Centre for Innovative Industry Economic Research Inc.

The Whitehorse Report

ICT Industry Survey and Analysis

July 2007

Centre for Innovative Industry Economic Research Inc.

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About the Centre for Innovative Industries Economic Research Inc

CIIER is an Asia-Pacific Centre, formed to create a facility, repository, and think-tank for consistent, competently researched, up-to-date, and analysed data on employment, markets, revenue streams, R&D, processes and management methods, specifically focussed on high technology, innovative, and emerging industries.

About Whitehorse Strategic Group Ltd.

Whitehorse Strategic Group Ltd. is an Australian owned management consulting practice founded in 1987 with a well established reputation in helping Industry and Government achieve success through strategies designed to maximise existing investments and capture efficiencies from new technologies. The Whitehorse Research Services Division produces the *'Top 250' ICT Industry Research Report*, widely recognised as the leading creditable indicator of trends in the Australian ICT industry, and conducts detailed analysis and reporting on Information Technology, and Reports on other high technology industries. Whitehorse principals specialise in the areas of ICT Market Research, eGovernment policy and strategy, Business Process Management, and Economic and Community Development.

Statistical Panel

Centre for Innovative Industry Economic Research Inc. **Australian ICT**	**July 2007**	**Trend**
Total ICT workers in Australia	**514,000**	Continuing steady growth, starting to accelerate
Employees in ICT Industry	**266,530**	Steady continued growth, State and sectoral variations
Revenue of ICT Industry	**$78.9 Billion**	Continued growth, sectoral variations
R&D of ICT Industry (T250 only)	**$613 Million**	Long term sustained decline, now on slightly improving plateau

Introduction

It is well recognised that the ICT industry in Australia is a key productivity enabler for other industries, but direct ICT employment, both in total and relative to other industries, shows that the ICT industry is also a major employer.
By the broadest definition, ICT employment accounts for nearly 5.5% of total Full Time Equivalent (FTE) employment in Australia, more than many other Australian industry sectors, including Mining; Electricity, Gas and Water supply; Banking and Finance; and TV, Radio, Media.
The ICT industry is also a significant source of export revenue, and accounts for nearly 80% of ICT R&D performed in this country.
This Summary has been prepared to give an overview of the current state of the Australian ICT industry, as of July 2007, based upon the Whitehorse Top 250 survey and methodology (T250), and other statistical sources.
Individual tailored reports by State and Industry sector are also available.

Variation in themes

Each of our six monthly reports is different, as particular themes become the focus of interest. The thematic structures have, until 2006, been predominately dictated by the wishes of the Government agencies commissioning the report. The last three reports have been produced without this constraint, and so they have reflected the statistically significant data emerging, and we have gradually broadened the report focus to include more emphasis on the important and under-researched area of employment skill-sets demand and on the development of more accurate and statistically justifiable skills demand forecasting.

Research background

The conduct of a research task such as this cannot take place effectively without the support and freely given time of many people. The consultants wish to thank all of the individuals and companies who assisted us by providing the data upon which the analysis is primarily based.

Research Support

This research has also been greatly assisted by the helpful cooperation of industry bodies, especially the Australian Information Industry Association (AIIA), and Software Queensland, both of which bodies have circulated the Survey questions to their members and encouraged participation. In recognition of this support, copies of our report and other data are made freely available to ICT industry bodies to assist them in their work.

The work is also supported by the partners of Whitehorse Strategic Group Ltd, who have generously provided access to the valuable intellectual property that has formed the basis of the CIIER models, and to gratis research time and effort of Whitehorse staff to collect and process Survey data.

Those Whitehorse Partners are:

David Goble	Richard Hogg
Ian Wells	Ana Govan
David Dennis	Ian Dennis
Phil Kowalski	

Survey and Analysis Process

The primary mechanism that is used to provide the data for this Report is a detailed survey of ICT companies in Australia, known as the 'Whitehorse Top 250'. The methodology employed includes a questionnaire both mailed and emailed out to respondents and direct verification telephone contact with a significant proportion of the survey base. The survey is supplemented by web-searches, press reports, Annual Reports, and other public sources of data.

The Whitehorse "Top 250" database contains detailed data for the last six years on now over 790 operating companies with 137,000 staff, $79 billion in revenue and over $600 million in R&D expenditure. Historical data is also kept on companies which have been acquired, merged, or closed during this period, leading to a database with over 1000 company entries.

The current data, gathered in May/June 2007, represents approximately 53% of total current industry employment and 92% of total current industry revenues in the ICT industry in Australia.

From this data, a series of industry models are developed in a consistent and statistically verified structure. These models allow for the estimation of National and State industry sectoral totals for a number of measures, and for comparison and trend analysis to be performed.

Structure of our Reports

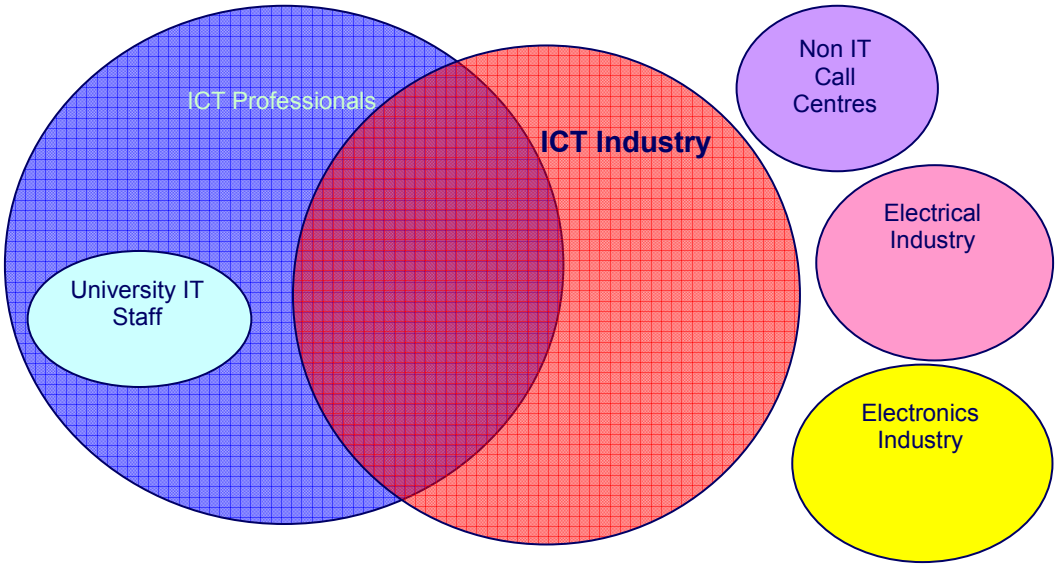
The Report level of our Reports varies, with data able to be presented in National Summary form, for particular States, or particular industry groupings.
Each of our periodic reports is also different, as the range of data that could be analysed is too much for any one report, and different priorities for concentration may be requested by the recipients, or indicated by the data. Where there is little variation from previous series data, the amount of detailed investigation is diminished as the content of previous reports on the subject matter will tend to apply. Some data may also be analysed at a national or a cross-sectoral level only, as the data density may not justify conclusions made for particular States, or for particular industry sectors or other groupings.

CIIER "ICT Worker" Model

One of the significant difficulties in understanding ICT in Australia is the frequent confusion between analysis of the ICT work-force in labour market terms (e.g. what job the individual performs), and analysing the ICT work-force in Industry terms (e.g. what kind of organisation the individual worked for).

ICT broad employment occurs in a number of groupings. These include:

- the providers of ICT goods and services (usually called the ICT industry).
- the purchasers and users of ICT goods and services including the government and private sectors who also employ a large number of specialists to help them apply their ICT purchases.
- the trainers, teachers and researchers into ICT who generally (but not always) operate within the universities and colleges.
- people who provide technical support to ICT, but who might, more properly, be categorised as electrical or electronics specialists
- people working in call-centres, or in desk-top publishing and graphics design



This "bubble" diagram illustrates some of these elements.

There is a significant percentage of ICT professionals in the ICT industry, but ICT industry employment includes not only those professionals but also many ICT non-professional technical, sales, logistical and administrative staff.

The "ICT Industry"

The term "ICT Industry" is also often used in the press, or by other commentators, for a confusing range of different things, ranging from the "tight" definition of companies solely concerned with the provision of ICT products and services, but that includes companies with major units supplying ICT good and services, through a "looser" definition that may include retail ICT, that may include call centres that are mainly parts of other industries (e.g. banking), that may include significant sections of the electronics industries, and of

other professional services (e.g. management consultants and, historically, accountants), to a "broad" definition that can include anyone working on ICT related matters in any industry.

We consider that the "broad" definition is best described by the term "ICT Worker", whereas the term "ICT Industry" is better reserved for the "tight" definition above, as defined by the Australian Bureau of Statistics [1], but perhaps "loosened" to embrace the other ICT goods and services covered by the more globally accepted OECD (2003 and 2004) definition, in order that international comparisons be made more meaningfully.[2]

It should be noted that these internationally agreed definitions are not followed by the Australian Bureau of Statistics, which recently stated that:

*"The Working Party on Indicators for the Information Society convened by the OECD has produced a draft 'Classification of ICT Goods' and is working on a classification of ICT services. The ABS had significant input into this work and the classification used by the ABS**... is broadly consistent with, but not identical to** the OECD classification as far as it relates to goods. **The OECD definition included a broader range of goods than the Australian definition**. The Australian definition only includes ICT goods if they are able to be networked or are components of goods that can be networked. It also excludes a range of medical, scientific and audio visual equipment".[3] (emphasis added).*

Obviously, where "goods" are excluded, so are the workers who produce, market, and distribute them, consequently **a more narrow definition of the goods and services involved in ICT necessarily also understates the commensurate employment and revenues involved, and thus the relative "size" and significance of the industry concerned**.

Whilst these overlaps and distinctions have been known for some time, to date there has not been an attempt to reconcile, and, more importantly, to quantify, the various components within a single employment model.

The diagram here illustrates a Model, developed by CIIER and Whitehorse, which allows us finally to reconcile these differences, regardless of the employment and classification paradigm selected, and to calculate the relative proportion of ICT employment that makes up the Australian ICT employment structure, by both Labour market and industry sector measures.

Perhaps as significantly, the Model also demonstrates the significant 65% overlap between ICT industry employment (using the "tight" ABS definition), and ICT professionals and technical staff employed across all industries, thus underscoring the common interests of ICT trade and professional bodies in Australian ICT industry development. (CIIER and Whitehorse include communications and engineering professional and technical staff within this definition of ICT professionals and technical staff)

[1] ABS 8126-0
[2] A Proposed Classification of ICT goods, OECD, Paris, 2003; Classifying Information and Communication Technology services, OECD, Paris, 2004
[3] ABS (2006) *ICT Satellite Account: Australia*, Cat No 5259.0, Canberra, p33.

This new model also allows us to model ICT technical and professional employment, and therefore potential work-force demand, by industry sector. This can help in analysing, and quantifying skills needs, since each industry has some more specific ICT skill-sets among the more generic needs of every industry.

The impact upon "Satellite" accounts of this approach is also significant. The ABS initial, and experimental, ICT satellite account[4] uses a very "tight" definition, both of ICT employment, in which it only includes 3 job groupings rather than the more usual 10-13, and in its definition of ICT production, where it seems to leave out software products produced by the Australian ICT industry, and draws a number of other definitional conclusions that tend, in our estimation, to understate production..

This leads to the ABS ICT Satellite account conclusion that ICT employment (as defined at around **235,000** persons in 2002-3) was then around **2.5%** of the total Australian employed.

However, using the broader definitions above, "ICT workers" amounted to over 500,000 persons in December 2005, or closer to 5.5% of total employed, a 120% larger contribution!

Broadening the definition for this satellite account, in accordance with the international norms above, would therefore also increase the perceived contribution of ICT to the national economy.

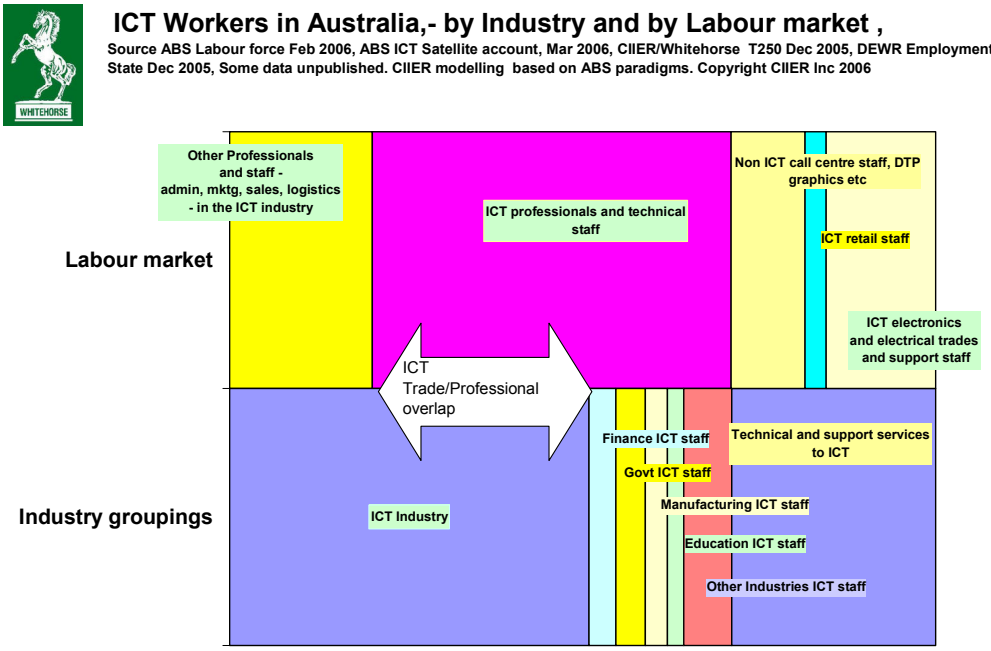
An increase from the, to some, already startling 4.6% contribution to GDP indicated by the ABS ICT Satellite Account report to an even more startling conclusion, might sway more conventional economists into truly recognising the economic significance of ICT, and its impact upon the Australian economy.

It is also pleasing to note that ABS have recently broadened their definitions, although not totally to the OECD model, and that new published information will comply with the new standard.

National and State based models

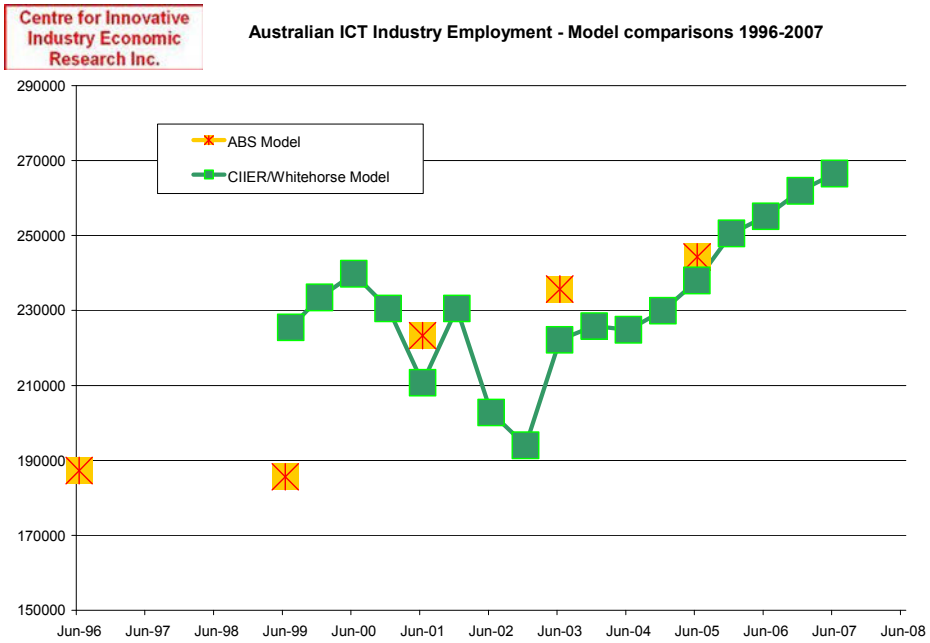
Models have now been built, both for the Australian work-force, and for specific States. The paradigms have been constructed for the January-December 2006 period, as some of the necessary data-sets are not yet available for later periods. The Models are, however, constructed in such a way that later data can be systematically added, thus allowing for time-series analysis to be developed.

[4] ABS 5259.0 2002-3



Frequency of survey and analysis

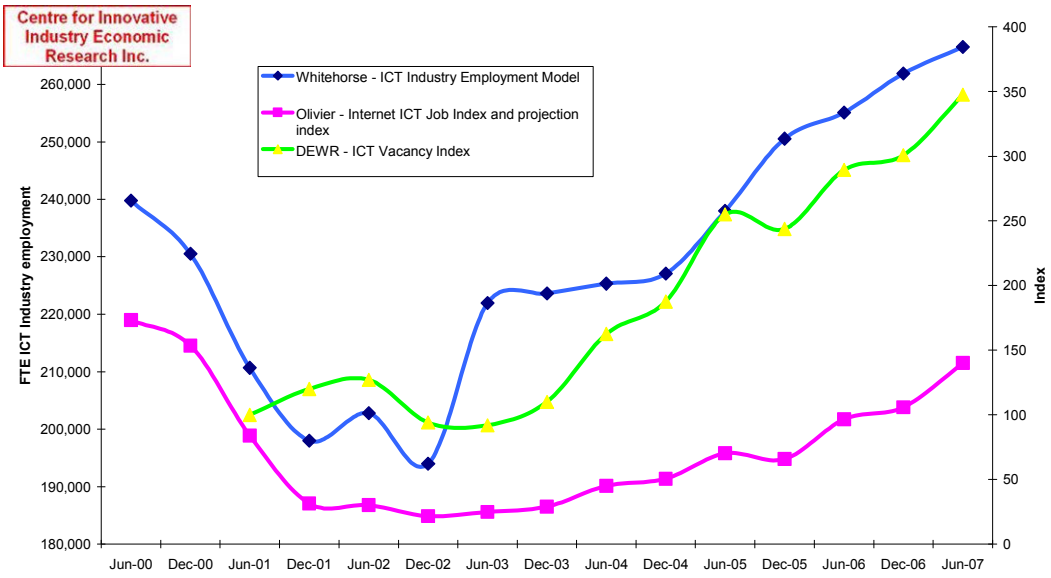
The chart below shows ABS and CIIER/Whitehorse published estimates of ICT industry employment. (In a number of cases ABS original estimates were later amended, the later data has been used in all cases)

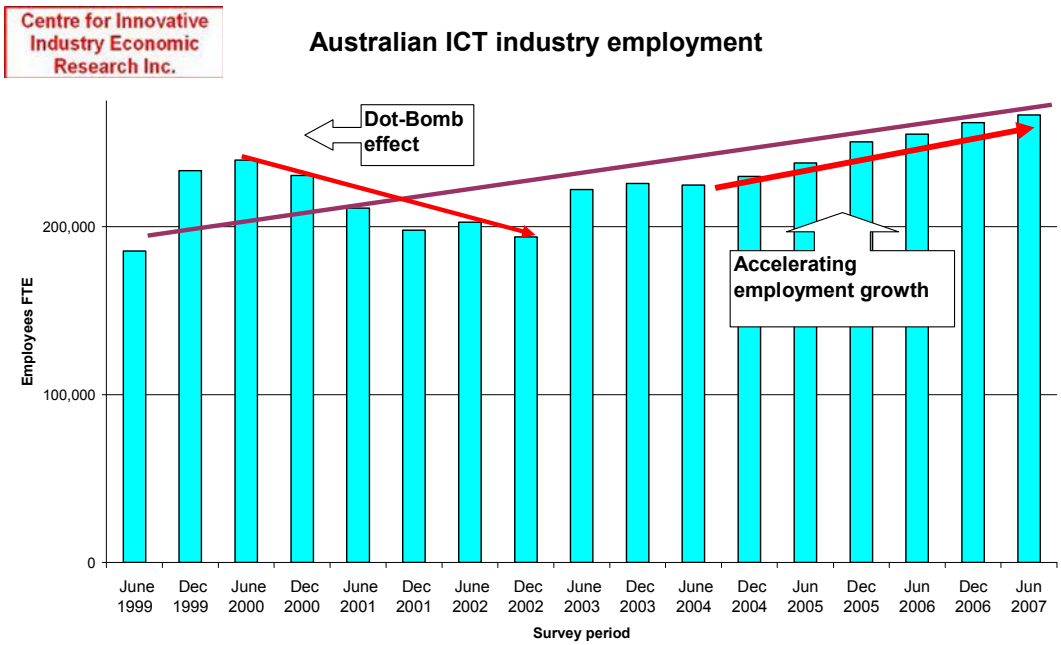


The ABS data, based upon an average three year gap between models, indicates steady ICT industry employment growth from 1999 through to 2005, however the CIIER/Whitehorse six-monthly data shows a far more volatile picture, charting outsourcing driven industry growth in 2000-2001, and both the “dot-bomb” employment reductions in 2001-2, the very swift recovery back to the old employment base in 2003-4, and the continued growth since then.

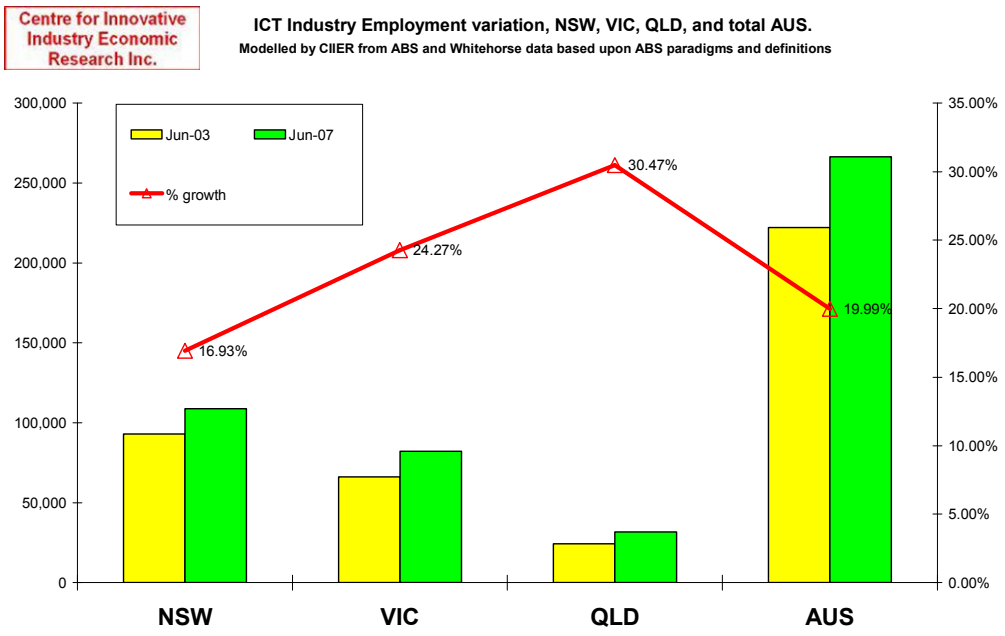
ICT Industry Employment

Employment Model

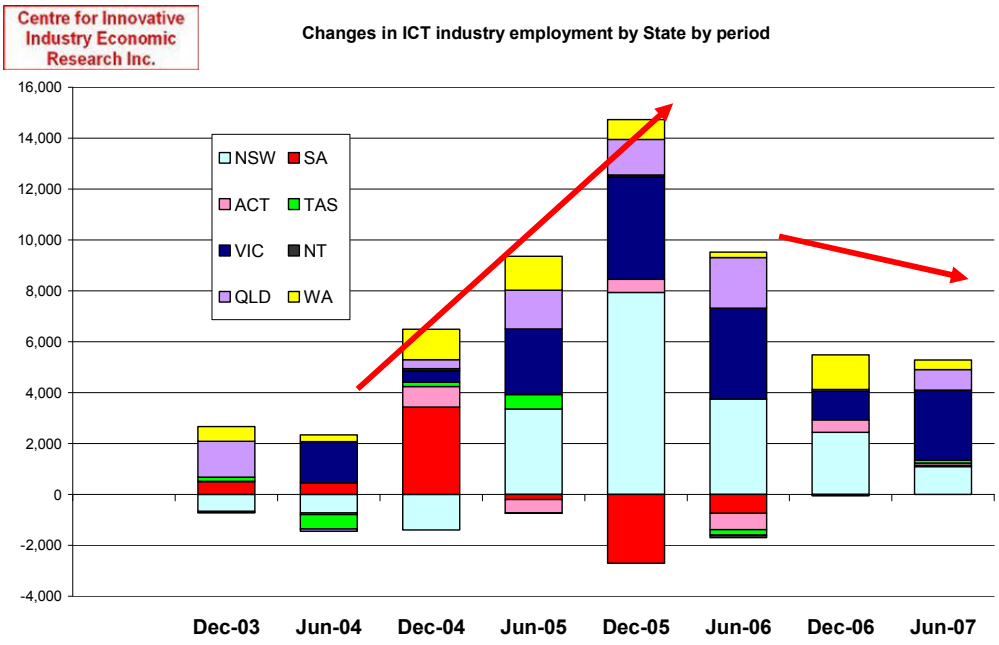




There is now steady growth in the national ICT industry employment trend, and it is also now above the previous high of January 2000. The rate of actual employment increase has slowed in the last three Surveys, mainly due to flat telecommunications employment, but the latest Olivier and DEWR index movements suggest that we are about to enter a higher paced employment growth period again.

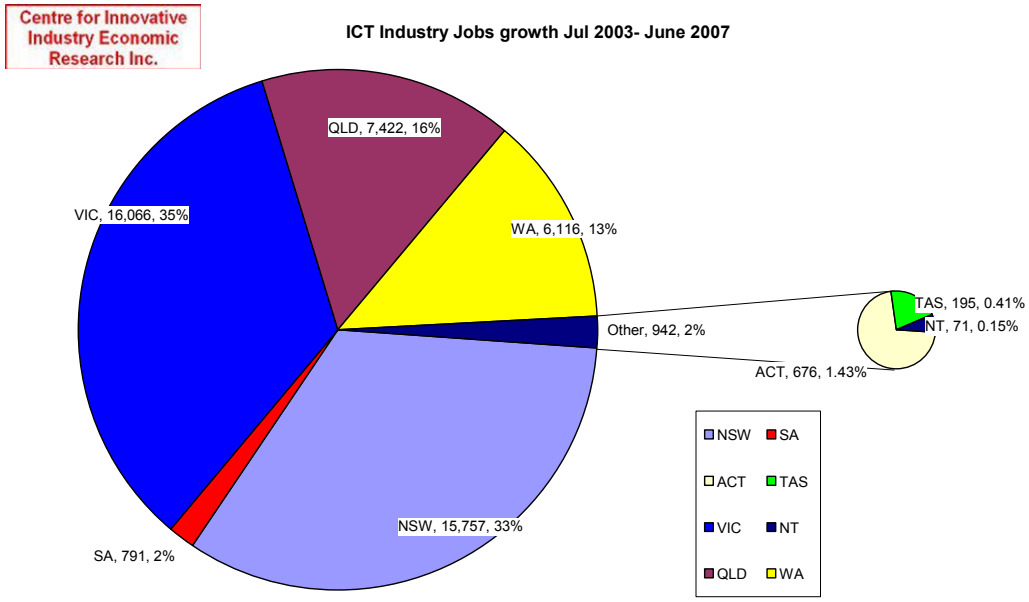


ICT industry jobs growth, however, varies significantly between the States. Percentile growth since June 2003 has been highest in WA, Qld, and ACT, well above average in Victoria, average in Tasmania, and a little below in NT, whilst SA has flat ICT industry employment. Actual jobs, however, have risen most in Victoria and NSW, outstripping even the "mining" States.



Employment volatility in the last six months has been most significant in Victoria and Queensland. WA jobs growth has slowed, suggesting a plateau has finally been reached in

mining industry driven ICT jobs growth. The reduction of national volatility since June 2006 has been continued, indicating a more stable, but still growing, environment.



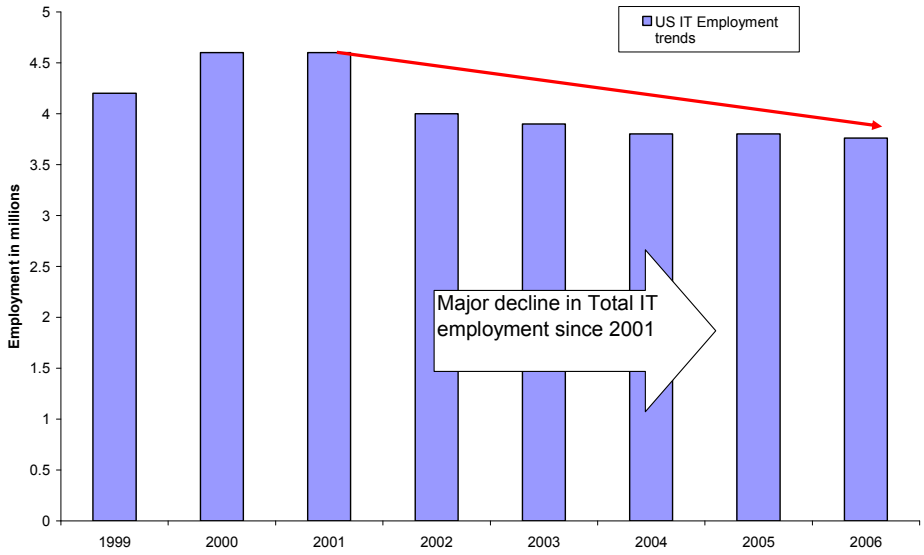
The % shown is that States contribution to national ICT industry employment growth, e.g. Queensland has contributed 16% of all national ICT industry jobs growth over the last 4 years. Such contribution needs to take into account the percentage of national jobs that the State concerned provides, e.g. approximately 40% of all ICT industry employees are located in NSW, so any contribution to employment growth in that State that is below 40% means that the State concerned is losing “market share”.

How does Australian ICT employment compare to the US and UK?

It is interesting to look at Australian ICT industry employment in comparison to that of the two countries from which we traditionally draw industry paradigms. There are two main reasons why this is useful. The first reason is the constant presumption by many in Government, and some in industry, that the "world's best practice" equates to whatever they do in London or New York, so we should learn from them, the second reason is the frequent presumption by the media that whatever happens in the US happens, or will happen, here.

Neither presumption is, of course, true.

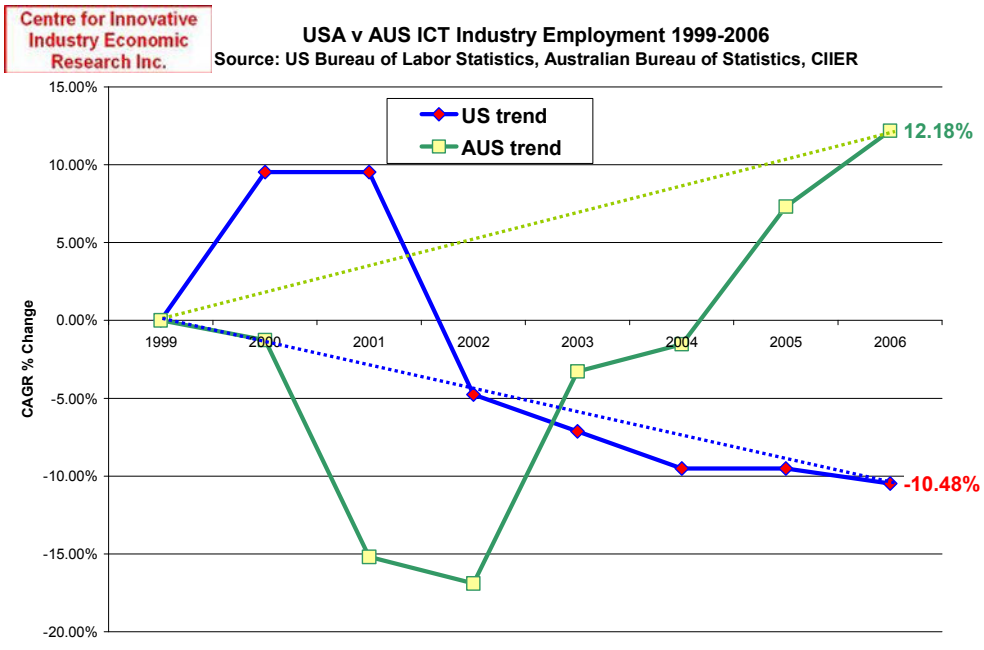
US IT Employment trend (Source US Bureau of Labor Statistics)



In the USA, contrary to the Australian trend already indicated, there has been a continued decline in ICT employment since 2000.

The charts following analyse these differences, both in trend terms and in the long-term 12% percentage employment growth of the Australian ICT industry, compared to the 11% decline in that of our American counterpart. These differences have occurred despite the global fluctuations on both of us caused by Y2K, the dot-com boom, the dot-bomb bust, the "panacea" surge of outsourcing and the impacts of offshoring.

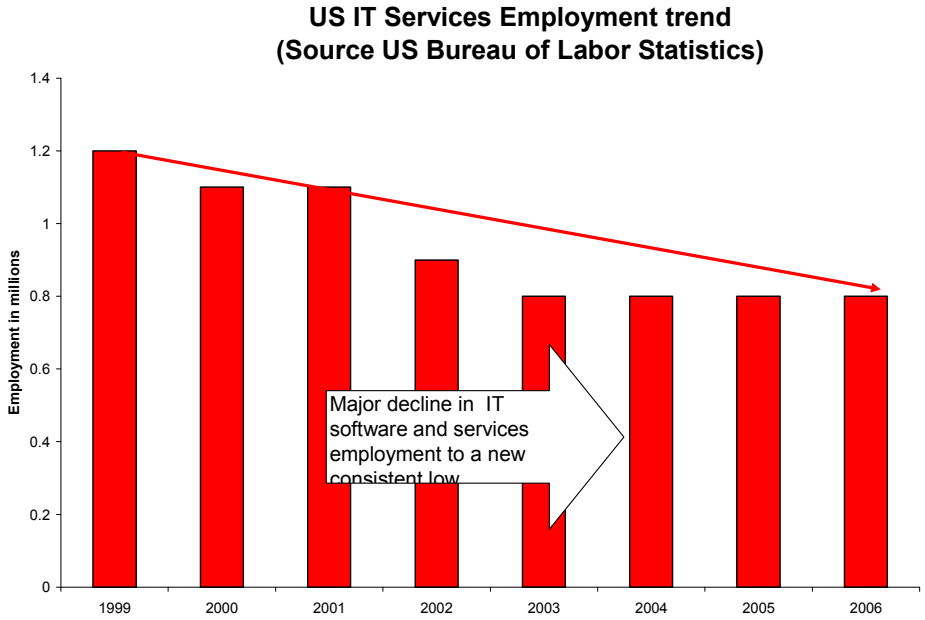
This analysis suggests that it might be counterproductive for Governments to continue seeking positive industry development paradigms from this source. Perhaps US States should be asking Australians how to do it better – rather than the reverse.



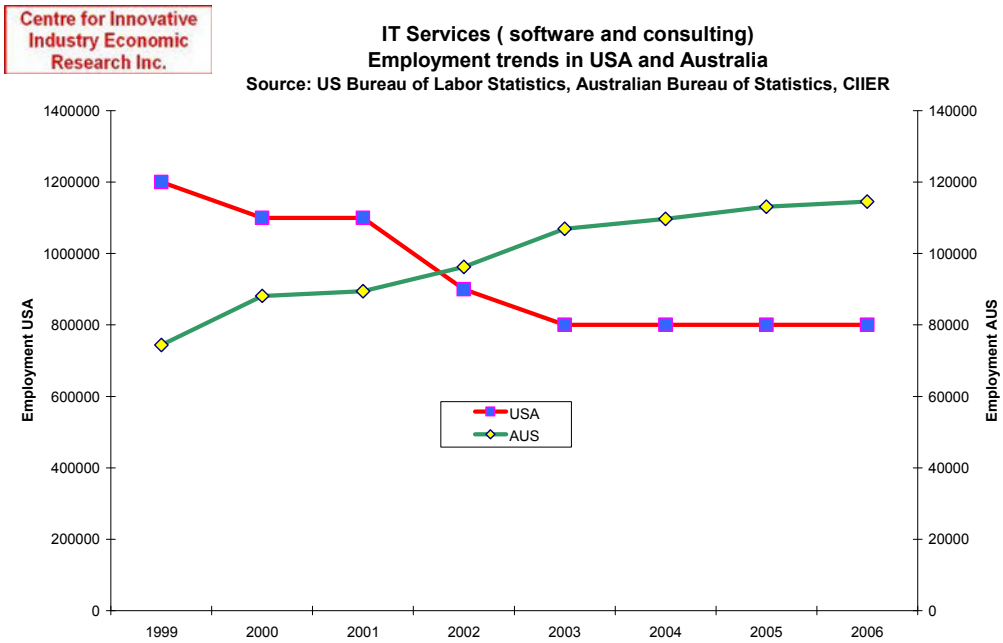
Software and services trend

The differences between the US and Australian paradigms become even more stark when we bear in mind that a large component of the US IT industry is still found in hardware manufacture, which is a comparatively small part of the Australian ICT industry.

In the USA, IT services (consulting software etc) is only around 21% of total IT (excluding telecommunications) employment, and is declining. The equivalent figure in Australia is nearly 59%, and growing.

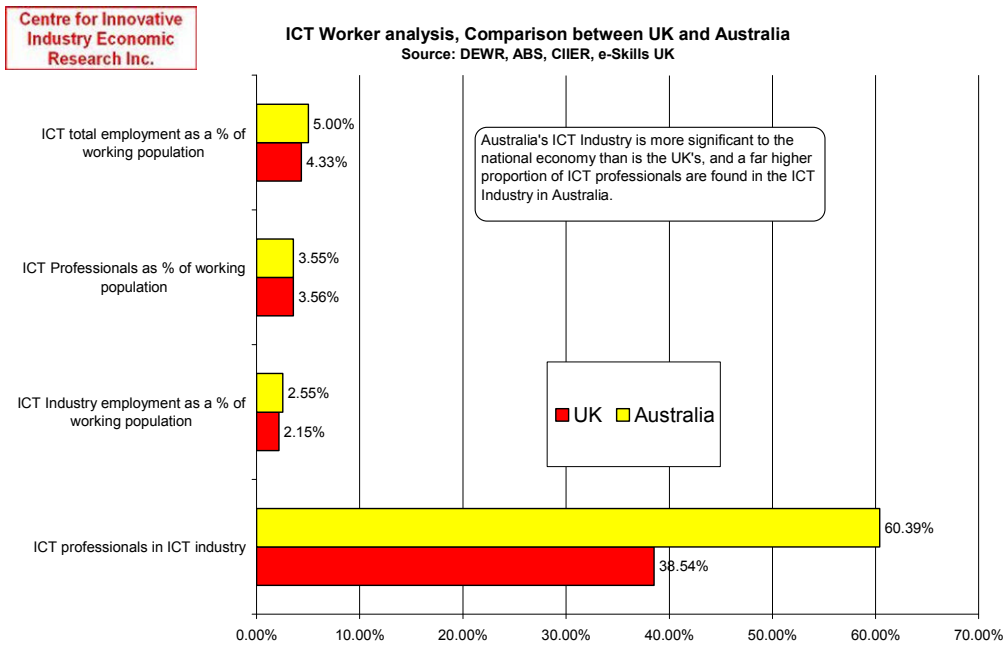


This variation is shown even more definitively by comparing the “shape” of US v AUS IT services employment on a two scale chart at 1:10 ratio between the US (LHS) and Australia (RHS).



The US data shows a steady decline, to a flat continuing trend, whilst Australian equivalent IT services employment has continued to grow over the same long-term period.

Unfortunately, CIIER does not have a time series for the UK data, but we do have access to the current e-Skills UK employment models, so can develop comparisons to the equivalent Australian data.



As can clearly be seen from this chart, many of the comparators are very similar between the UK and Australian paradigms, although Australian ICT has mostly slightly higher ICT densities, with the strong exception of the ratio of ICT professionals to total ICT employment, for which Australia is significantly higher.

We believe that this difference is mainly due to the already noted higher proportion of software and service employment in the Australian mix, compared to higher levels of routine and often lesser qualified manufacturing employment in other countries.

It is highly likely, therefore, that a similar variation would apply to comparison to the US ICT employment paradigm.

Elsewhere in the World - Japan

“Wanted: 90,000 programmers
Skyrocketing demand for software leading to shortage of engineers to write it”

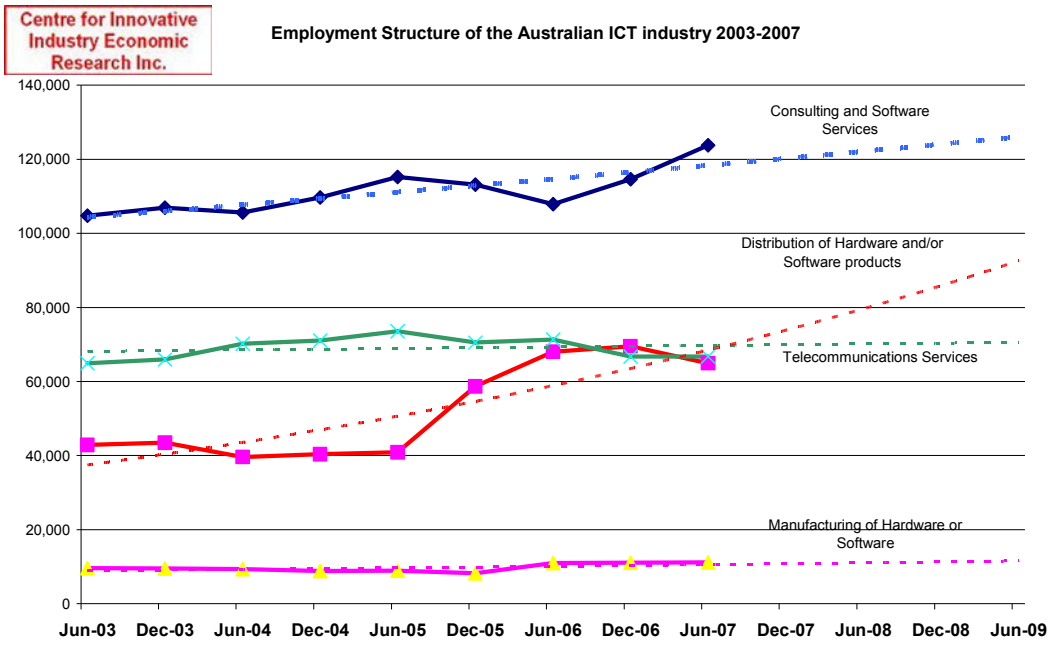
“From cell phones to flat-panel TVs, digital home appliances are making rapid technological advances. In fact, advances are coming so fast that there are not nearly enough software developers to keep up with the demand for new control software, companies say.
The amount of software that requires development, be it for picture processing or transmission controls, has skyrocketed in recent years.
Companies are engaged in a frantic search for skilled workers in this field; some estimates say the industry is short about 90,000 engineers. With software-related problems also on the rise, fears that these issues will stunt the growth of the market

have reached crisis levels, prompting industry players to tie up to improve efficiency in software development.
One reason for the shortage of software engineers is the sheer amount of software that needs to be written for all varieties of digital appliances. For 70% of the development cost of a cell phone. The software that goes into one type of cell phone is comparable to the basic system of a local bank, said a director of a domestic software company." (Nikkei Weekly June 18 2007)

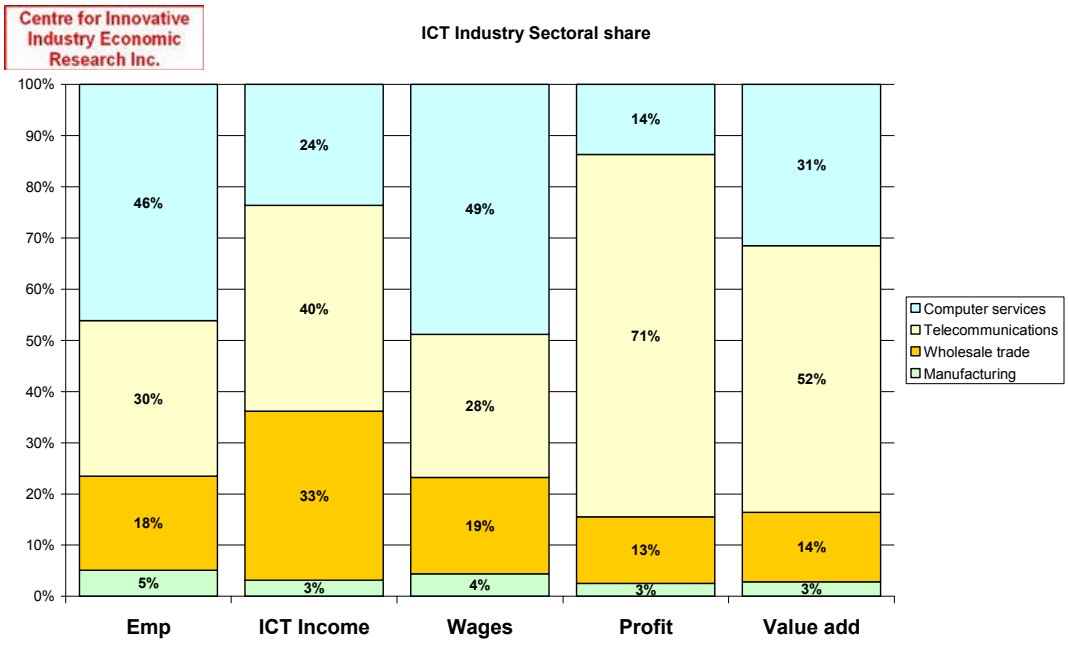
Changes in ICT employment structure

Whilst there have been significant changes in ICT industry employment by location, there have been significant changes in the composition of the structure of the ICT industry as well.

This graph shows both the impact of those changes by industry sector, and the effect if the current trend continues. Of most import is the continuing flat to downward trend in telecommunications employment, which, whilst it is offset in total terms by growth in other industry sectors, tends to include quite specific skill-sets that are not shared with other sectors. The recent rises in the distribution sector also seem to have flattened and declined in the last two surveys, whilst consulting, software and services employment continues to grow even more strongly than predicted.



These changes not only impact upon gross employment and sectoral significance, but also on demand for particular skills in the future.



In this context, it is also useful to consider the difference in economic impacts of growth or contraction in particular ICT industry sectors. The graph above shows the significant economic disparity in economic "plusses and minuses" for the individual sectors. (For consistency, the calculations are based upon the latest ABS originated data from 2005-6, and thus vary in some percentages from more current data).

According to ABS, Computer and software services, for example, employs around 46% of all ICT industry staff, pays 49% of all ICT industry wages, contributes 31% of all ICT industry "gross value add" (GDP less allowances for taxes and charges) but only receives 14% of all ICT industry profits.

Distributors, with much the same profit share, contribute less than half of the GVA, employment and wages of the software and services sector, and the telecommunications sector is by far the most profitable, whilst also contributing strongly to GVA.

To maximise economic benefit to Australia, those industry sectors which provide the highest levels of employment, exports, and GVA, are obviously those to which the majority of industry development support should be provided.

ICT Industry Employment Skills demand

The issue: How many people do we need?

ICT Skills-related reports produced so far by government and industry stakeholders have mainly addressed qualitative issues or focussed on one-off, snap-shots of employment and skills. They do not answer the key question:

"**How many ICT people will we need in 5-10-15 years time, what skills will they require, and what are our projections of the employment shortfall or over supply, based on current settings, that we will need to deal with?**"

Answering this question would assist Governments to adjust skilled migration targets, educators to structure their courses, IT recruiters to identify targets, and ICT employers to feel some certainty that they will be able to access the skilled staff that they require and grow their businesses in the future.

Modelling ICT skills demand

This requires detailed employment modelling that takes into account industry and support employment growth/contraction, current positions and trends, age demographics, morbidity statistics, University, TAFE and VET completions, and skilled migration trends; and creates a range of growth scenarios for forward planning purposes.
CIIER have established the ICT Skills Demand Quantification Project, in order to build such a model, drawing on the best available public and private data, and on the developed expertise in industry and demographic modelling within the CIIER group of consultants.

The aim of the project

This is not a one-off demand forecast. The central aim of this project is to develop and refine a model that can be used over time to produce rolling forecasts.
Such a model could evolve over time as it is developed and refined.
We will test the model on existing data, using historical data to project, via the model, to the present, and then validate it against the known position.
The model will be developed as a national model, structured so that state and/or industry sector versions could also be derived. Phase I of the project would focus on the development of a basic national (or single state) model, and Phase II on its development and refinement.

Elements of the model

The principal elements of such a model include:

- The collection and analysis of a wide range of data on historical and forecast trends relating to: GDP and GSP; economy wide markets and industries, employment and occupations; training commencements, completions and graduations; inward and outward skilled migration trends; labour productivity trends; gender and age demographics at the national and state levels, as well as developing an understanding of the potential implications of globalisation and trade in such areas as offshoring IT and IT-enabled business services;
- The development and formalization of a model capable of embracing and reflecting the many trends in the above data, reconciling the numerous unconnected nomenclatures and data structures, converting both current and historical data into comparable formats ; and

- The building, formalization, testing, validation and further development and refinement of the model.
-

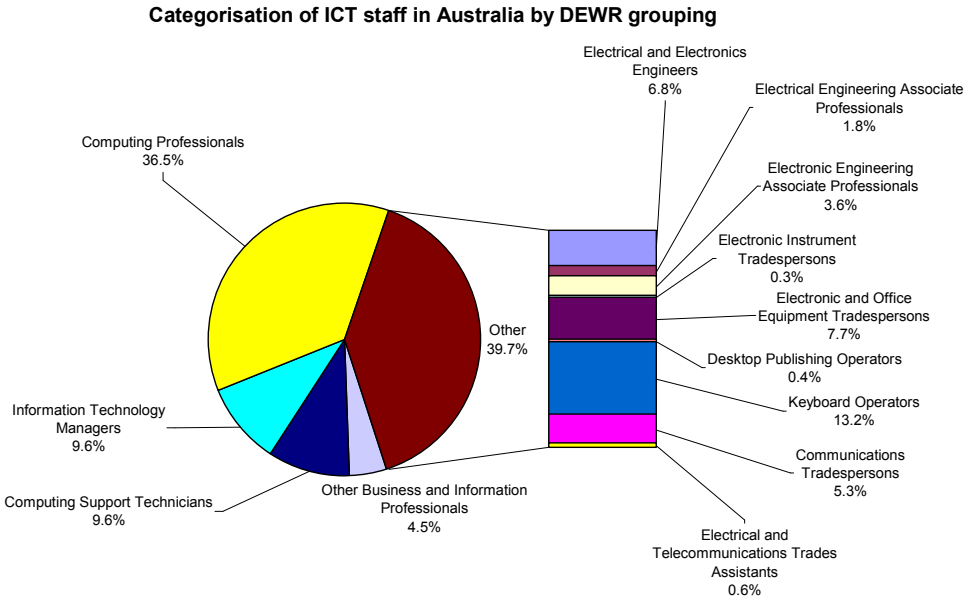
Capabilities required

The development of such a model demands a range of capabilities, not the least of which being a very good understanding of national, state, industry and occupation statistics and data sources, as these will provide the essential basis for modelling. The CIIER group is defined above all else by its strength in and focus on the collection and analysis of economic and social statistics.

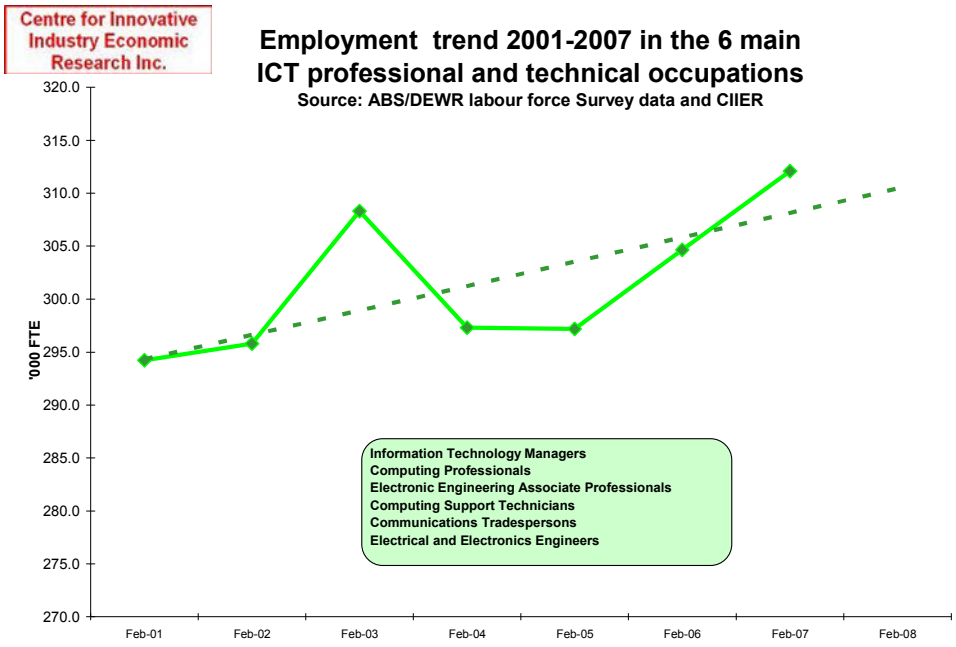
A second area of necessary expertise is in the development and formalization of such a model, and CIIER consultants bring experience in the use of input-output (IO) models for Australia and Victoria – with the use an IO approach to estimating the impacts of growth in one industry on other industries that are its suppliers and customers being an obvious area of the refinement of the model. We have also used "gravity models" to explore the clustered nature of IO impacts – which might also be useful for state level analysis.

A third requirement is a good understanding of globalisation, international trade and investment trends, in order to understand how globalisation and the off-shoring versus on-shoring of services might play out, and knowledge of relevant work on these issues, such as the OECD work on estimating the type and number of jobs exposed to off-shoring.

What do we know now



When evaluating skills demand, it is useful to look first at the relative significance of particular skill-sets. This chart shows the March 2006 DEWR grouping of ICT worker categories (using a "broad" definition, across all industries in Australia showing that nearly half are categorised as either "Computer professionals", or "IT managers".



As can be seen from the chart above, Australian ICT employment in the key ICT professional and technical occupations across all industries is very similar to that within the ICT industries, - in a period of continued growth.

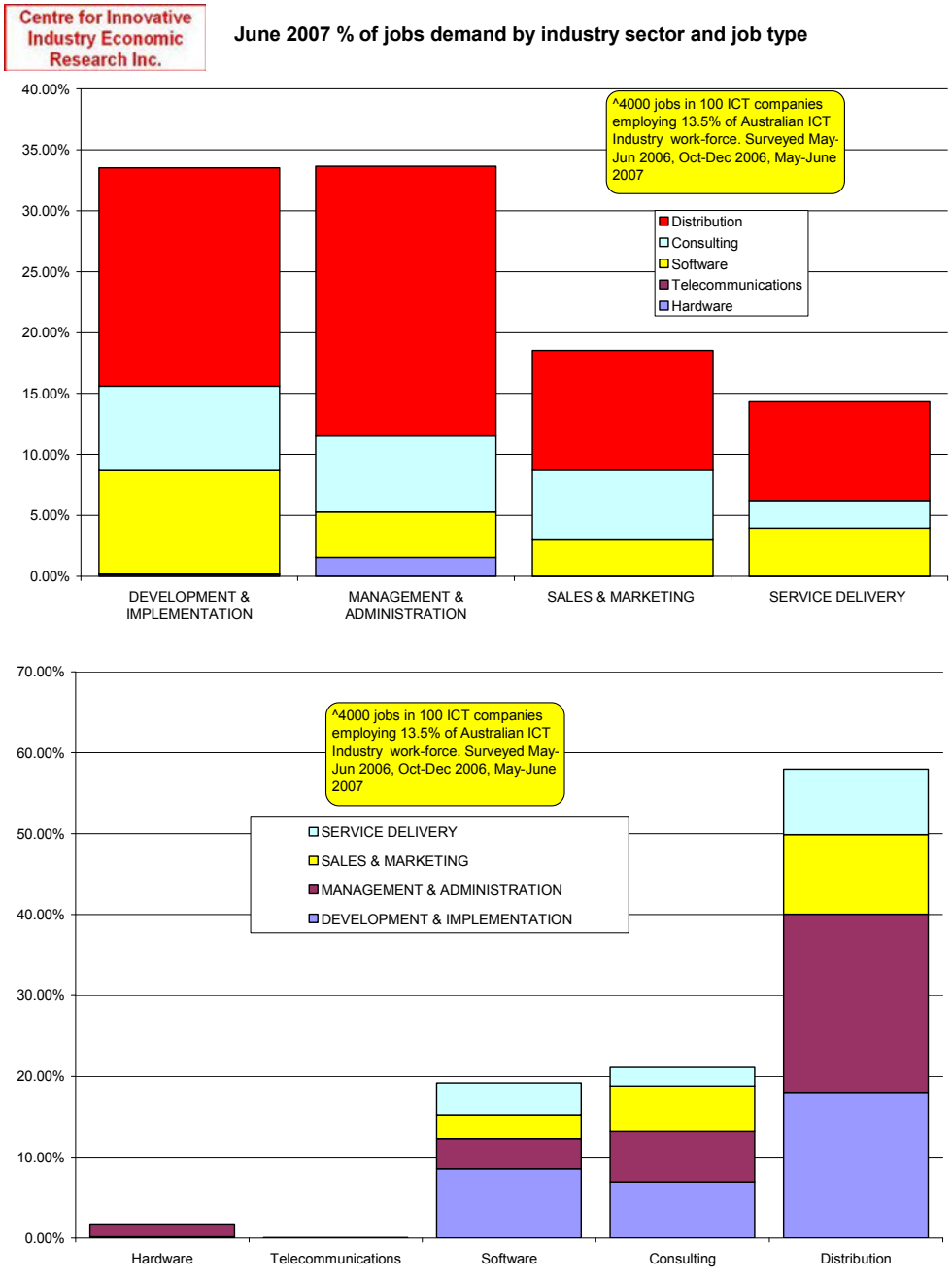
For the purpose of the analysis below, ICT skills have been categorised into a standardised structure, developed originally for the ICT Skills Snapshot project, but since applied to a number of other ICT labour market studies by CIIER and others.

ANZCO compatibility

CIIER has commenced a “mapping” exercise to establish correlation between the model we have developed and the new ANZSCO ICT employment model, and is in the process of converting all of our current and historical data and structures to the new ANZSCO format. This will enable historical and trend analysis to continue under the new structure.

Skill Category	Subcategory	Skill designation
Development & implementatio	Human factors	Documentation
	Installation & integration	Systems installation/decommissioning
		Systems integration
	Systems development	Analyst Programmer
		Business analysis
		Data analysis
		Database design
		Media and Content
		Programming/software development
		Systems design
		Systems ergonomics/design
		Systems testing
		Technical authority
Management & administratior	Project management	Programme management
		Project management
		Project office
	Quality management	Compliance
		Quality assurance
		Quality management
	Resource management	Asset management
		Education & training management
		ICT management
		IS co-ordination
		Service delivery management
		Systems development management
	Supply management	Contract management
		Procurement
Sales & marketing	Sales and marketing	Account management
		Marketing
		Sales support
		Selling
Service delivery	Education and training	Education & training delivery
		Training materials creation
	Engineering	Communications & network engineer
		Hardware engineer
		Systems engineer
	Infrastructure	Capacity management
		Configuration management
		Network control
		Security administration
	Operation	Application & system support
		Database administration
		ICT operations
		Service level control
	User support	Network administration & support
		Other
		User support
Strategy & planning	Business/IS strategy and planning	Business process improvement
		Business risk management
		IS strategy & planning
	Information management Advice	Consultancy
		Information resource management
		Technical specialism
	Technical strategy and planning	Business continuity planning
		Change control
		Emerging technology monitoring
		Methods and tools
		Network planning
		Systems architecture

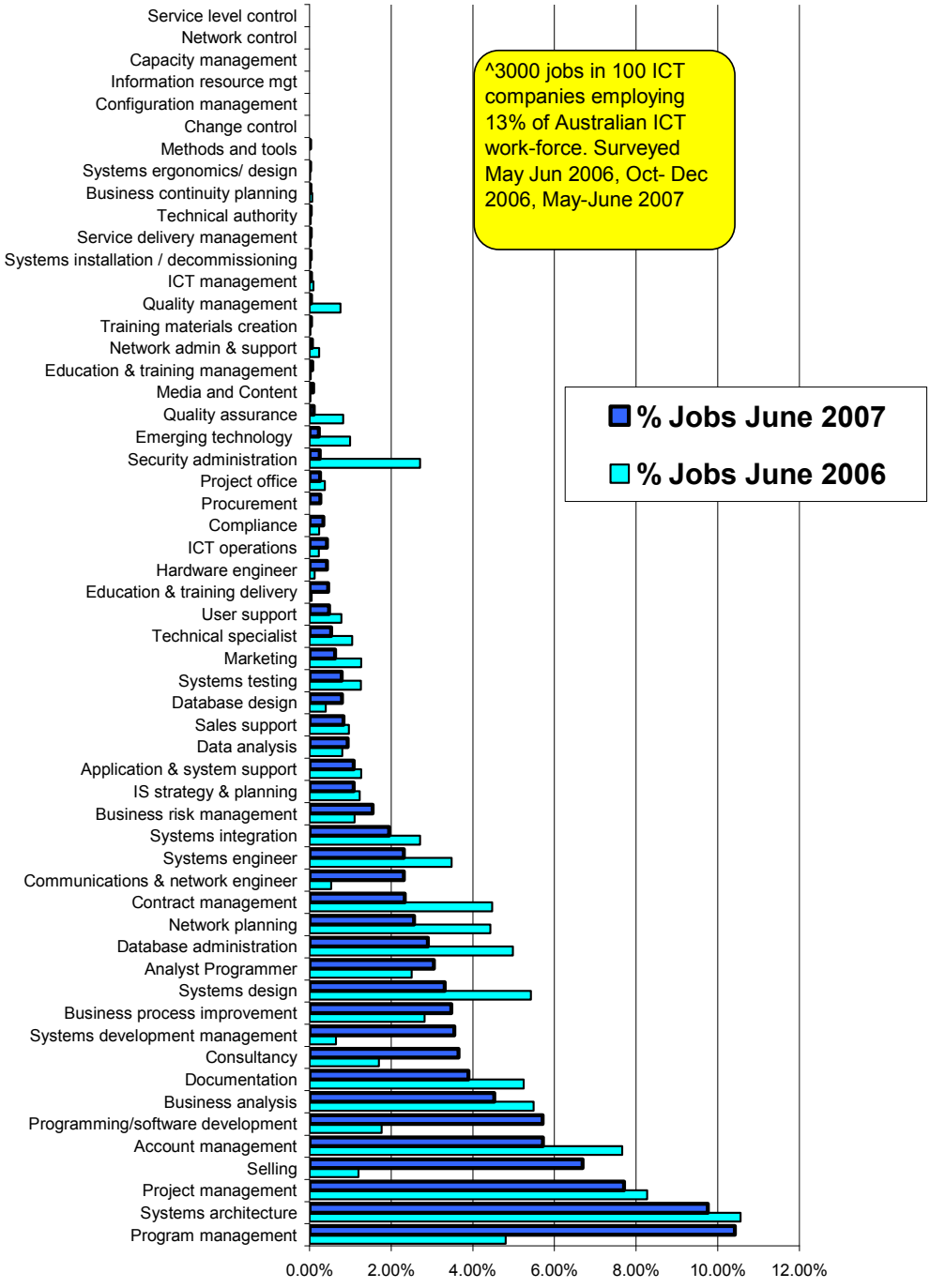
This orientation to management and professional requirements noted in the DEWR pie-chart is reinforced in the "Skills-set sought" analysis shown here, in which ICT industry T250 respondents were asked to indicate what skills etc were in demand for them.



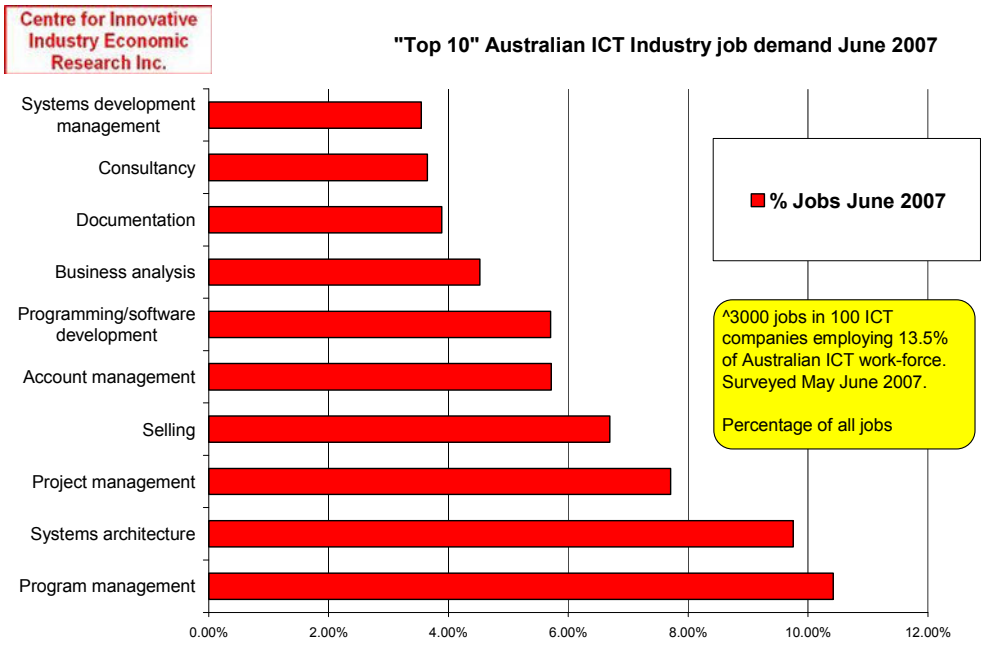
This data was then analysed individually for each company, and based upon the size of each company's work-force and turnover ratios, an estimated "vacancies" calculation was made. It is interesting that "development and implementation" jobs and "strategy and planning" jobs well outpace "service delivery".

Centre for Innovative Industry Economic Research Inc.

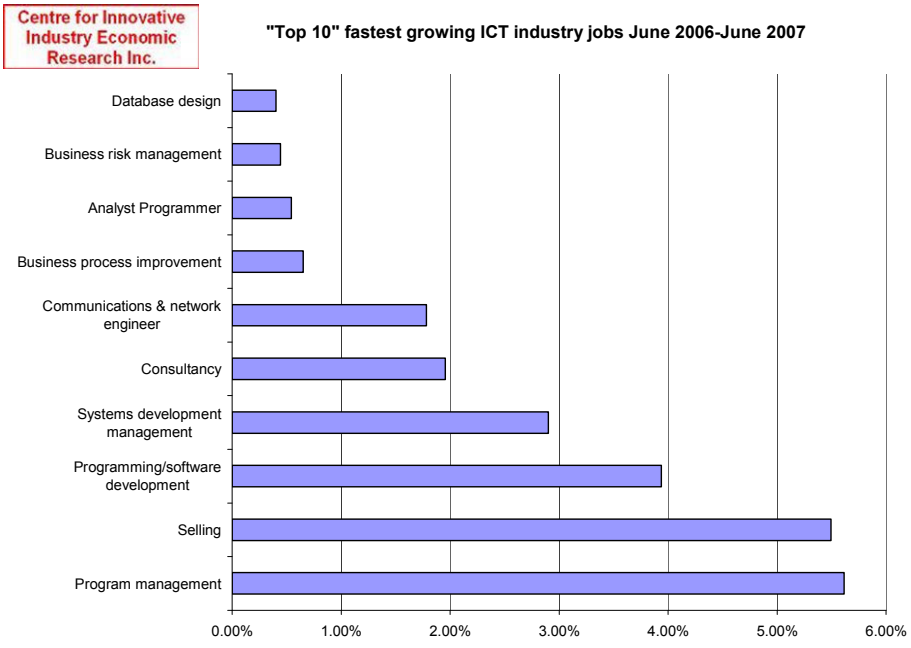
ICT Industry skills demand - skills jobs as percentage of total jobs June 2006 and June 2007



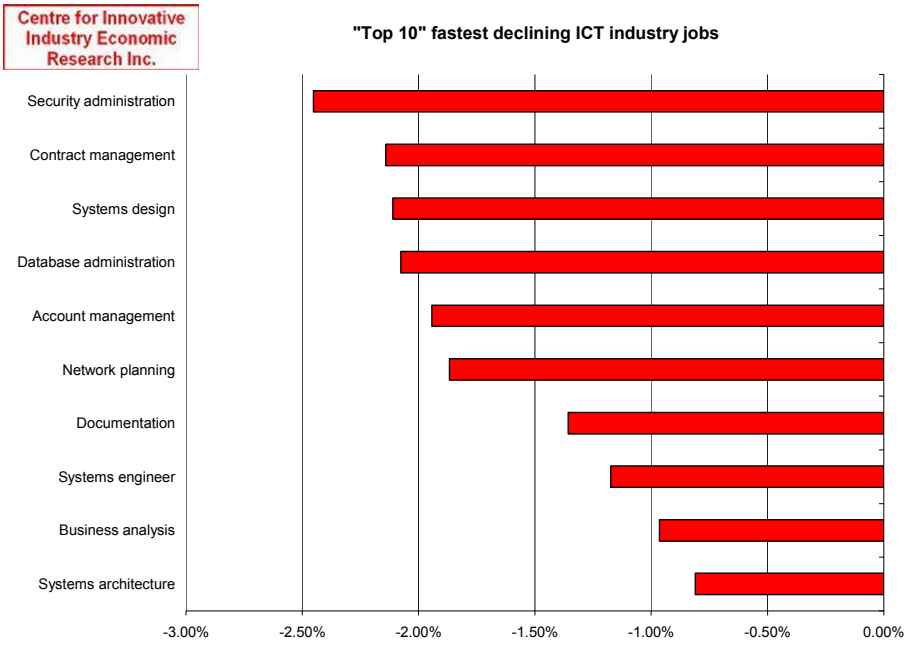
The detailed data shows that, even in a short six-month timeframe, demand can change significantly for particular skill-sets.



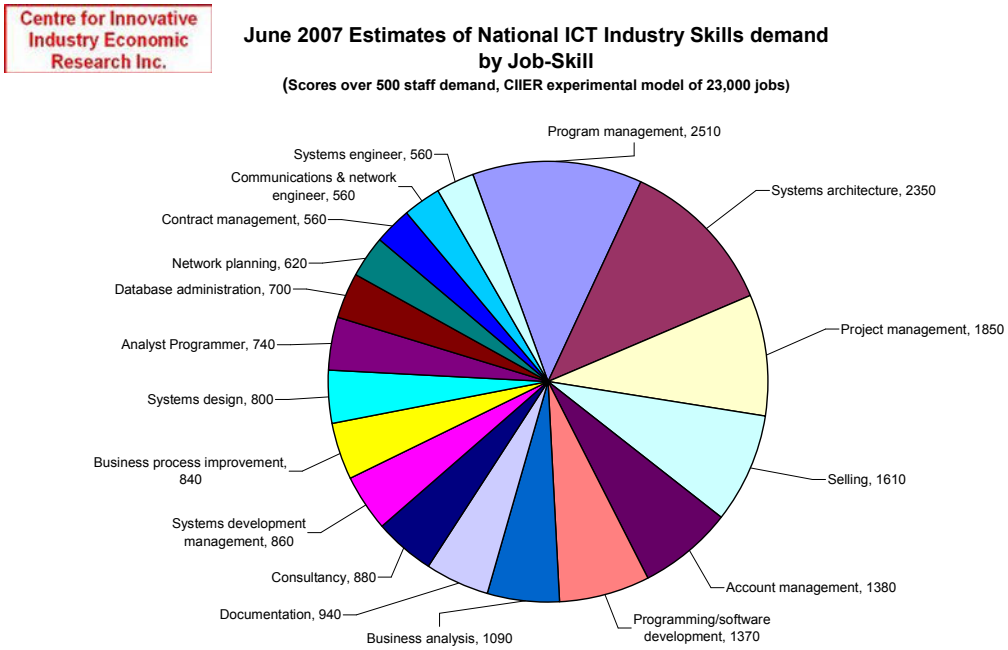
The chart above shows the current "Top 10" job-skills in demand. We note that some of these groups have, however, lessened in demand since earlier Surveys, whilst others, outside this list are growing more quickly.



It is also important to note that those growing are growing much faster than those declining!



ICT Skills demand quantification



The data above represents the first outcome of the new experimental model of skills forecast projections outlined above. It is based, at this point, solely upon the ICT industry data taken from the December and June T250 Surveys, but still represents up-to-date input from over 100 companies employing over 13% of the total Australian ICT work-force in all States and Territories. There are, based upon standard turnover ratios, approximately

4,000 sample jobs, extrapolating to 23,000 jobs across the industry, represented in this analysis.

Net ICT industry job growth over the year concerned is, of course less than this, (around 12,000), but it must be remembered that skills demand is a “gross” requirement, i.e. it must also supply replacement staff for those leaving, and cover for jobs movement between companies. We are advised that the gross/net ratio in the ICT industry is about 2.3 to 1 at the moment, so the size of the sample can be considered statistically indicative.

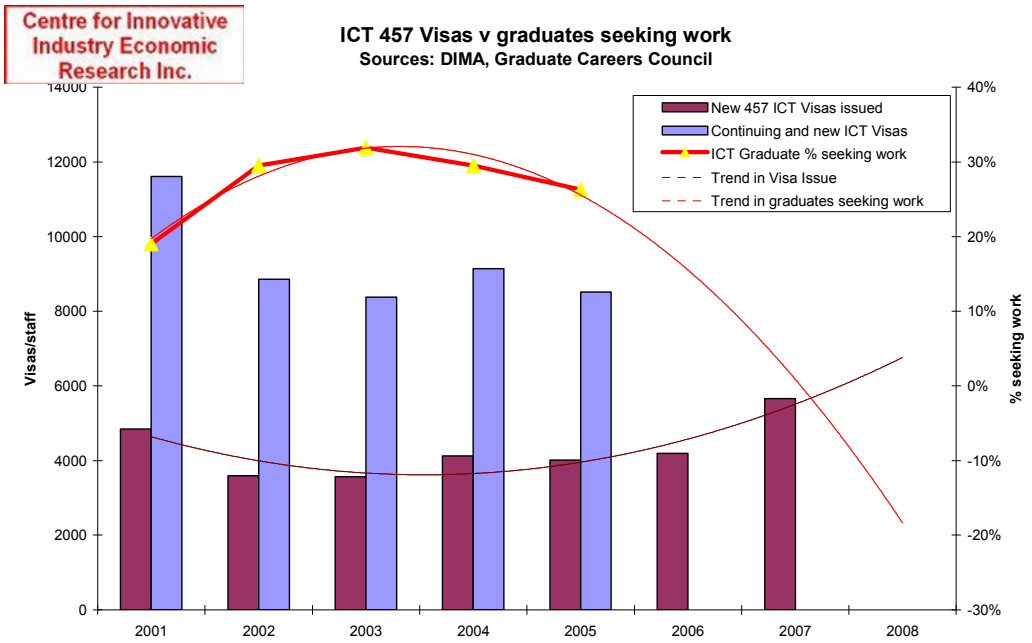
On the basis of this analysis, the model projects the gross demand for particular ICT skill-sets, based upon the SFIA/CIIER definitions. It’s most useful application is in placing some indicative upper limits on the quantification of some of the more significant job-skills, and thus helping to identify those that might be over-supplied, or under-supplied, by either ICT courses at Universities and TAFES, or from other sources, e.g. migration or private sector training.

Naturally not all of the projected 1850 project management jobs, for example, will be filled by new graduates, but a percentage of such jobs could be, and we need to now evaluate, for each job-skill, what those relative percentages might be.

One guarantee, however, is that the graduate share of new jobs will not be more than 100%, so where Universities are producing more graduates in a job-skill than the total demand, we can be sure that those graduates are unlikely to find work in that particular job-skill.

CIIER has proposed the further development and refining of this important model to Government and other stakeholders. The Australian Computer Society and some Universities have already indicated their strong support.

Another use of this research would be to ensure that temporary visas are more likely to be applied to areas of real skills needs, rather than to areas of skill that are already able to be supplied locally.



The evidence above suggests that, as ICT 457 Visas have increased, graduates seeking work have declined. Whilst this might indicate that the graduates concerned are gaining work more quickly, the gross drop in overall ICT graduations has been far more stark than the reduction in graduates seeking work shows, creating a vicious spiral of reinforcing decline.

- Graduates can't get work (possibly because they are inappropriately skilled),

- so less enrolments are made next year,

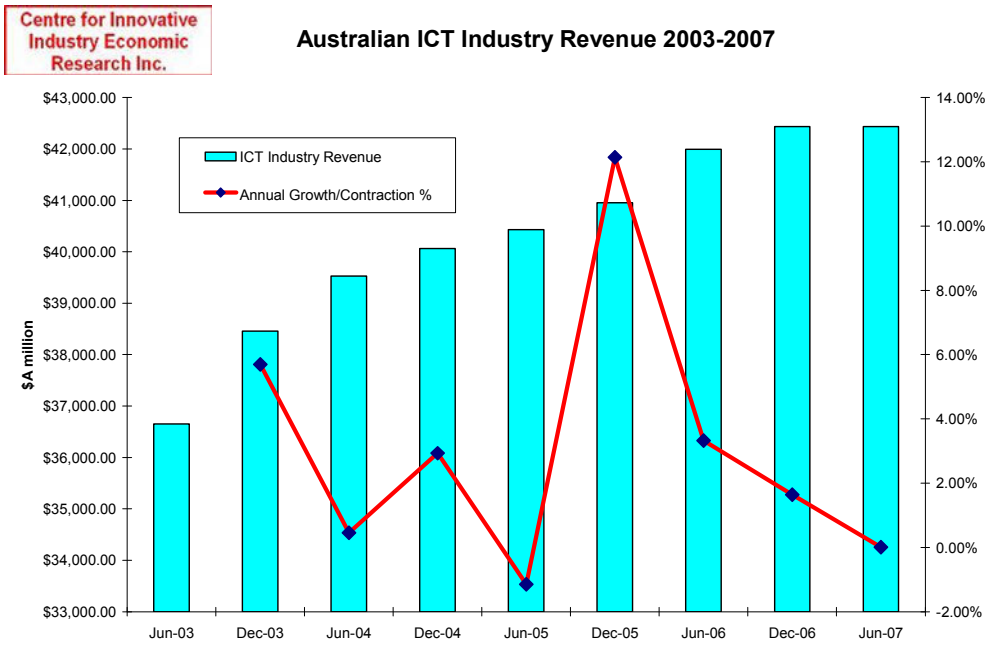
- this means less people graduate in the next cycle,

- this means more visas are needed,

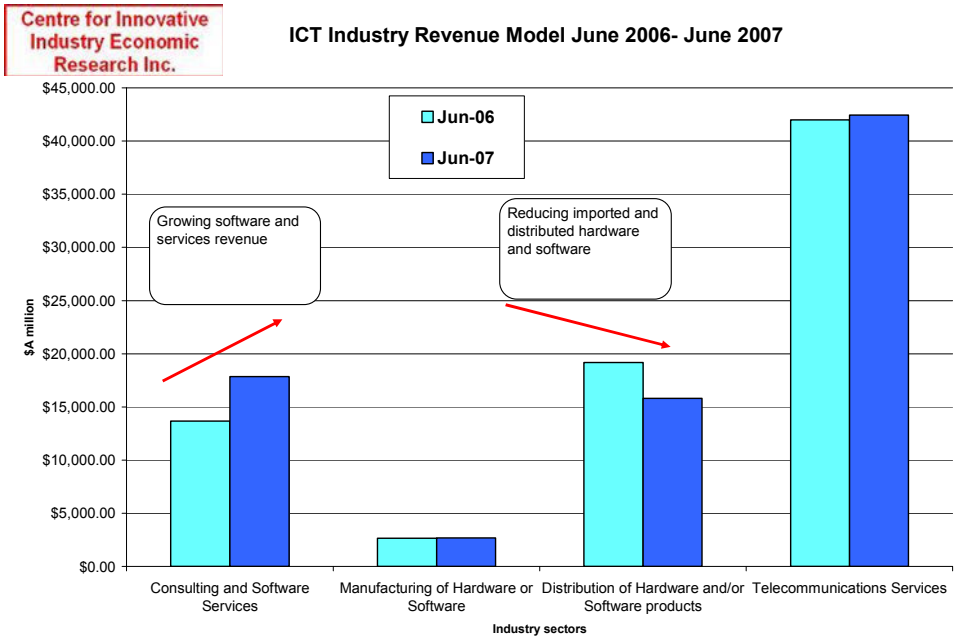
- so there is less work for the new graduates,

- so Graduates can't get work.

ICT Industry revenue



Australian ICT industry revenue held firm in the last six months to nearly $Billion 80, but with a slowing rate of growth.



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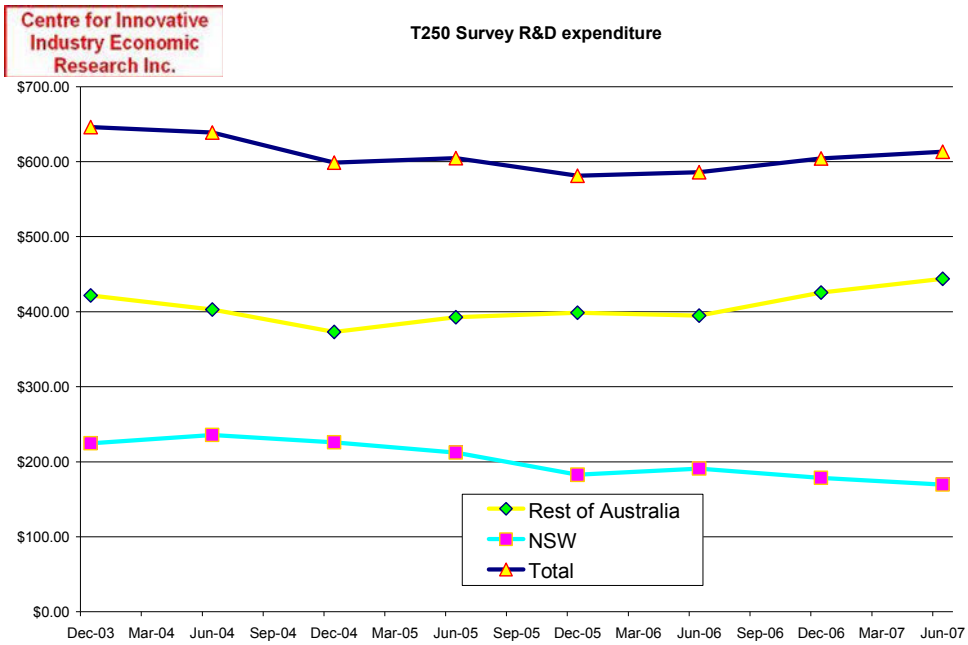
Industry sector revenue grew at different rates, however, indicating variations continuing to take place in the mix of “goods” v “services”
Variations in growth in ICT industry revenue accompanied by changes in the number of staff employed per $million earned, can indicate higher or lower profitability, based upon higher productivity levels, or continued employment restructure.

The cumulative percentile impact of these changes since June 2003 shows that the greatest changes have occurred in distribution companies (importers and wholesalers), whilst manufacturing has continued to decline.

This trend and its implications were analysed in more detail in our Dec 2006 report. For further information contact us at mailto:admin@whitehorsestrategic.com

ICT Industry research and development



After an extended period of decline to 2004, followed by a very flat national ICT industry trend to June 2006, the trend in Total R&D has continued the lift indicated in the last Survey – led by the smaller States.

The strong presence of NICTA in NSW has still not translated into a counter-trend lift in that State, which has declined again in ICT industry R&D spend since last survey.

Victorian ICT R&D has also declined, now back to 2005 levels, despite that State continuing to have a higher percentage of ICT industry R&D than its employment share, and also despite a lift in Victorian telecommunications R&D after three years of decline.

ICT Industry Development

Alliances, Barriers, Grants and support

Markets, Exports

These analyses were dealt with extensively in December 2005. For further information contact us at mailto:admin@whitehorsestrategic.com.

ICT Industry Female Employment

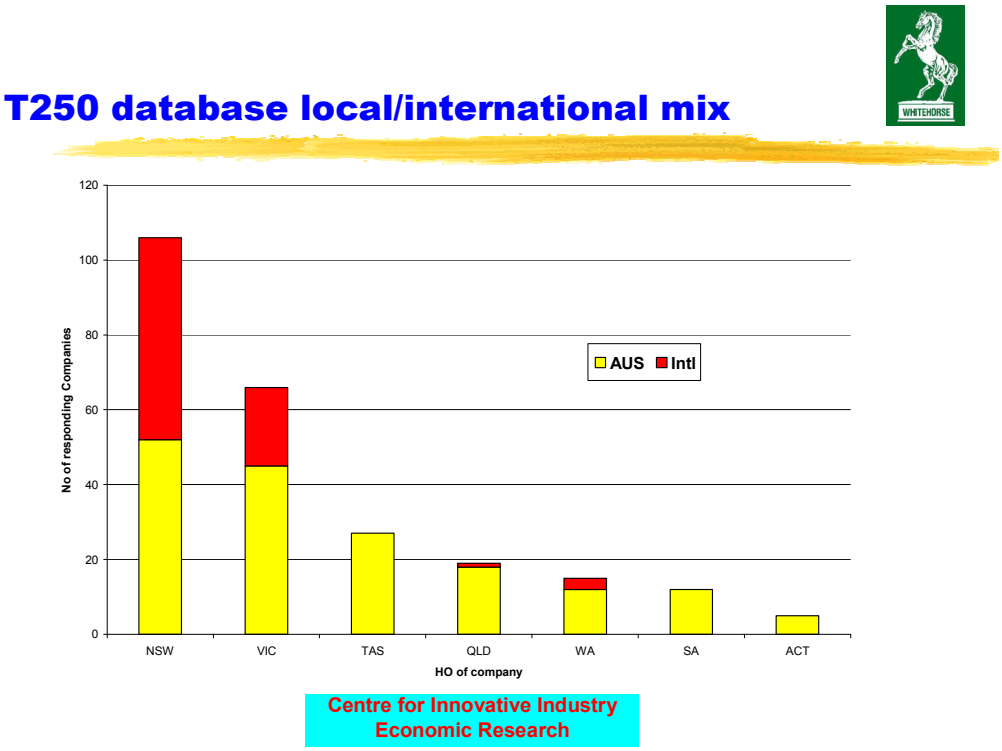
This analysis was dealt with extensively in June 2006. For further information contact us at mailto:admin@whitehorsestrategic.com

ICT Industry Demography

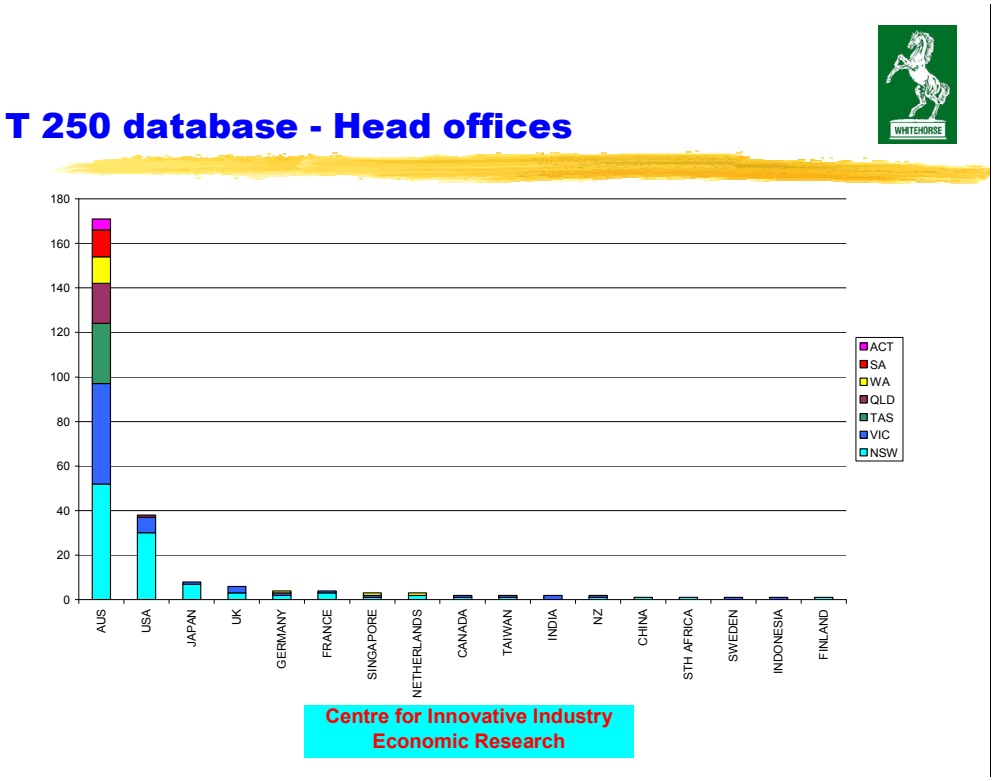
Company Numbers and Sizing
This analysis was dealt with extensively in June 2006. For further information contact us at mailto:admin@whitehorsestrategic.com

The "T250 database

- Over 1000 total company records
- Data back to 1998 – updated 6 monthly
- Detailed Employment data for over 130,000 staff - 52% of the Australian ICT Industry
- All States and Territories represented
- All industry sectors represented
- Employment and Revenue models based upon ABS paradigms and stringently tested



The "mix" of local and international company data in the database, by necessity, overstates international presence, as a significant number of larger companies are internationally owned. This is statistically compensated within the model.



The database includes companies headquartered in all States and Territories, to ensure a lack of regional bias, however most international companies tend to be headquartered in NSW, Victoria and Queensland.

This same evenness of representation is maintained for the State samples.