equipment during 2008.

Figure 6.4 State Shares of ICT Equipment Exports by Category, 2008



Source: TradeData (www.tradedata.net), CSES Analysis.

6.3 New South Wales

In 2008, NSW exported $835 million worth of domestically produced ICT equipment, down from more than $1 billion during 1997, but up on more recent years. It accounted for around 43% of Australia's (state attributable) equipment exports.

Computer equipment was the largest category of domestically produced ICT equipment exports from NSW in 2008, worth $218 million or 58% of the national total. Components exports from NSW were worth $182 million, audiovisual equipment exports $151 million, other ICT-related equipment exports $147 million, and communications equipment exports $136 million. Components, audiovisual and other ICT-related equipment exports from NSW have grown over the last decade, whereas computer and communications equipment exports have declined.

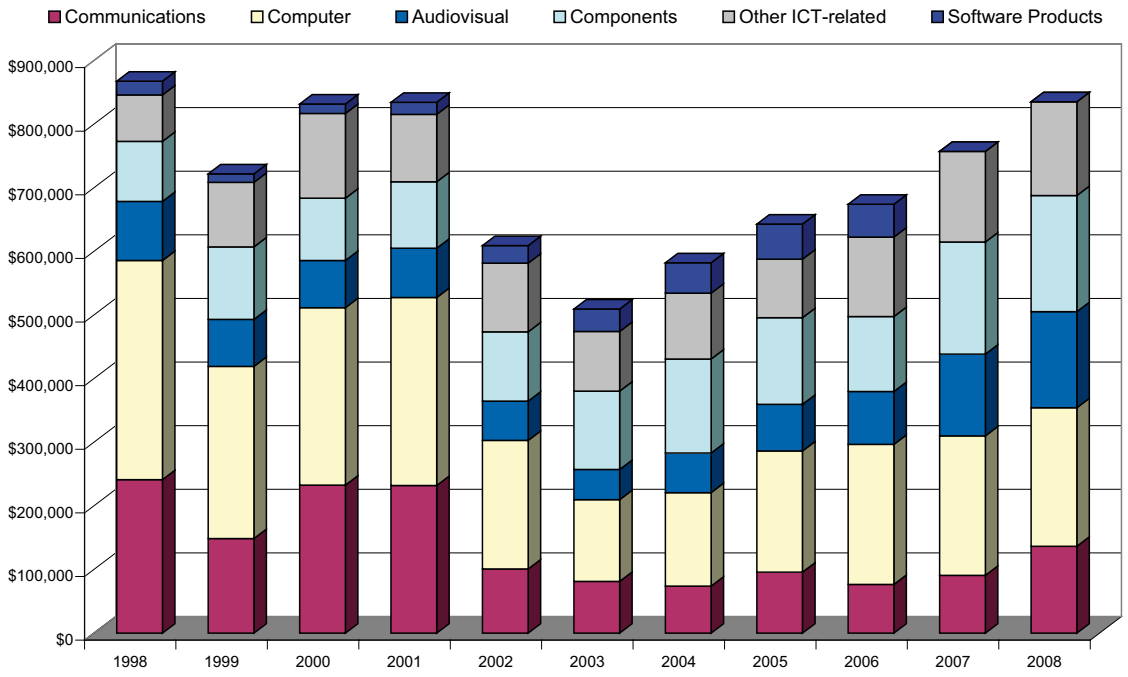
Table 6.1 NSW's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	241,005	232,479	100,763	73,757	76,511	136,355
Computer	344,718	278,859	202,188	147,050	220,095	217,757
Audiovisual	92,630	74,133	61,707	62,035	83,001	151,206
Components	94,352	97,998	108,858	147,942	117,856	182,482
Other ICT-related	73,253	133,259	107,906	103,378	125,014	147,327
Software Products	21,416	14,876	27,731	47,922	51,480	..
Total	*867,375*	*831,605*	*609,153*	*582,084*	*673,956*	*835,127*
ICT Equipment Imports						
Communications	1,432,847	4,181,279	2,440,145	3,068,668	3,390,697	4,090,487
Computer	5,085,159	6,081,413	5,638,534	5,653,171	6,291,152	6,310,634
Audiovisual	1,330,364	1,851,693	1,983,083	2,789,259	2,695,022	3,869,699
Components	862,942	1,245,041	299,204	405,627	325,646	2,020,222
Other ICT-related	809,266	894,305	1,072,730	988,735	1,285,100	2,905,903
Software Products	488,269	439,459	376,640	364,924	406,916	..
Total	**10,008,847**	**14,693,190**	**11,810,337**	**13,270,384**	**14,394,532**	**19,196,944**
Balance (Approx.)	**-8,201,679**	**-12,430,628**	**-9,749,155**	**-11,652,774**	**-12,759,489**	**-17,143,119**

Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Balances are no more than approximations.
Source: TradeData (www.tradedata.net), CSES Analysis.

Imports of ICT equipment into NSW cost more than $19 billion in 2008, up from $10 billion a decade earlier. NSW accounted for 64% of total national ICT equipment imports. Computer equipment, costing $6.3 billion, was the largest category, followed by communications equipment ($4 billion), audiovisual equipment ($3.9 billion), other ICT-related equipment ($2.9 billion), and components ($2 billion). ICT equipment imports into NSW have increased by 6.7% per annum over the last decade (in current prices), while exports from NSW have declined by 0.4% per annum. NSW's approximate deficit on trade in ICT equipment in 2008 was $17 billion. [18]

Figure 6.5 NSW's Exports of ICT Equipment, 1998 to 2008 ($'000)



Source: TradeData (www.tradedata.net), CSES Analysis.

State-based services trade data are limited and are rounded to millions. However, communications services exports from NSW were reported to have been worth $310 million in 2008, computer and information services exports $867 million, and audiovisual services exports $109 million. Communication and computer and information services exports have been growing since 2000, while other categories have fallen. Imports of communications services cost NSW $363 million in 2008, imports of computer and information services cost $800 million, and imports of audiovisual services cost $1.2 billion. Hence, NSW had a deficit on ICT services trade during 2008 of around $1 billion (excluding software royalties and license fees).

[18] ICT equipment trade data are derived from customs returns, which show the *State of Origin* for exports and the *State of Destination* for imports. Because of the way in which State of Origin and State of Destination are coded, State-based exports report locally produced exports and exclude re-exports, but State-based imports include both re-imports and re-exports. Hence, the difference between State exports and imports reported in the following tables reflects the difference between the States' domestically produced exports and its total imports. This is not the same as the State's ICT trade balance. The *approximate* ICT equipment trade balances reported in the tables below are calculated as the State's locally produced exports and re-exports discharged from that State, minus total imports (including both re-exports and re-imports) with that State destination. Because of differences between State of Origin and State of Discharge these balances are no more than indicative approximations.

Table 6.2 NSW's ICT Services Trade, 2000 to 2008 (AUDm)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
ICT Services Exports									
Communications services	564	366	347	338	282	274	319	258	310
Computer & information services	642	660	879	908	1,022	816	823	754	867
Audiovisual & related*	1,474	117	145	134	124	119	151	130	109
Software royalties & fees	..	..	..	..	..	..	..	..	..
ICT Services Imports									
Communications services	654	564	527	447	315	281	291	235	363
Computer & information services	704	702	764	784	806	804	954	887	800
Audiovisual & related	534	605	692	691	780	688	831	873	1,168
Software royalties & fees	..	..	..	..	..	..	..	..	..

*Note: *Includes the one-off impacts of the Sydney Olympic Games. .. no data available. np not published.*
Source: ABS, CSES Analysis.

6.4 Victoria

In 2008, Victoria's domestically produced ICT equipment exports were worth $700 million, marginally up from $696 million a decade earlier – with Victoria accounting for 38% of national (state attributable) equipment exports. Other ICT-related equipment was the main export category.

Victorian ICT equipment exports have declined from their 2001 peak of $792 million, but have increased by 0.1% per annum over the last decade (in current prices). There has been significant variation by category, with strong growth in components, audiovisual and other ICT related equipment exports. The big falls since the mid 1990s have been in exports of communications and computer equipment – with computer equipment exports falling from $288 million in 1998 to just $89 million in 2008, and communications equipment exports falling from $128 million in 1998 to $78 million in 2008. Amongst other factors, this probably reflects the exit of IBM's then Bluegum/Solectron's manufacturing activities from Wangaratta.

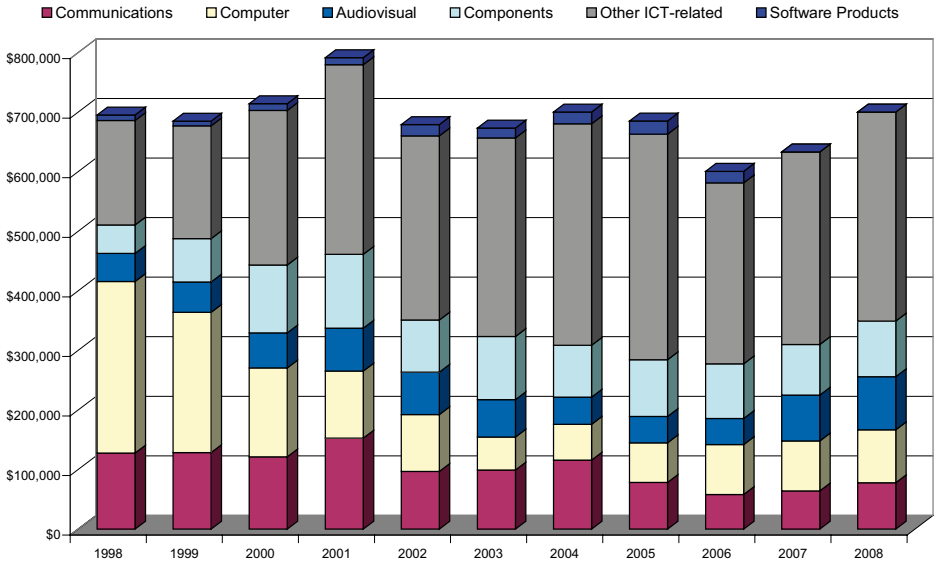
Imports of ICT equipment destined for Victoria cost more than $6.7 billion in 2008, up from $3.4 billion a decade earlier. Victoria accounted for around 23% of national ICT equipment imports. Other ICT-related equipment accounted for $2 billion, communications equipment accounted for $1 billion, computer and audiovisual equipment each accounted for around $1.3 billion and components $1 billion. Exports of ICT equipment from Victoria have grown 0.1% per annum over the last decade, while imports into Victoria have grown by 7% per annum. Victoria's deficit on ICT equipment trade stood at around $5.8 billion in 2008 (See note 18).

Table 6.3 Victoria's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	127,784	121,497	96,981	115,873	58,057	77,806
Computer	288,065	149,289	95,304	60,135	83,955	89,074
Audiovisual	47,218	58,860	71,395	45,632	43,758	89,211
Components	47,630	113,867	87,479	87,170	91,846	93,359
Other ICT-related	175,637	259,547	309,152	371,970	303,792	350,987
Software Products	9,251	11,437	19,111	19,604	19,484	..
Total	**695,585**	**714,496**	**679,422**	**700,385**	**600,892**	**700,437**
ICT Equipment Imports						
Communications	689,198	1,006,983	695,046	1,021,853	1,574,527	1,022,300
Computer	788,754	1,024,150	1,068,530	1,119,501	1,335,755	1,342,161
Audiovisual	651,712	874,515	966,478	1,210,442	1,251,809	1,311,982
Components	612,960	588,068	225,592	237,614	232,920	1,026,570
Other ICT-related	597,429	606,919	722,649	782,487	866,786	2,039,074
Software Products	61,438	68,833	60,921	65,102	95,028	..
Total	**3,401,489**	**4,169,468**	**3,739,216**	**4,436,998**	**5,356,825**	**6,742,087**
Balance (Approx.)	**-2,537,104**	**-3,218,409**	**-2,883,586**	**-3,566,367**	**-4,629,926**	**-5,827,576**

Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Balances are no more than approximations.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 6.6 Victoria's Exports of ICT Equipment, 1998 to 2008 ($'000)



Source: TradeData (www.tradedata.net), CSES Analysis.

Services trade data are limited. However, communications services exports from Victoria were reported to have been worth $215 million in 2008, and computer and information services exports $502 million. Audiovisual services exports were not reported in 2008. *Imports* of communications services were not reported in 2008, imports of computer and information services cost Victoria $457 million, and imports of audiovisual and related services were not reported. If we assume that 2008 audiovisual services exports were similar to 2004, and imports of communication and audiovisual services were similar to 2007 then Victoria would have had a deficit on trade in ICT services (excluding software royalties and license fees) of around $47 million.

Table 6.4 Victoria's ICT Services Trade, 2000 to 2008 (AUDm)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
ICT Services Exports									
Communications services	354	240	231	233	205	199	194	156	215
Computer & information services	143	110	184	186	np	235	405	499	502
Audiovisual & related	26	6	16	np	41	np	np	np	np
Software royalties & fees	..	..	..	..	..	..	..	..	..
ICT Services Imports									
Communications services	531	446	398	300	227	198	212	207	np
Computer & information services	92	92	136	212	213	200	224	437	457
Audiovisual & related	np	np	69	40	28	53	70	47	np
Software royalties & fees	..	..	..	..	..	..	..	..	..

Note: .. no data available. np not published. Source: ABS. CSES Analysis.

6.5 Queensland

Queensland exported $165 million worth of locally produced ICT equipment in 2008, well up on the $57 million it exported a decade earlier. In 2008, Queensland accounted for around 8% of national (state attributable) equipment exports. Computer and other ICT-related equipment were the main export categories.

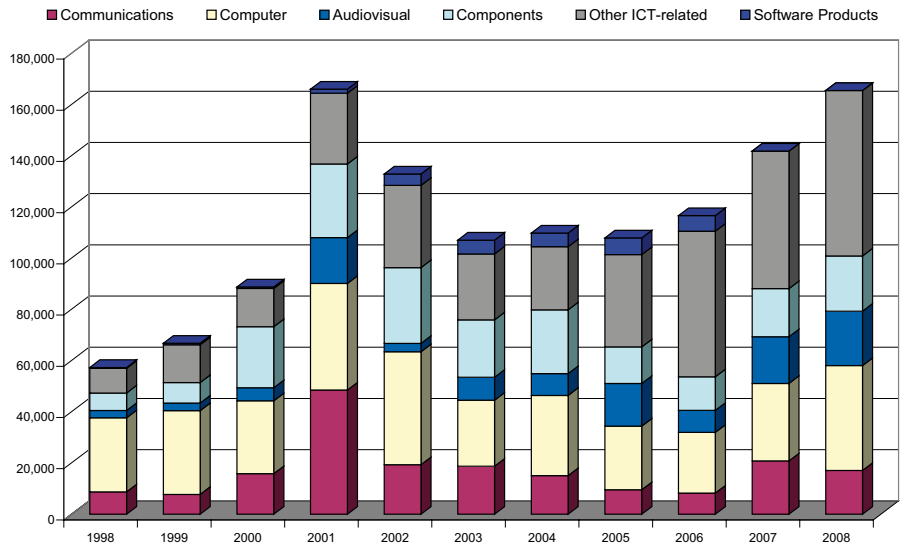
Queensland's export growth has been strong throughout the decade, with all the major categories of ICT equipment contributing, but growth in exports of other ICT-related and audiovisual equipment has been particularly strong. As elsewhere, imports of ICT equipment continue to grow – costing nearly $2 billion in 2008, up from $398 million a decade earlier. Other ICT-related and audiovisual equipment are the largest categories of imports into Queensland – at $652 and $495 million, respectively. Queensland's deficit on ICT equipment trade in 2008 was approximately $1.7 billion (See note 18).

Table 6.5 Queensland's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	8,690	15,815	19,327	15,032	8,220	17,087
Computer	28,950	28,464	44,109	31,358	23,710	40,949
Audiovisual	2,867	5,092	3,270	8,510	8,600	21,264
Components	6,833	23,831	29,612	24,880	13,121	21,548
Other ICT-related	9,612	14,984	32,132	24,670	56,877	64,629
Software Products	351	561	4,399	5,353	6,111	..
Total	57,303	88,747	132,850	109,803	116,638	165,477
ICT Equipment Imports						
Communications	53,324	152,763	176,020	102,567	243,599	226,347
Computer	83,796	146,453	187,697	295,312	397,044	375,010
Audiovisual	95,886	144,567	166,021	291,394	361,905	495,292
Components	26,687	61,044	42,301	47,184	86,555	214,684
Other ICT-related	119,223	128,340	155,598	184,990	229,825	651,852
Software Products	18,734	35,663	64,310	99,003	98,220	..
Total	**397,649**	**668,830**	**791,948**	**1,020,450**	**1,417,149**	**1,963,185**
Balance (Approx.)	**-310,713**	**-547,761**	**-617,950**	**-868,697**	**-1,272,384**	**-1,720,244**

Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Balances are no more than approximations.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 6.7 Queensland's Exports of ICT Equipment, 1998 to 2008 ($'000)



Source: TradeData (www.tradedata.net), CSES Analysis.

Services trade data are limited. However, communications services exports from Queensland were reported to have been worth $118 million in 2008, and exports of computer and information services realised $190 million, while imports of communications services cost Queensland $123 million, and imports of computer and information services cost $35 million. Thus, Queensland would have had a surplus on trade in ICT services (excluding software royalties and license fees) of around $150 million.

Table 6.6 Queensland's ICT Services Trade, 2000 to 2008 (AUDm)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
ICT Services Exports									
Communications services	249	159	170	159	134	135	129	107	118
Computer & information services	np	np	73	56	61	72	124	169	190
Audiovisual & related	-	-	np	23	np	np	4	np	4
Software royalties & fees	..	..	..	..	..	..	..	..	..
ICT Services Imports									
Communications services	332	287	284	209	155	133	136	109	123
Computer & information services	45	34	35	18	12	18	19	46	35
Audiovisual & related			np	np		5	6	np	2
Software royalties & fees	..	..	..	..	..	..	..	..	..

Note: .. no data available. np not published.
Source: ABS. CSES Analysis.

6.6 South Australia

For the smaller States trade data are more volatile, reflecting the lumpy nature of trade and the impacts of particular transactions. This volatility should be borne in mind when interpreting these data (especially apparent trends). Moreover, some items of electronics may fall outside the classifications of ICT and/or may be deemed confidential items. This may lead to an understatement of state-based exports where there is significant defence-related electronics manufacturing.

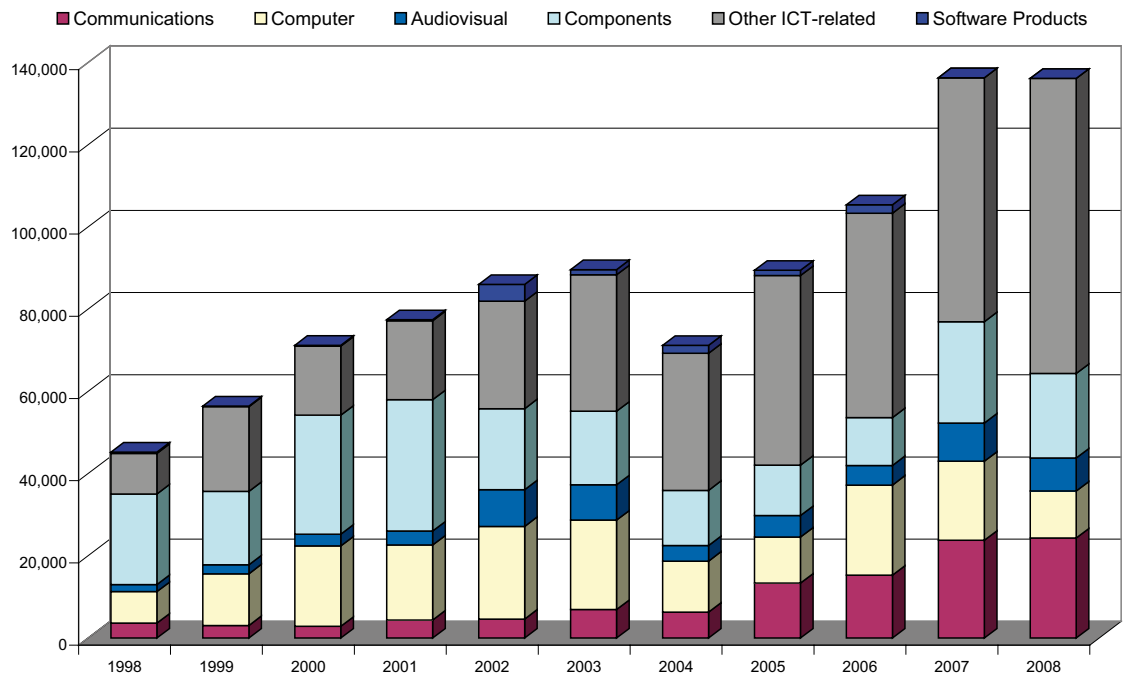
South Australia's locally produced exports of ICT equipment reached $136 million in 2008, up from $45 million in 1998 and growing strongly. Other ICT-related equipment ($72 million) and computer equipment ($24 million) were the major contributors. ICT equipment imports reached $554 million in 2008, up from $264 million a decade earlier. These are significantly lower import levels than Queensland and Western Australia. South Australia's ICT equipment trade deficit was approximately $410 million in 2008 (See note 18).

Table 6.7 South Australia's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	3,618	2,848	4,604	6,283	15,267	24,322
Computer	7,675	19,551	22,548	12,418	21,932	11,436
Audiovisual	1,707	2,864	8,934	3,790	4,775	8,023
Components	22,043	28,936	19,710	13,417	11,632	20,583
Other ICT-related	9,865	16,799	26,156	33,375	49,740	71,795
Software Products	332	227	4,060	1,919	2,059	..
Total	45,240	71,225	86,012	71,202	105,405	136,158
ICT Equipment Imports						
Communications	42,510	50,952	45,238	29,178	44,473	42,022
Computer	29,853	37,348	35,121	77,489	71,594	38,337
Audiovisual	11,882	20,926	70,942	99,658	117,455	145,728
Components	49,928	118,280	24,628	23,161	31,345	75,941
Other ICT-related	128,447	111,205	127,416	114,745	128,621	251,831
Software Products	1,070	716	899	1,817	1,837	..
Total	**263,690**	**339,427**	**304,243**	**346,048**	**395,325**	**553,859**
Balance (Approx.)	**-214,676**	**-265,870**	**-213,008**	**-268,998**	**-280,732**	**-411,365**

Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years and it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Balances are no more than approximations.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 6.8 South Australia's Exports of ICT Equipment, 1998 to 2008 ($'000)



Source: TradeData (www.tradedata.net), CSES Analysis.

Services trade data are limited. However, communications services exports from South Australia were reported to have been worth $95 million in 2008 and exports of computer and information services $2 million. Imports of communication services were not reported in 2008 but cost South Australia $82 million in 2007, and computer and information services imports cost $59 million.

Table 6.8 South Australia's ICT Services Trade, 2000 to 2008 (AUDm)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
ICT Services Exports									
Communications services	162	119	103	107	90	106	110	114	95
Computer & information services	np	48	33	4	7	20	np	5	2
Audiovisual & related	np	np	np	np	np	np	np	np	np
Software royalties & fees	..	..	..	..	..	..	..	..	..
ICT Services Imports									
Communications services	140	133	143	101	np	np	np	82	np
Computer & information services	np	np	np	np	15	14	10	12	59
Audiovisual & related	np	np	np	np	np	np	np	np	np
Software royalties & fees	..	..	..	..	..	..	..	..	..

Note: .. no data available. np not published. Source: ABS. CSES Analysis.

6.7 Western Australia

Western Australia's locally produced ICT equipment exports were worth $108 million in 2008, up from $92 million a decade earlier. The largest category was other ICT-related equipment, with substantial exports of communications equipment and computer equipment. Western Australia accounts for around 11% of total national communications equipment exports (excluding re-exports).

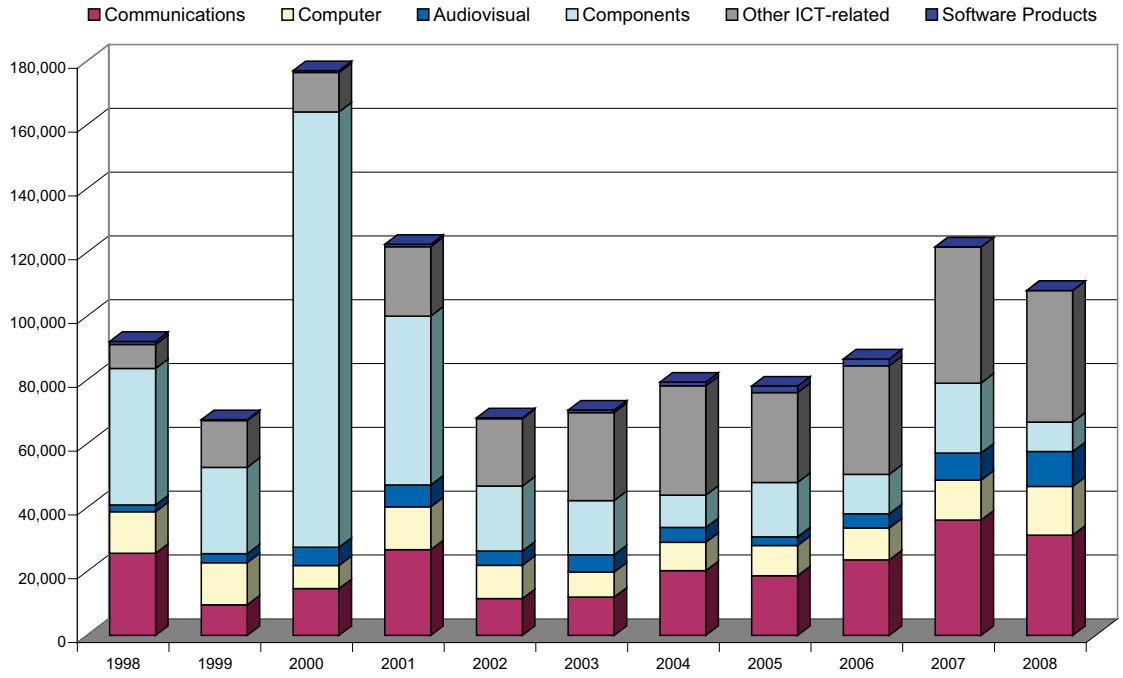
ICT equipment imports into Western Australia cost the State $1.2 billion in 2008, up from $861 million a decade earlier. Other ICT-related equipment accounted for $522 million and audiovisual equipment for $220 million. Western Australia's imports of ICT equipment have grown faster than exports over the last decade, and there is a deficit on the State's ICT equipment trade of some $1 billion (See note 18).

Table 6.9 Western Australia's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	25,726	14,701	11,553	20,289	23,687	31,425
Computer	13,042	7,228	10,391	8,886	9,980	15,250
Audiovisual	2,143	5,728	4,508	4,690	4,448	10,969
Components	42,769	136,404	20,358	10,101	12,361	9,215
Other ICT-related	7,487	12,368	21,121	34,260	34,002	41,277
Software Products	998	581	319	1,183	2,172	..
Total	92,165	177,010	68,250	79,409	86,650	108,137
ICT Equipment Imports						
Communications	33,679	108,137	43,897	43,131	97,831	88,723
Computer	612,764	576,266	356,007	328,895	354,609	205,340
Audiovisual	50,512	66,379	94,578	112,407	187,460	219,998
Components	53,036	70,704	19,777	21,921	36,579	169,472
Other ICT-related	102,032	88,458	106,229	164,111	202,960	521,570
Software Products	9,203	5,076	4,952	9,277	7,430	..
Total	**861,227**	**915,021**	**625,441**	**679,741**	**886,869**	**1,205,103**
Balance (Approx.)	**-744,056**	**-716,020**	**-540,620**	**-577,963**	**-781,202**	**-1,064,348**

Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years and it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Balances are no more than approximations.
Source: TradeData (www.tradedata.net), CSES Analysis.

Figure 6.9 Western Australia's Exports of ICT Equipment, 1998 to 2008 ($'000)



Source: TradeData (www.tradedata.net), CSES Analysis.

Services trade data are limited. However, computer services exports from Western Australia were reported to have been worth $110 million in 2008 and communication services $101 million. Imports of computer services cost Western Australia $188 million and communication services a further $360 million in 2008. Western Australia would have had a deficit on trade in ICT services (excluding software royalties and license fees and audiovisual) of around $336 million.

Table 6.10 Western Australia's ICT Services Trade, 2000 to 2008 (AUDm)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
ICT Services Exports									
Communications services	127	82	84	80	69	67	64	np	101
Computer & information services	8	7	6	np	np	16	np	83	110
Audiovisual & related	np	np	-	2	-	-	1	np	1
Software royalties & fees	..	..	..	..	..	..	..	..	..
ICT Services Imports									
Communications services	177	160	152	113	96	89	np	107	360
Computer & information services	12	np	32	17	9	13	26	84	188
Audiovisual & related		np	4	4	np	np	np	np	np
Software royalties & fees	..	..	..	..	..	..	..	..	..

Note: .. no data available. np not published.
Source: ABS. CSES Analysis.

6.8 Tasmania

Tasmania's exports of locally produced ICT equipment are small. Worth a little more than $1.5 million in 1998, they exceeded $3.5 million in 2008. Tasmania's ICT imports cost the State $9.2 million in 2008. Tasmania had a deficit on trade in ICT equipment in 2008 of approximately $5.7 million (See note 18).

Services trade data are very limited with $13 million of communications services exports and only $1 million of computer and information services exports being reported in 2008. Imports of communications services cost Tasmania $15 million in 2008.

Table 6.11 Tasmania's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	335	197	400	388	441	746
Computer	176	175	137	335	182	95
Audiovisual	266	72	862	88	744	292
Components	33	116	129	172	869	387
Other ICT-related	726	1,357	390	789	781	2,028
Software Products	2	1	1	12	257	..
Total	1,537	1,918	1,919	1,784	3,275	3,548
ICT Equipment Imports						
Communications	945	309	592	75	601	440
Computer	183	70	260	96	424	311
Audiovisual	255	260	225	395	2,066	275
Components	473	48	119	457	109	1,252
Other ICT-related	2,534	3,372	4,189	1,466	1,541	6,954
Software Products	0	7	6	1	8	..
Total	**4,391**	**4,065**	**5,391**	**2,490**	**4,750**	**9,232**
Balance (Approx.)	**-2,798**	**-2,145**	**-3,468**	**-693**	**-1,468**	**-5,656**

Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Balances are no more than approximations (See note 18).
Source: TradeData (www.tradedata.net), CSES Analysis.

Table 6.12 Tasmania's ICT Services Trade, 2000 to 2008 (AUDm)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
ICT Services Exports									
Communications services	33	21	21	20	17	16	15	12	13
Computer & information services	-	-	-	-	-	-	-	1	1
Audiovisual & related	-	-	np	-	-	-	np	np	-
Software royalties & fees	..	..	..	..	..	..	..	..	..
ICT Services Imports									
Communications services	43	37	35	27	20	17	17	np	15
Computer & information services	np		np					np	2
Audiovisual & related									-
Software royalties & fees	..	..	..	..	..	..	..	..	..

Note: - no data available. np not published.
Source: ABS. CSES Analysis.

6.9 Northern Territory

Exports of locally produced ICT equipment from the Northern Territory are small, being worth about $6 million in 2008 – up from just $245,000 a decade earlier. Other ICT-related and computer equipment were the major categories. Imports of ICT equipment into the Territory have grown since the late 1990s – up from $37 million in 1998 to $44 million in 2008. The Territory's deficit on trade in ICT equipment was around $36 million in 2008 (See note 18).

Table 6.13 Northern Territory's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	13	528	88	58	28	125
Computer	88	695	317	505	663	579
Audiovisual	30	529	190	43	11	192
Components	29	228	136	53	455	384
Other ICT-related	83	707	241	509	774	4,616
Software Products	1	4	1	45	23	..
Total	245	2,691	973	1,213	1,954	5,897
ICT Equipment Imports						
Communications	1,311	1,901	15,198	10,057	4,945	14,397
Computer	1,175	2,362	2,153	7,133	3,497	3,114
Audiovisual	686	4,619	778	1,045	1,278	1,364
Components	646	687	580	2,953	979	2,334
Other ICT-related	32,941	10,282	16,340	13,231	15,005	22,700
Software Products	107	43	4	9	65	..
Total	**36,866**	**19,894**	**35,053**	**34,428**	**25,770**	**43,909**
Balance (Approx.)	**-13,733**	**6,571**	**-19,571**	**-23,192**	**-21,589**	**-36,382**

Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media). Balances are no more than approximations (See note 18).
Source: TradeData (www.tradedata.net), CSES Analysis.

Services trade data are very limited. In 2008 The Territory reported exports of communications services of $6 million, and imports to the same value.

Table 6.14 Northern Territory's ICT Services Trade, 2000 to 2008 (AUDm)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
ICT Services Exports									
Communications services	17	9	9	8	7	7	6	np	6
Computer & information services	-	-	-	-	-	-	-	-	-
Audiovisual & related	-	-	-	-	-	-	-	-	-
Software royalties & fees	..	..	..	..	..	..	..	..	..
ICT Services Imports									
Communications services	20	15	14	12	np	np	np	np	6
Computer & information services		np					np	np	-
Audiovisual & related	..	..	..	..	..	..	..	..	..
Software royalties & fees	..	..	..	..	..	..	..	..	..

Note: - no data available. np not published.
Source: ABS. CSES Analysis.

6.10 Australian Capital Territory

Data relating to ICT equipment trade for the ACT are limited and appear to suffer from some variation as to inclusion in, and exclusion from, NSW data, and the limited opportunities to export directly from, or import directly into, a port in the ACT. They should be interpreted with great caution.

ICT equipment exports from the ACT appear to have been worth around $3.9 million in 2008, with exports of other ICT-related equipment being the only reported export. Imports appear to have cost $3.2 million in 2008 with other ICT-related equipment the major category at $1.8 million.

Services data are even more limited. However, communication services exports from the ACT were reported to have been worth $69 million and imports $12 million in 2008.

Table 6.15 ACT's ICT Equipment Trade, 1998 to 2008 ($'000)

	1998	2000	2002	2004	2006	2008
ICT Equipment Exports						
Communications	12	0	0	0	0	0
Computer	301	0	413	0	535	0
Audiovisual	26	13	0	3	0	0
Components	506	58	414	0	0	0
Other ICT-related	3,327	0	2,573	0	1,090	3,893
Software Products	5	13	0	0	0	..
Total	4,177	84	3,400	3	1,624	3,893
ICT Equipment Imports						
Communications	401	2,240	4	362	274	307
Computer	1,506	157	70	262	123	830
Audiovisual	73	47	709	222	0	241
Components	186	16	6	6	0	52
Other ICT-related	124	125	404	266	446	1,750
Software Products	3	0	0	24	25	..
Total	**2,293**	**2,584**	**1,193**	**1,142**	**868**	**3,180**
Balance (Approx.)	..	..	..	..	..	..

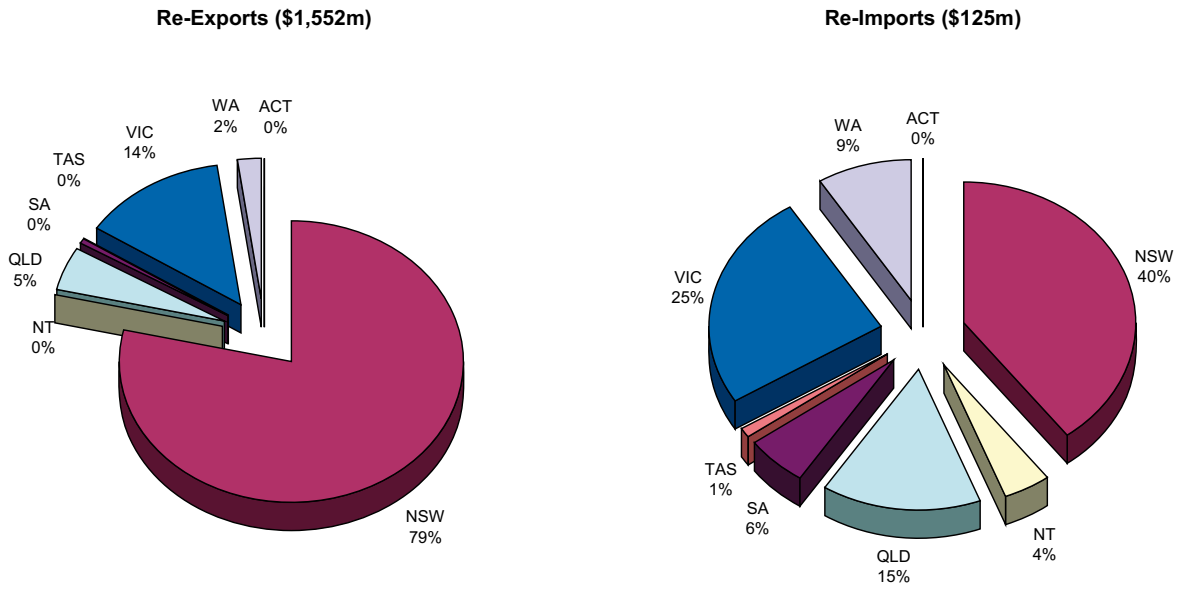
Notes: All data are current prices. Imports are cif, exports fob. Exports exclude re-exports, but imports include them. Due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media).
Source: TradeData (www.tradedata.net), CSES Analysis.

6.11 Re-exports and Re-Imports by State

As noted, ICT equipment trade data are derived from customs returns, which show the '*State of Origin*' for exports and the '*State of Destination*' for imports. Because of the way in which State of Origin and State of Destination are coded, State-based exports report locally produced exports and exclude re-exports, but State-based imports include both re-imports and re-exports.

Re-exports accounted for about 43% of total ICT equipment exports in 2008, so it is important to note the State-by-State flow of re-exports. Among other things, that flow indicates the role of various States in international supply and value chains and as entrepôt ports (i.e. international distribution hubs).

Figure 6.10 ICT Equipment Re-Exports and Re-Imports by State, 2008 (per cent)



Note: Re-exports by State of Discharge and re-imports by State of Destination.
Source: TradeData (www.tradedata.net), CSES Analysis.

What is immediately apparent from an analysis of the data is that New South Wales (Sydney) plays an important role in regional distribution – accounting for nearly 80% of all ICT equipment re-exports during 2008 (more than $1.2 billion) (Figure 6.10).

7 International Comparisons

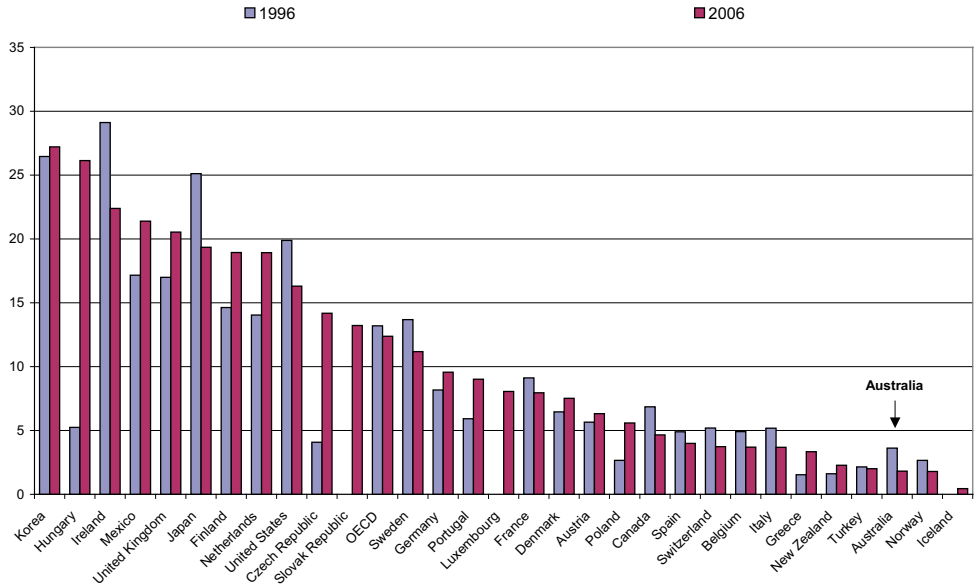
This chapter explores some international comparisons in order to put Australia's ICT trade performance into perspective. It is based on the *OECD Information Technology Outlook, 2008.*

7.1 Contribution of ICT Equipment to Exports

This section compares Australia's ICT equipment export performance with that of other OECD countries. Exploring ICT export performance, the OECD (2008) noted that:

One indicator is the share of ICT goods in total merchandise exports, which varies significantly from country to country. In 2006, ICT goods accounted for 27% of Korea's merchandise exports, and between 20 and 26% of merchandise exports from Hungary, Ireland, Mexico and the United Kingdom. Among OECD countries, Iceland, Norway, Australia and Turkey are the least specialised in the production of ICT goods for export. Some countries, such as the Netherlands, act as transport and distribution hubs and exhibit relatively high levels of trade in ICT equipment and a larger share of ICT equipment in merchandise trade than domestic production would suggest, with re-exports making a substantial contribution to exports. [19]

Figure 7.1 ICT Equipment Share of Total Exports, 1996 to 2006 (per cent)



Source: OECD (2008) OECD Information Technology Outlook 2008, OECD, Paris. CSES Analysis.

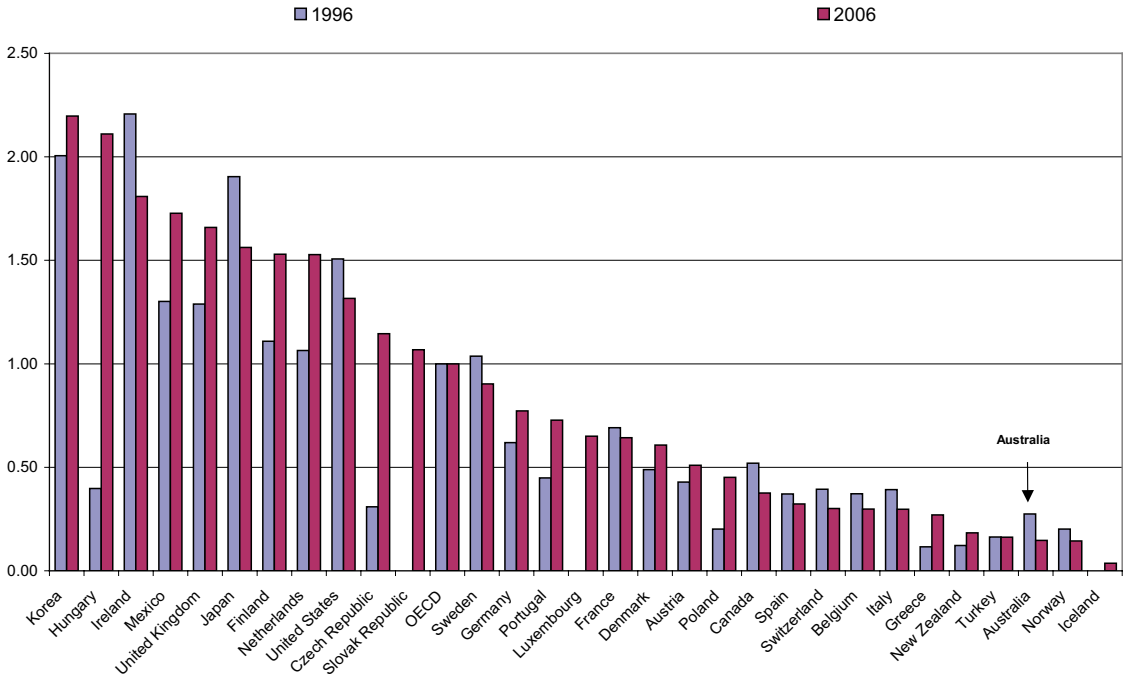
In 2006, ICT equipment accounted for less than 2.0% of Australia's total merchandise exports, compared with an OECD average of 12.4%. Australia ranked 28th of the 30 OECD countries in terms of the contribution of ICT equipment to total merchandise exports. The contribution of ICT was much higher in a number of countries.

[19] OECD (2008) *OECD Information Technology Outlook 2008*, OECD, Paris, p93.

7.2 ICT Trade Performance

Another way to look at specialisation in ICT equipment manufacture for trade is to calculate an index of 'revealed comparative advantage', to see whether an industry performs better or worse in each country than the average across the OECD. [20]

Figure 7.2 Revealed Comparative Advantage in ICT Equipment, 1996 and 2006



Source: OECD (2008) OECD Information Technology Outlook 2008, OECD, Paris. CSES Analysis.

Examining revealed comparative advantage in ICTs, the OECD noted that:

In 2006, 11 OECD countries had a comparative advantage in ICT manufacturing – Korea, Hungary, Ireland, Mexico, the United Kingdom, Japan, Finland, Netherlands, the United States, the Czech Republic and the Slovak Republic. Recent trends suggest increasing specialisation; those with an increasing advantage include a mix of countries that already had a high level of specialisation (e.g. Finland and Mexico) and countries with relatively recent investment in ICT manufacturing (e.g. Hungary, the Slovak Republic, Czech Republic and to a lesser extent Poland). Again, the focus of ICT production in Korea (and elsewhere in Asia), Ireland, Mexico and Eastern Europe is evident, as is the continuing global rationalisation of production. [21]

In 2006, Australia was ranked 28th of 30 OECD countries, with a 'revealed comparative advantage' of 0.15. Disturbingly, this was down from 0.27 in 1996, one of the most rapid declines in ICT production advantage experienced by an OECD country over the period.

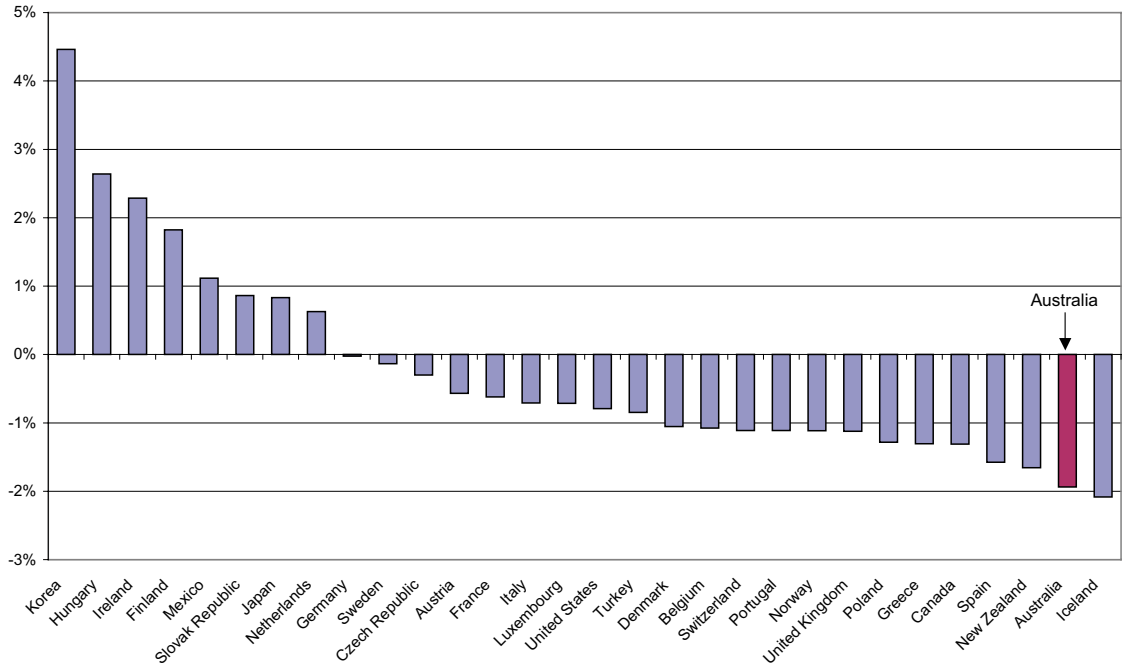
[20] Revealed comparative advantage is calculated as the ratio of the share of ICT equipment exports in total merchandise exports for each country to the share of OECD ICT exports in total OECD merchandise exports. A value greater than 1 indicates a comparative advantage, and a value less than 1 a comparative disadvantage.

[21] OECD (2008) *OECD Information Technology Outlook 2008*, OECD, Paris, p94.

7.3 The Cost of Australia's ICT Trade Deficit

The balance of trade in ICT equipment as a share of GDP shows and how much ICT imports are costing the economy – how 'affordable' and sustainable the ICT deficit may be.

Figure 7.3 ICT Equipment Surplus/Deficit as a Percentage of GDP, 2007 (per cent)



Source: OECD, CSES Analysis.

During 2007, Australia's deficit on trade in ICT equipment amounted to nearly 2% of GDP, while the average for OECD countries was 0.4%. Australia was ranked 29th among 30 OECD countries. Some countries enjoyed a significant surplus on trade in ICT equipment. For example, Korea realised a surplus of trade in ICT equipment in 2007 worth more nearly 5% of GDP, and in Ireland the surplus of ICT equipment trade was worth 2.6% of GDP.

However one looks at it, Australia's unusually high dependence on ICT equipment imports, and the very low contribution made to merchandise exports by ICTs are clearly evident.

Appendix I – Defining ICTs

In this appendix we present a brief summary of the structure and coverage of the ICT Map first developed by the author in Houghton *et al.* (1996) *Mapping the Information Industries*. During 2003-04, the OECD developed and promulgated a new categorisation of ICT equipment, which it is now using for trade analysis. In order to reflect these developments and maintain international comparability, the ICT Map has been updated to reflect these changes. [22] However, due to a customs reclassification in 2007 there is a break in the time series and data for 2007 onwards are not strictly comparable with earlier years. Moreover, it is no longer possible to track software goods (i.e. recorded and unrecorded software-related media).

Mapping ICTs

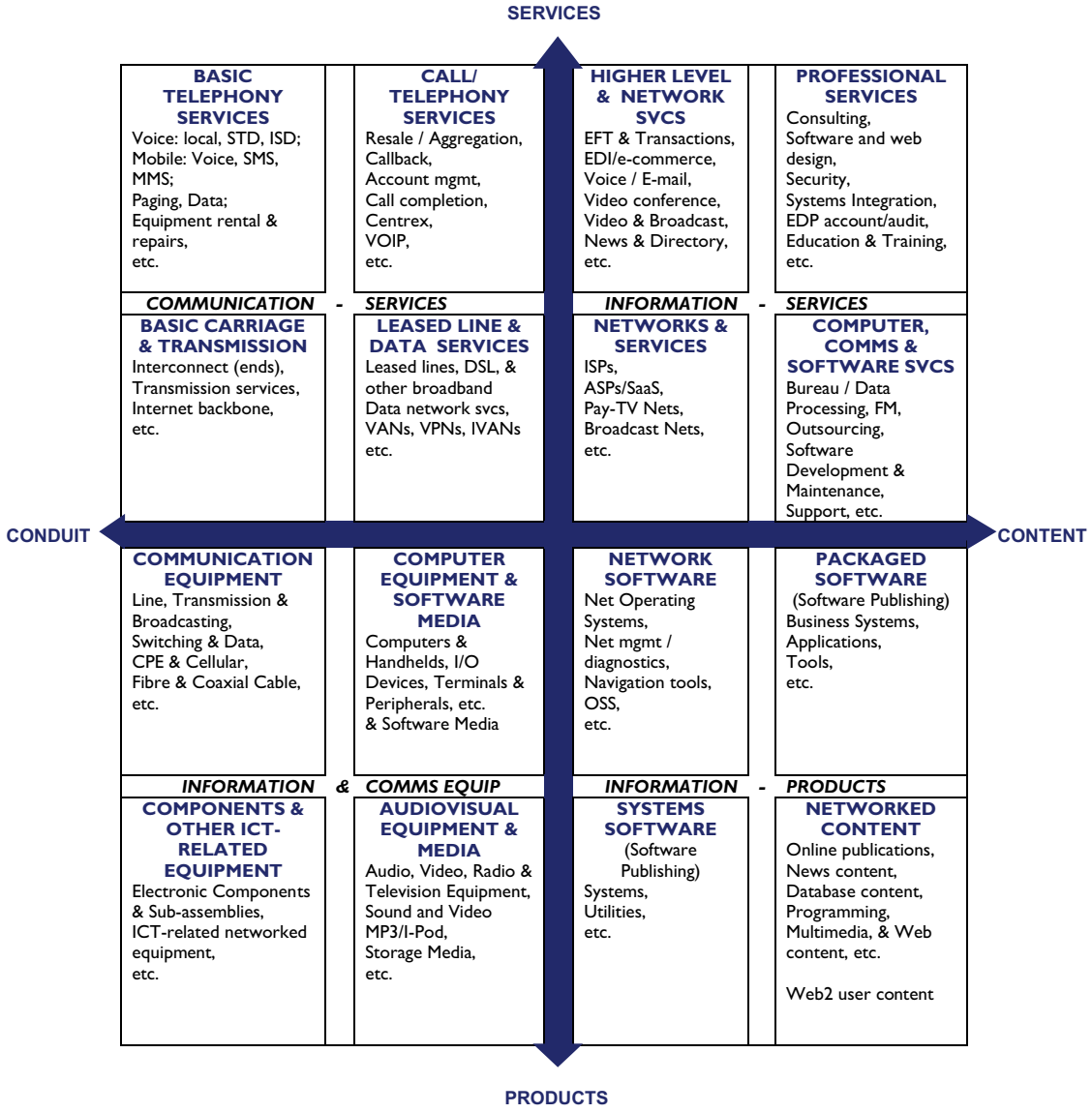
The ICT Map captures both the ICT industries and the products and services they produce in an analytical framework that provides a simple overview of the various related industries and markets that make up ICT. Its defining characteristic is the 'Net', and it includes all the equipment, content and services involved in delivering networked content and services.

The information industries map is drawn (as shown in Figure A1.1) with a vertical product-service dimension and a horizontal conduit-content dimension. Representing activities along a product-service dimension helps to highlight aspects of the 'chain of production' and is suggestive of a blurring of the traditional product and service categories into a middle ground of 'systems' or 'solutions'. The horizontal conduit-content dimension reflects distinctions between the activities of recording, processing, transmitting, publishing and creating information. It is an axis of increasing information value-add.

The information technology space thus created is then broken down into quadrants, representing the four major information industry sectors according to this two-dimensional classification. These are *communication services* in the upper left-hand quadrant, *information-based services* in the upper right-hand quadrant, *communication and information equipment* in the lower left-hand quadrant and information products (i.e. content and software products) in the lower right-hand quadrant.

[22] Those wishing for more detail on the conceptualisation and development of the ICT Map should refer to: Houghton, J.W., Pucar, M. and Knox, C. (1996) Mapping the Information Industries, Productivity Commission Staff Information Paper, Canberra; and Houghton, J.W. (1999) 'Mapping Information Industries and Markets,' Telecommunication Policy, 23(10/11), November & December 1999, pp689-700.

Figure A1.1 The ICT Map



Source: Based on Houghton, J.W., Pucar, M. & Knox, C. (1996) Mapping the Information Industries, Staff Information Paper, Productivity Commission, Canberra.

Using the same principles, we further subdivide each of these four quadrants into product/service classes. These are placed higher on the vertical product-service dimension when they are closer to the end users' use, and lower on the vertical product-service dimension when they are elemental parts of the network. They are placed towards the left-hand end of the conduit-content dimension when they are mere conduit or medium, and further towards the right-hand end when there is more information or knowledge content.

The rationale for the placement of industries and of product and service classes is essentially the same. The vertical product-service dimension reflects what the enterprise supplies to the market. It can be seen as reflecting the level of customer dependence on, or interaction with, the supplying enterprise in the provision of the network infrastructure that the customer requires. The horizontal conduit-content dimension reflects the extent of information value-added.

The *communication services* quadrant (the upper left-hand quadrant) is divided as shown in Figure A1.1. In the upper left-hand segment basic telephony services; in the upper right-hand segment, value-added telephony services; in the lower left-hand segment, basic carriage and transmission services; and in the lower right-hand segment, leased line, DSL and other public switched data network and connection services.

The *information services* quadrant (the upper right-hand quadrant) is divided as shown in Figure A1.1. In the upper left-hand segment, higher level, network-based services; in the upper right-hand segment, professional services; in the lower left-hand segment, networks and connectivity services; and in the lower right-hand segment, computer and software services.

The *information and communication equipment* quadrant (the lower left-hand quadrant) is divided as shown in Figure A1.1. In the upper left-hand segment, communications equipment; in the upper right-hand segment, computer equipment; in the lower left-hand segment, electronic components and sub-assemblies and a range of other ICT related equipment; and in the lower right-hand segment, audiovisual equipment.

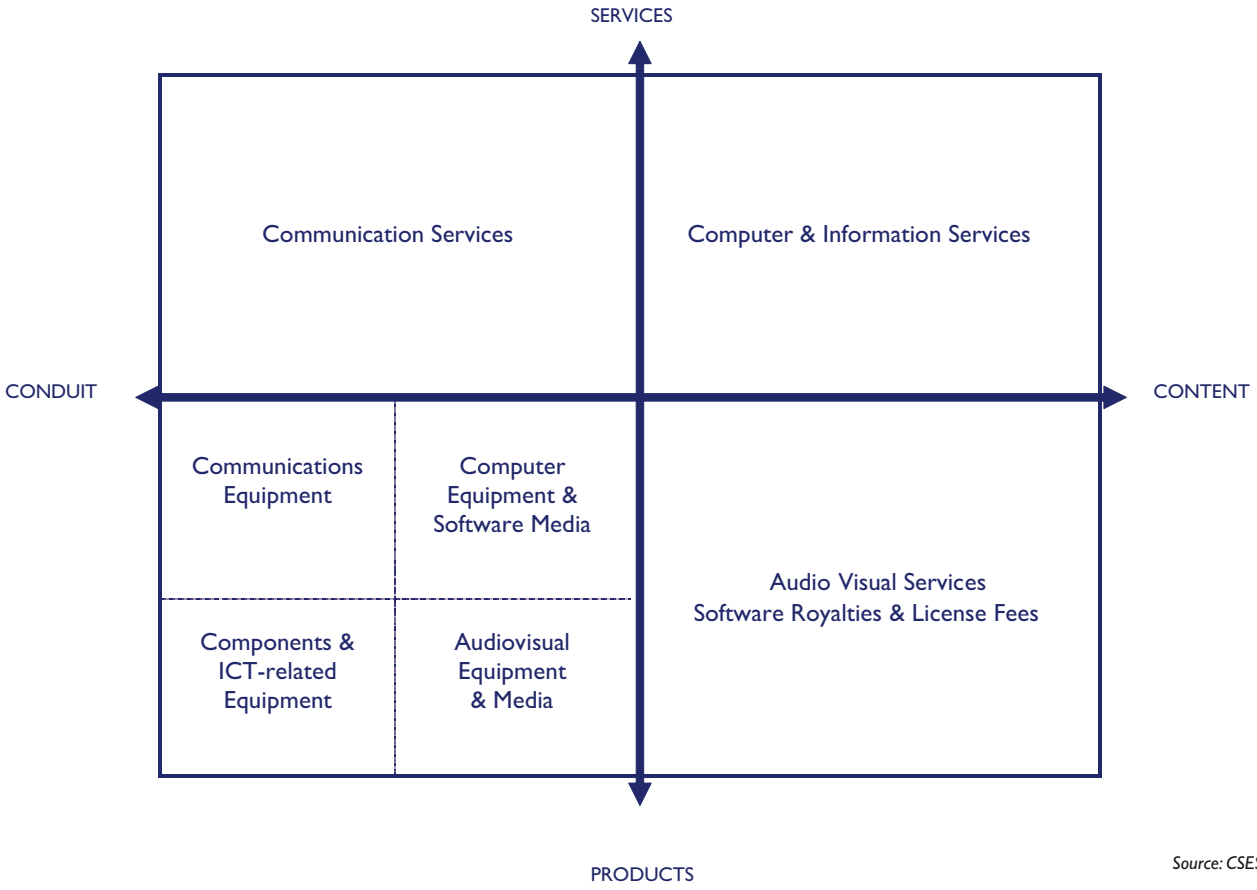
The *content* quadrant (the lower right-hand quadrant) is divided as shown in Figure A1.1. In the upper left-hand segment, network and communication related software; in the upper right-hand segment, packaged software; in the lower left-hand segment, systems software and utilities; and in the lower right-hand segment, network content.

This structured classification builds the picture of information technology depicted in Figure A1.1. It divides ICT into four main *industry* segments – communication services, information services, information and communication equipment, and information products and publications (ie. software and content). Each is, in turn, divided into product/service classes. These classes include, *inter alia*, the *commodity* items listed in Figure A1.1.

ICT Definitions Used

In the body of this report we use this ICT Map as the framework for the presentation of an update on Australia's trade in ICT products and services. Inevitably there is some compromise between the ideal framework for analysis and the availability of data which have been collected using traditional industry and commodity classification systems.

Figure A1.2 Mapping Trade Data Descriptions



Source: CSES.

Figure A1.2 maps the ICT equipment, content and services categories used throughout this report onto the ICT Map framework. They include: communication services (telecommunications, postal and courier); computer services (IT consultancy, data processing and other services) and information services (database, subscription and other services); information and communication equipment (communications, computer and audiovisual equipment, components, other ICT-related equipment and media products); and software and content (audiovisual and related services and software-related royalties and license fees).

Within these groupings internationally agreed definitions of what constitutes ICT goods and services are used. For ICT goods these are outlined in OECD (2003) *A Proposed Classification of ICT Goods*, OECD, Paris. For ICT related services the definitions are outlined in OECD (2004) *Classifying Information and Communication Technology Services*, OECD, Paris. Additional content categories are covered, as outlined above.

Glossary of Terms

ABS	Australian Bureau of Statistics
ACA	Australian Communications Authority
ADP	Automatic Data Processing
AIIA	Australian Information Industries Association
ANZSIC	Australian and New Zealand Standard Industry Classification
ASP	Application Service Provider
ATM	Automatic Teller Machine
AUD	Australian Dollar
BCS	Basic Carriage Services
BERD	Business Expenditure on R&D
CAGR	Compound Annual Growth Rate
Centrex	Enhanced services offered by provider from central exchange
CIF	Cost Insurance Freight
CMP	Cellular Mobile Telephone
COS	Central Office Switch
CPE	Customer Premises Equipment
CRT	Cathode Ray Tube
DASD	Direct Access Storage Device
EDI	Electronic Document Interchange
EDP	Electronic Data Processing
EFT	Electronic Funds Transfer
EFTPOS	Electronic Funds Transfer at Point of Sale
F3	Future Framework
FM	Facilities Management
FOB	Free On Board
GDP	Gross Domestic Product
GERD	Gross Expenditure on R&D
HLS	Higher Level Services
IAP	Internet Access Provider
IC	Integrated Circuit
ICT	Information and Communication Technology
IDC	International Data Corporation
IDD	International Direct Dialling
IO	Input-Output
ISD	International Subscriber Dialling
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunications Union
IVAN	International Value-Added Network
LCD	Liquid Crystal Display
KTS	Key Telephone System
LAN	Local Area Network
MNE	Multinational Enterprise
Modem	Modulator / De-modulator
OSS	Operational Support System
PABX	Private Automatic Branch Exchange
PC	Personal Computer
PCB	Printed Circuit Board
PCS	Personal Communications System
PSDN	Packet Switched Data Network
PSTN	Public Switched Telephone Network
POS	Point of Sale
R&D	Research and Development
SI	Systems Integration
SMEs	Small to Medium Enterprises
SOHO	Small Office / Home Office
SP	Service Provider
STD	Subscriber Trunk Dialling
Svcs	Services
TV	Television
USD	U.S. Dollar
VAN	Value-Added Network
VAS	Value-Added Services
VPN	Virtual Private Network
WAN	Wide Area Network

References

ABS (various years) *Australian National Accounts*, Cat No 5206.0, Canberra.

ABS (various years) *Balance of Payments and International Investment Position*, Australia, Cat No 5320.0, Canberra.

ABS (various years) *Balance of Payments and International Investment Position,* Australia, Cat No 5365.0, Canberra.

ABS (various years) *International Trade in Goods and Services*, Australia, Cat No 5368.0, Canberra.

CIO (2006) *Global Outsourcing Guide* 2006, IDG Communications, Sydney.

Ebenstein, A., Harrison, A., McMillan, M. and Phillips, S. (2009) *Estimating the impact of trade and offshoring on American workers using the current population surveys*, NBER Working Paper 15107, NBER, Cambridge. (Available www.nber.org/papers/w15107).

Framework for the Future Steering Committee (2003) *Enabling Our Future: A framework for the information and communication technology industry*, DCITA, Canberra, p19.

Grewal, B. et al. (2002) *China's future in the knowledge economy: Engaging the new world*, Victoria University and Tsinghua University Press.

Harvey, J. (2008) *Transition: The IBM Story*, Switzer Media & Publishing, Sydney.

Houghton, J.W. (1999) 'Mapping Information Industries and Markets,' *Telecommunication Policy*, 23(10/11), November & December 1999, pp689-700.

Houghton, J.W. (2008) 'ICT Trade and Globalisation of the ICT Sector', in *OECD Information Technology Outlook 2008*, OECD, Paris.

Houghton, J.W., Pucar, M. and Knox, C. (1996) 'Mapping Information Technology,' Futures 28(10) pp1-15.

Houghton, J.W., Pucar, M. and Knox, C. (1996) *Mapping the Information Industries*, Productivity Commission, Canberra, July 1996.

McKinsey Global Institute (2003) *Offshoring: Is It a Win-Win Game?* McKinsey Global Institute, San Francisco, August 2005.

OECD (2003) *A Proposed Classification of ICT Goods*, OECD, Paris.

OECD (2004) *Classifying Information and Communication Technology (ICT) Services,* OECD, Paris.

OECD (2006) *Information Economy – Sector Definitions Based on the International Standard Industry Classification (ISIC 4)*, OECD, Paris.

OECD (2006) *Classifying Information and Communication Technology (ICT) Services,* OECD, Paris.

OECD (2007) *OECD Communications Outlook 2007*, OECD, Paris.

OECD (2008) OECD *Information Technology Outlook 2008*, OECD, Paris.

OECD (2009) *Investing in Innovation for Long-Term Growth*, OECD, Paris.

Pilat, D. and Wolfl, A. (2004) 'ICT Production and ICT Use: What Role in Aggregate Productivity Growth?' in OECD (2004) *The Economic Impact of ICTs: Measurement, Evidence and Implications*, OECD, Paris.

TradeData International (Various years) Trade Data.

UNCTAD (Various years) International Trade Database.

About Centre for Strategic Economic Studies

The Centre focuses on the processes of economic, technological and social change in the contemporary world. It seeks to understand the causes and consequences of these processes, and the appropriate policy responses for different situations.

The Centre has three main activities:

- research on long-term economic, social and technological issues
- commercial activities, including publications, conferences and electronic data services
- postgraduate teaching.

Centre for Strategic Economic Studies
PO Box 14428,
Melbourne City, MC 8001
Australia
www.cfses.com

July 2009 (Version 2.0)
Houghton, John W. and Welsh, Alison.
Australian ICT Trade Update 2009.
ISSN 1447-6576 (Print)
ISSN 1447-6665 (Online)