Australian Bureau of Statistics
&
Department of Communications

Review of
Information & Communications
Technology (ICT) Statistics

Submission by the
Australian Computer Society Inc

27 February 2015

About the ACS

The Australian Computer Society (ACS) is the peak body for Australia's information and communications technology (ICT) professionals. In everything we do, our goal is to help our members be the best they can be through structured lifelong learning and professional development. We help our members realise their professional ambitions in the global economy, making the most of a digital era of extraordinary possibility. ACS is the independent public voice of the Australian ICT profession and the guardian of professional ethics and standards.

The ACS is active in supporting regional and international capability as a member of the International Federation for Information Processing (IFIP) under the auspices of UNESCO.

The ACS accredits Australian ICT tertiary education courses.

In addition, the ACS has strategic relationships with the Australian Council of Deans of ICT, the Council of Australian Directors of ICT, and has within its structure a number of Academic Boards, Committees and Special Interest Groups. ACS also has partnerships with various industry and advocacy groups and leading ICT employers.

In fulfilling our role, the ACS is active on a range of policy fronts and works closely with relevant ICT stakeholders to improve ICT skills, education and training capability and quality in Australia. The ACS is also a consistently strong advocate on the need to ensure Australia has in place the appropriate data collection systems, methodology and supporting resources which allow Governments, industry and other stakeholders to accurately measure ICT activity in, and contribution to, the economy and society generally. Accurate, comprehensive and up to date data is a necessary prerequisite for both good policy development and for good business decisions. ACS has been at the forefront of the data quality issue for many years and has established a leadership position through its highly regarded Australian ICT Statistical Compendium which was first published in 2009. The knowledge and expertise ACS has developed through the production of the Compendium, coupled with our active role in policy debates, makes us well placed to make an important contribution to this current review.

The ACS acknowledges the contribution to the preparation of this submission by Mr Ian Dennis, FACS, FAIM, FAICD. Ian has been the lead researcher and editor of the ACS ICT Statistical Compendium since it was first published in 2009. Ian has also been a member of the ICT Sector Advisory Committee of Innovation and Business Skills Australia (IBSA), and has served on UN and European Commission ICT Expert panels. This submission also draws on some work done by The Centre for Innovative Industries Economic Research (CIIER) which is an Australian think-tank led by Ian Dennis that has developed and analysed data on employment, markets, revenue streams, R&D, processes and management methods for high technology, innovative, and emerging industries.

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Executive Summary

ACS welcomes the opportunity to provide a submission to this Review, and thanks the Department of Communications and the Australian Bureau of Statistics (ABS) for this important initiative.

In 2008, according to an Australian Treasury paper and supported by the ABS, it was not the mining sector that "rescued" Australia from the global financial crisis, but the services sectors, including the ICT sector.[1] In addition, both prior to the resources boom and in later studies, Australian ICT has been shown to contribute more to Australia's GDP than the mining sector and many other more traditional industries[2]. In 2011 ACS research showed that ICT's contribution to Australia's GDP was larger than the construction, property and business services, health and community services, transport, retail, education, agriculture and utility sectors.

The Australian economy is undergoing a radical shift away from 19th and 20th century industries to a digital economy. Without appropriate focus on and access to the relevant statistics, Governments and the private sector are restricted in their ability to make informed decisions on issues related to ICT employment, education and skills, and the general health of the ICT ecosystem in the Australian economy. This could place Australia at a significant competitive disadvantage.

ICT is evident in every industry sector, (hence the "digital economy"), but ICT is not yet always recognised statistically as an industry sector in its own right. We contend that this gap will continue until the current industry statistical metrics used in Australia are updated to reflect the pervasiveness and reality of ICT in the 21st century.

ANZSIC (Australia, New Zealand Standard Industry Classification) is a multi-level nomenclature for industry sectors, and whilst it has an upper level ICT grouping (Information Media and Telecommunications) which includes some small non-ICT elements, this group unfortunately does not include the numerically larger Software and Services ICT industry sector, which is included as a misnamed sub-set (Computer Systems Design) within the upper level grouping "Professional, Scientific and Technical services".

"Information Media and Telecommunications" also leaves out ICT hardware manufacture, ICT wholesale and retail trade, and ICT consulting sectors, which are scattered across other ANZSIC classifications.

General economists, and other commentators, sometimes presume that "information media and telecommunications" in ABS data and government publications is the ICT industry, and make comment without realising that in employment terms, it is actually less than half of the employment the "real" ICT industry.

This same analysis impacts upon calculations of ICT revenue and exports. More importantly, ICT contribution to GDP/GVA, which regularly becomes a synonym for economic importance, is frequently understated for ICT but overstated for the ANZSIC industry classifications in which the missing ICT industry sectors are hidden.[3] This difficulty is magnified when trying to dimension the "digital economy", requiring analysis of economic "inputs", much of which is from the ICT industry.

ACS has previously postulated, and reiterates that a restructure/renaming of parts of ANZSIC (included here as Appendix A) would, if implemented, greatly improve ICT industry data statistical relevance.

Further confusion is now arising with the use of the terms "digital economy" and "internet economy" to describe both those elements of the economic processes of all industries impacted by ICT, or by

1 The Australian Economy and the global downturn – Part 2: The Key quarters: http://www.treasury.gov.au/PublicationsAndMedia/Publications/2011/Economic-Roundup-Issue-2/Report/Part-2-The-key-quarters

2 ABS ICT Satellite Account 2003, published 2006: http://www.abs.gov.au/AusStats/ABS@.nsf/MF/5259.0

3 The ABS has measured the ICT industry intermittently as a specific exercise since 1996, with its last report now over seven years old representing the period 2006-7 (cat 8126.0) and published in October 2008.

the specifics of internet-based ICT, and the productive elements (labour, infrastructure, etc) that make these possible.

It is easier to accurately define Australia's digital economy by what it is not, rather than by what it is. In the broadest sense the "digital economy" is almost the entire domestic economy, other than those very small components of the economy that do not use any ICT support at all (e.g. subsistence farming or street musicians - unless they also distribute their outputs electronically).

More logically, the "digital economy" is all of the ICT industry, and that significant proportion of every other economic sector that uses ICT. Mining, healthcare, education, government, wholesale and retail trade, manufacturing, transport, and other sectors all rely on ICT goods and services, and are therefore all participants in the digital economy.

The "internet economy" can be defined as a varying subset of the digital economy. The variation is because the decision whether to use internet-based ICT or internal organisational ICT is one that is made for lots of different reasons - technical, financial, data security or operational control - and those decisions change over time. The distinction is also economically irrelevant, other than for ICT suppliers whose markets are internet-focussed products and services. Unfortunately, these terms are sometimes used interchangeably, and the more narrow definition of internet economy has lead to some narrow and conservative interpretations of the significance of the digital economy, and thus of the ICT industry and ICT profession that creates and maintains it.

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 in ICT who generally (but not always) operate within 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 desktop publishing and graphics design

In addition to the significant percentage of ICT professionals in the ICT industry, ICT industry employment also includes many ICT non-professional technical, sales, logistical and administrative staff.

ANZSCO (Australia, New Zealand Standard Classification of Occupations) is a multi-level nomenclature essential to the understanding of employment statistics. The upper level (the 2-digit level) is meant to bring like occupations together so they can be aggregated. Unfortunately, the ICT occupation grouping at this level leaves out some occupations that we, and others, would consider are, wholly or in part, within ICT. Accordingly, simple extracts from employment data of the "ICT" ANZSCO group (26) can easily lead to inadvertent understatement of the actual position of ICT employment.

The ACS maintains a more appropriate classification of ICT occupations is required to understand the ICT sector and the "digital economy" in Australia and thus inform ICT skills policy with a clear, verifiable set of metrics. The ACS has previously recommended that this might potentially be achieved by reference to the nomenclature of the Skills Framework for the Information Age.[4]

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4 http://www.sfia.org.uk/

ACS Response to the Discussion Paper

We have chosen to respond to the Review by addressing the specific questions outlined in the discussion paper.

What definitions do you use for information and communications technology?

Definitions and nomenclature

ACS uses, where possible, definitions and nomenclature used by the Australian Government, (ANZSCO/ANZSIC) but notes that the Government is not always internally consistent (viz ANZSCO variants used by Department of Immigration and ATO).

For occupations, ACS considers that the internationally recognised Skills for the Information Age (SFIA) structure is more useful and **recommends** that ANZSCO should be reformed and simplified to more closely correlate to SFIA. We explore some of the reasons for this recommendation in Appendix B to this submission.

ACS also considers that the proposed definitions in Appendix B are more relevant for ICT Industry sectors, and **recommends** that consideration also be given to reforming ANZSIC to establish a clear, upper level, ICT Industry grouping based upon the ACS/CIIER nomenclature. We suggest a possible model for this reform in Appendix A ("*A model for reform of the ABS Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 - Codes and Titles*").

ACS considers that the definition of "digital economy" issued by the (then) Department of Broadband, Communication and the Digital Economy,[5] titled "Australia's Digital Economy: Future Directions" released in 2009 as a more effective definition than that proposed in the Terms of Reference.

> **"The digital economy is the global network of economic and social activities that are enabled by platforms such as the Internet, mobile and sensor networks. The digital economy refers to the devices most of us use each day such as computers, phones and game consoles. It includes the online maps that we consult, the web searches that we do to find information and our electronic banking."**

What are your critical data needs in this area? What do you use the information for? (Why is this information important to you? What decisions are made using the information?)

What data do we need?

ACS uses statistical data to establish and improve understanding of the ICT industry and profession and the broader digital economy, for analysing trends and outcomes, and in the development of policy positions and programmes.

The key data requirements are:

- The size of the digital economy and its contribution to both the national economy and individual State and Territory economies
- The number of people working in the digital economy, the ICT profession and relevant industry sectors (at both national and State/Territory level)
- The break-up of occupations and skills
- Enrolments and completions in ICT courses in the VET and tertiary sectors
- Skilled migration levels in ICT
- Women's participation in the ICT workforce

- Spending on digital economy R&D and the activities funded
- The requirements of the digital economy, particularly in terms of skills, over the next 10-15-20 years.

What benefits are there to your organisation from having this information available to you (e.g. impact on your time frames, productivity, costs etc.)?

Benefits to the ACS
The key benefits to the ACS fall into three broad categories. First it allows us, and indeed other representative bodies, to more effectively fulfil our responsibility to advocate into Governments on policies and programmes relevant to the ICT industry and the ICT profession. Second, it allows us to provide accurate and comprehensive information to our members on issues relevant to their profession. And thirdly, it helps us better understand trends in or membership base and the ICT profession generally.

Do the ABS statistics meet your information needs? If not, please provide a reason (e.g. accuracy, timeliness, relevance etc.) Are you aware of any other data that are, or may be publicly available which would meet your information needs? Who owns these data?

ABS Statistics
Whilst the ABS Statistics are in the main sufficiently timely, they currently do not meet our information needs. They are neither sufficiently accurate, nor structured in a relevant way.

The most important data for both our and ICT Industry needs are ICT labour market data. These are a basic "building block" for almost all other ICT economic data (including the important "inputs" calculation for contribution to GDP/GVA, whether by industry sector or by occupational grouping).

Since 2009, the ACS has published the "ICT Statistical Compendium", incorporating within that publication both ICT Industry data and ICT professional and technical employment data. The motivation for the Compendium was in part to fill the gap left following the discontinuation of the ABS 8126.0 publication.

ABS Labour market data is an important component of this research, and has been made available for a fee by the ABS by commissioned extract (in the ANZSCO 4 digit form requested) from 2009 to 2011.

In 2012 the ABS indicated that this data could no longer be provided in the form required, on the basis of the ABS need to maintain appropriate levels of statistical veracity. After negotiation, ABS supplied an aggregated data set for the publication for 2012 at the statistical equivalent of ANZSCO level 2. In 2013 this data was also provided in this form, but further restricted by the refusal by ABS to provide separate State data for TAS/ACT/NT.

A similar approach was taken by ABS for data 2014.

Supplying data at these aggregated levels meant that anomalous results became far more difficult to analyse, however we did attempt to do so in 2012/13. (We reprint that analysis as Appendix C[6]). In brief, it identified around 45,000 ICT industry jobs (out of a 274,000 total) that we considered may have been misallocated.

ACS **recommends** that ABS return to its previous practice of supplying requested Labour Market data to 4 digit ANZSCO levels.

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6 2013 Australian ICT Statistical Compendium P19 " Possible ABS Misclassifications of ICT Technical and professional employment?" - http://acs.org.au/__data/assets/pdf_file/0004/28570/Australian-ICT-Statistical-Compendium-2013.pdf

ACS notes that a number of other commentators have queried the survey structure and density used by ABS for Labour market data over the last few years. The ABS has now undertaken its own review of that issue[7], and has accepted the recommendations for improvement from that Review.

ACS simply questions whether there is much point in ABS gathering data at ANZCO level 6 (in which ABS defines some 60+ ICT occupations), if it is only doing so at sufficient statistical certitude to allow publication at ANZSCO level 2 (5-6 aggregations of these).

ACS **recommends** that the important and fundamental ABS Labour Force Survey receive the infrastructure and operational support required for acceptable levels of statistical certitude to apply to the 4 digit ANZSCO level for data for all States and Territories.

Where are the gaps?

In 2002, then Australian Statistician, Dennis Trewin, wrote[8] "There seems to be a growing acceptance that it is important to try and measure the knowledge-based economy." He went on to say "relevant statistics should be shown within a framework which is:

- Structured in a logical and understandable manner
- Developed in the light of relevant theory and empirical evidence
- Widely accepted by policy makers and other users
- Unbiased in its choice of statistical indicators
- Comprehensive whether or not relevant statistics exist for all framework elements"

At that time in 2002 the ABS had already published three reports on the ICT industry (ref 8126.0) - 1996, 1999, and 2001.[9] A further four iterations of this report, (albeit with periodic changes in sectoral nomenclature and inclusion/exclusion), took place in 2003, 2005, 2007 and 2009, based, in each case, on data from the previous year. No ICT industry study has been published by the ABS since 2009.

ACS **recommends** that Series 8126.0 be recommenced, either undertaken by ABS, or by outsourcing to a third party. The ACS would be interested in considering some involvement in the latter were it pursued.

In an (unpublished) ABS paper in 2007[10], the author, Siddhartha De, states" "The Information Economy includes the ICT sector (industries which supply the products which store, display, and process information) and the industries which produce that information (usually referred to as the content sector)". The 65 page report goes on to identify some of the (then) gaps in ICT Statistics (Appendix 1, pp54/55), and to propose the establishment of an ICT portal within the National Data Network to help address this. The ICT portal was not established.

ACS **recommends** that consideration be given to the re-establishment of the National Data Network ICT portal project.

Measuring ICT Contribution

In 2006 ABS published the first and only "ICT Satellite Account"[11] which attempted to calculate the contribution of ICT products and activities within the national accounting framework. It showed, amongst other outcomes, the 2002-3 contribution of ICT to GDP was 4.6% (or 4.9% of GVA), and noted in the Preface "the phenomenon of the 'new economy'". (It was noted in the report that, even

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7 Independent Technical review into the Labour Force Survey and ABS Response, Nov 2014, ABS -http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/6202.0main+features4Nov%202014

8 ABS 1375.0 (Measuring a Knowledge -based economy and Society); Dennis Trewin , Australian Statistician 2002 - http://www.ausstats.abs.gov.au/Ausstats/free.nsf/Lookup/4F8E59034103E624CA256C230007DC05/$File/13750_aug%202002.pdf

9 8126.0 ICT, Australia - http://www.abs.gov.au/ausstats/abs@.nsf/mf/8126.0

10 ICT Statistics (Discussion paper on Strategic Issues) Siddhartha De , ABS, 2007

11 5259.0 ICT Satellite Account 2006 - http://www.abs.gov.au/AusStats/ABS@.nsf/MF/5259.0

then, of the then 17 conventional ANZSIC categories, ICT contribution to GVA ranked ahead of Agriculture; Government administration; Education, and Personal and other Services).

In the 12 years since 2002-3, no ICT satellite updates have been published.

In 2008, according to an Australian Treasury paper[12] and the ABS, it was not the mining sector that "rescued" Australia from the global financial crisis, but the services sectors, with the exception of the finance and insurance sector. Prior to the current resources boom, and not withstanding data set limitations, Australian ICT contributed more to Australia's GDP than the mining sector[13].

ICT services represent a large proportion of the remaining services.

Sectoral contributions to GDP growth Sep 2008-May 2008
Source ABS 5206.0 and Treasury
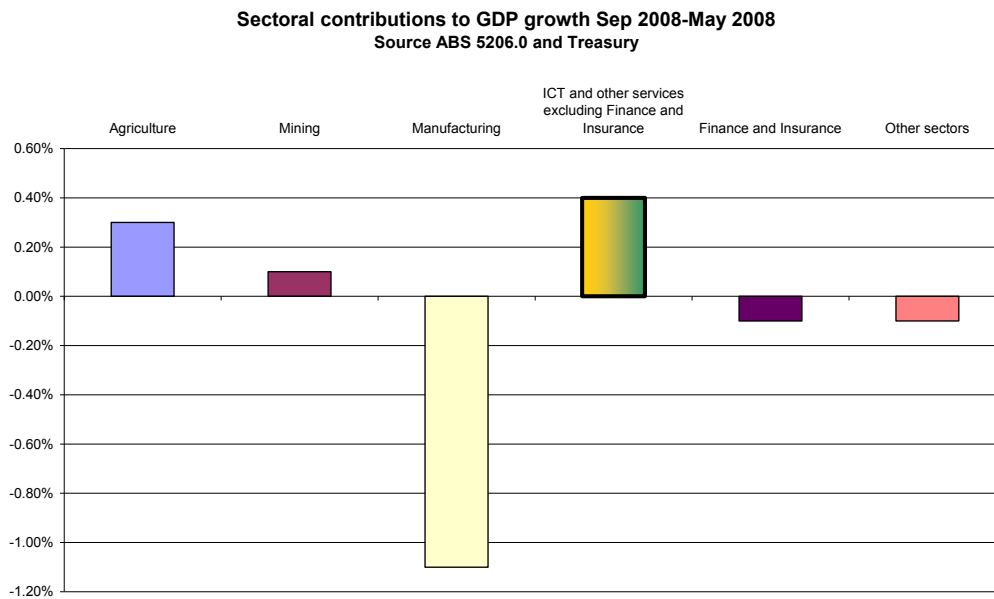
In early 2011 economic analysts, IBIS, published an industry sectoral analysis of fiscal contribution to Gross Domestic Product (GDP) in 2010, derived from ABS data. CIIER reviewed this analysis, and found that, (even excluding ICT manufacture, ICT wholesaling, and ICT retail, and some ICT consulting), the ICT Industry sector contributed nearly 8 per cent of Australian GDP. This was as much as the mining industry, and more than all other industry sectors, other than manufacturing, and finance and insurance.

In 2011 Deloitte Access Economics attempted to calculate a value for what they termed "the Internet Economy".[14]

In June 2012 IBM released a report that they had commissioned from IBISWorld, which further evaluated the impact of digital technology on Australian Industry.[15]

In 2013 a draft CIIER paper on the Knowledge Economy was incorporated into the Statistical Compendium[16] relating to ICT economic contribution. CIIER had previously calculated the ICT contribution at over $100 billion on outputs, it then calculated the then ICT inputs contribution to GDP at $21.9 billion, or 6.9% of the national total. As noted in the report, as there is no ICT ANZSIC Division for ICT, a number of conservative estimates had to be made to arrive at this inputs figure, which ACS consider is understated.

12 The Australian Economy and the global downturn – Part 2: The Key quarters: http://www.treasury.gov.au/PublicationsAndMedia/Publications/2011/Economic-Roundup-Issue-2/Report/Part-2-The-key-quarters
13 ABS ICT Satellite Account 2003, published 2006 - http://www.abs.gov.au/AusStats/ABS@.nsf/MF/5259.0
14 "The Connected Continent", Deloitte Access Economics 2011 - https://www.deloitteaccesseconomics.com.au/uploads/File/DAE_Google%20Report_FINAL_V3.pdf
15 A Snapshot of Australia's Digital Future to 2050, IBM, IBISWorld, 2012 - http://www-07.ibm.com/au/pdf/1206_AustDigitalFuture_A4_FINALonline.pdf
16 Australian ICT Statistical Compendium, ACS/CIIER 2013 - http://acs.org.au/__data/assets/pdf_file/0004/28570/Australian-ICT-Statistical-Compendium-2013.pdf

So as far as we can determine, no official calculation of ICT contribution to the Australian economy has been made since the 2006 Satellite Account.

Why do we need such a calculation?

A simple evaluation of the economic contribution of other major industries to Australian GDP shows that of the 16 top level ANZSIC industry sectors, only Manufacturing, and Finance and insurance, make a greater industry sectoral contribution than ICT does.

Industry sector contribution to Australian GDP (2010)
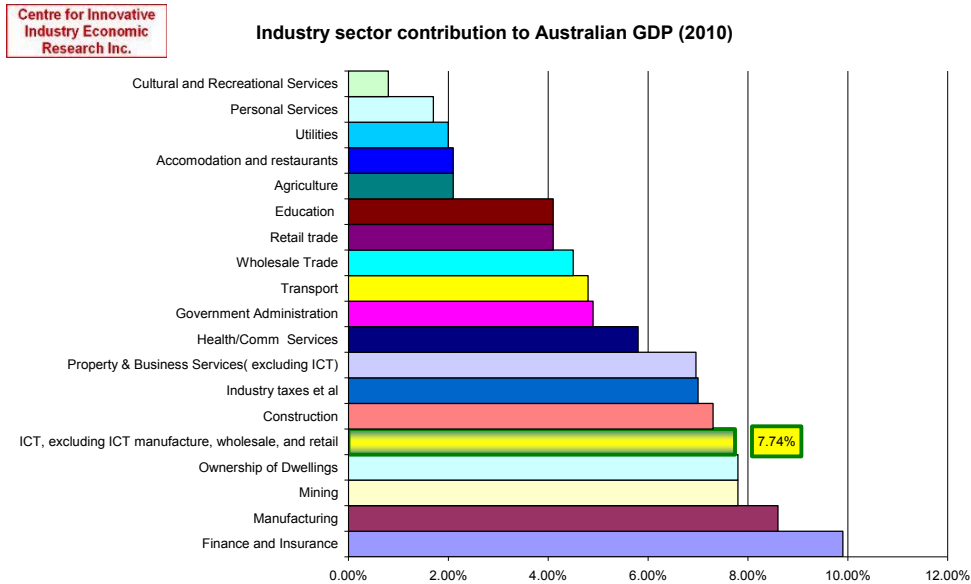
Since contribution to GDP is one of the key economic measures referenced to justify policies and programmes, the lack of official attention to ICT and the digital economy leads to a potential skewing of priorities.

ACS **recommends** that the ICT Satellite Account be updated to encompass the digital economy, and be published to coincide with a reinstituted 8126.0 ICT industry series.

ACS **recommends** that, should ABS not be sufficiently resourced to undertake the ICT Satellite Account, that it could be outsourced. ACS would in interested in potential involvement in the latter were it pursued.

Is there data that your organisation holds which are, or could be released publicly to add to the available information on ICT? Please include any administrative or 'big data' sources.

Data ACS Holds

Since 2009, ACS has been producing an ICT Statistical Compendium to combine quality ICT related data into a single summary report as part of the ACS commitment to improving ICT outcomes in Australia. The Compendia have been very well received by the ICT profession, ICT industry, and by Governments around Australia and internationally. In 2013 the Compendium included new analysis on the economic value of ICT and its significance to the Australian economy. The objective is to produce a series of 'snapshots' of statistical data on the ICT workforce for ACS members, industry and government, and a potential 'bible' for ICT users, incorporating statistics on the Australian ICT sector, ICT higher and vocational education, ICT trade, and ICT employment and skills.

Our aim is to continue to assist policy makers involved in the ICT sector by providing the latest available data, and to provide a tool for ICT professionals and the ICT industry, and for businesses that deal with the ICT sector.

ACS ICT Surveys & Other Relevant Reports
- ACS Women Surveys - https://www.acs.org.au/communities/acs-women/initiatives
- ACS Remuneration Report 2012 - https://www.acs.org.au/__data/assets/pdf_file/0003/11577/ACS-2012-Remuneration-Survey.pdf
- ACS ICT Statistical Compendium 2013 - http://acs.org.au/__data/assets/pdf_file/0004/28570/Australian-ICT-Statistical-Compendium-2013.pdf
- ACS Skills White paper - Common ICT Job Profiles & Indicators of Skills Mobility - http://www.acs.org.au/__data/assets/pdf_file/0005/26528/ICT-Skills-White-Paper-Common-Job-Profiles-and-Skills-Mobility-30-Dec-2013.pdf

Other than cost, are there any major barriers to collecting, producing and/or using statistics to inform your ICT statistical information needs?

Barriers
Given the pervasive nature of ICT and the significant and rapidly growing impact of digital technologies on the Australian economy, there is an urgent need for more comprehensive and contemporary data collections on ICT related activity. Accurate and up-to-date data are the critical foundations for good policy-making by Governments and sound decision-making in the private sector. One barrier to having this data in recent years has been the lack of funding and other resources being made available to the ABS. The ACS strongly urges Government to consider boosting ABS resourcing in this area in coming years. Cost and resourcing issues are also a barrier for non-Government organisations such as the ACS and others in the ICT industry who try to fill the gaps in official data through our own survey collections.

The other key barrier appears to be one of culture and mindset.   ACS' view is that for many years now, Governments, and indeed many in the private sector, have significantly underestimated the impact digital technologies are having, and increasingly will have, on our competitiveness, productivity and standards of living. As a result, the need to appropriately measure digital related activity in our economy has also had a low priority. This mindset must now change. ACS sees some promising signs that the change is occurring. But it needs to accelerate. Governments and the private sector must come to terms with the full impact of the digital revolution and start planning and making decisions accordingly.   Within Government, resourcing the ABS to accurately and comprehensively measure activity in the digital economy would be an important step forward in that process.

What role do you see your organisation playing in the collection and dissemination of publicly available ICT statistics?

Role ACS Could Play
ACS stands ready to consult on any amendments to nomenclatures and data structures for ICT, and to advise on or, by agreement, potentially undertake some of the ICT statistical work formerly undertaken by ABS, e.g. 8126.0 and the ICT Satellite Account, and to assist in the calculation of ICT contribution to the economy.

ACS could also assist with the development of translation matrixes from current ANZSCO to a new format, to allow for retention of historical data.

What role(s) do you see for other organisations in ICT statistics?

Roles for Other Bodies

ACS is aware of AIIA member surveys, various State Government ICT surveys/reports, the IBSA Environment Scan, and numerous private sector economics reports that are based upon surveys of variable quality. Our earlier recommendation concerning the re-establishment of the National Data Network portal project by ABS would help to provide a mechanism for greater access to such data.

ACS is also aware of the Pearcey Foundation[17] PRIDE (Pearcey Institute for the Digital Economy) initiative. We understand that the Pearcey Foundation is making its own submission to this Review which will present the case for this important concept more fully.

ACS **recommends** that serious consideration be given by Government to the merits of issues raised in the Pearcey Foundation PRIDE initiative.

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[17] www.pearcey.org.au

Summary of ACS Recommendations

1. **ACS recommends that ANZSCO should be reformed and simplified to more closely correlate to the internationally recognised Skills for the Information Age (SFIA) structure.**

2. **ACS recommends that consideration be given to reforming ANZSIC to establish a clear, upper level, ICT Industry grouping based upon the ACS/CIIER nomenclature. We suggest a possible model for this reform in Appendix A ("A model for reform of the ABS Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 - Codes and Titles").**

3. **ACS recommends that the important and fundamental ABS Labour Force Survey receive the infrastructure and operational support required for acceptable levels of statistical certitude to apply to the 4 digit ANZSCO level for data for all States and Territories.**

4. **ACS recommends that ABS return to its previous practice of supplying requested Labour Market data to 4 digit ANZSCO levels.**

5. **ACS recommends that ABS Series 8126.0 be recommenced, either undertaken by ABS, or by outsourcing to a third party.**

6. **ACS recommends that serious consideration be given to the re-establishment of the ABS National Data Network ICT portal project.**

7. **ACS recommends that the ICT Satellite Account be updated to encompass the digital economy, and published to coincide with the 8126.0 ICT industry series.**

8. **ACS recommends that, should ABS not be sufficiently resourced to undertake the ICT Satellite Account, that consideration be given to outsourcing to a third party.**

9. **ACS recommends that serious consideration be given by the Government to the merits of the issues raised in the Pearcey Foundation PRIDE initiative being submitted to this review.**

Appendix A

A model for reform of the ABS Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 - Codes and Titles[18]

Suggested name changes			Current Anzsic code	Current ANZSIC title
Major sector	**Information and Communications Technology, Digital Content, media, and entertainment**			
ICT Content	Digital content, media, games, and entertainment		5700	Internet Publishing and Broadcasting
ICT Content	ICT Information management services and digital libraries	part of	6010	Libraries and Archives
ICT Content		part of	6020	Other Information Services
ICT Products	Computer and Electronic Office Equipment Manufacturing		2421	Computer and Electronic Office Equipment Manufacturing
ICT Products	Communication Equipment Manufacturing		2422	Communication Equipment Manufacturing
ICT Products	Computer and Computer Peripheral Wholesaling		3492	Computer and Computer Peripheral Wholesaling
ICT Products	Telecommunication Goods Wholesaling		3493	Telecommunication Goods Wholesaling
ICT Products	Software Wholesaling		3492?	
ICT Products	Computer and Computer Peripheral Retailing		4222	Computer and Computer Peripheral Retailing
ICT Products	Software retailing		4222?	
ICT Products	Software Publishing		5420	Software Publishing
ICT Products	Computer and telecommunications equipment repair and maintenance	part of	9422	Electronic (except Domestic Appliance) and Precision Equipment Repair
ICT services	ICT outsourcing and transaction processing		5921	Data Processing and Web Hosting Services
ICT services	Electronic Information Storage Services		5922	Electronic Information Storage Services
ICT services	System Design and Software development Services		7000	Computer System Design and Related Services
ICT services	ICT Engineering Design and Engineering Consulting Services	part of	6923	Engineering Design and Engineering Consulting Services
ICT services	ICT Consulting, Management, and Education Services	part of	6962	Management Advice and Related Consulting Services
ICT services	ICT Consulting, Management, and Education Services	part of	8220	Educational Support Services
ICT services	ICT Scientific and Technical Services n.e.c.	part of	6999	Other Professional, Scientific and Technical Services n.e.c.
ICT transmission	Telecommunications Network carrier Operation		5801	Wired Telecommunications Network Operation
ICT transmission	Telecommunications Network carrier Operation		5802	Other Telecommunications Network Operation
ICT transmission	Other Telecommunications Services		5809	Other Telecommunications Services
ICT transmission	Internet Service Providers and data transmission services		5910	Internet Service Providers and Web Search Portals

	Publishing, Broadcasting, and non-digital information			
Media and entertainment	Newspaper Publishing		5411	Newspaper Publishing
Media and entertainment	Magazine and Other Periodical Publishing		5412	Magazine and Other Periodical Publishing
Media and entertainment	Book Publishing		5413	Book Publishing
Media and entertainment	Directory and Mailing List Publishing		5414	Directory and Mailing List Publishing
Media and entertainment	Other Publishing (except Software, Music and Internet)		5419	Other Publishing (except Software, Music and Internet)
Media and entertainment	Motion Picture and Video Production		5511	Motion Picture and Video Production
Media and entertainment	Motion Picture and Video Distribution		5512	Motion Picture and Video Distribution
Media and entertainment	Motion Picture Exhibition		5513	Motion Picture Exhibition
Media and entertainment	Post-production Services and Other Motion Picture and Video Activities		5514	Post-production Services and Other Motion Picture and Video Activities
Media and entertainment	Music Publishing		5521	Music Publishing
Media and entertainment	Music and Other Sound Recording Activities		5522	Music and Other Sound Recording Activities
Media and entertainment	Radio Broadcasting		5610	Radio Broadcasting
Media and entertainment	Free-to-Air Television Broadcasting		5621	Free-to-Air Television Broadcasting
Media and entertainment	Cable and Other Subscription Broadcasting		5622	Cable and Other Subscription Broadcasting
Library and non-digital information	non-digital Libraries and Archives	part of	6010	Libraries and Archives
Library and non-digital information	Other Information Services	part of	6020	Other Information Services

The structure above is put forward by ACS for consideration.

It would address one of the key concerns of the ICT profession and industry by establishing a unified and consistent high level ANZSIC sector for ICT.

The use for ICT of the "Content", "Product", "Services", "Transmission" sectoral designators also allows a much simpler and elegant distinction between ICT industry sectors and activities.

The separation of the non-ICT portions into a separate grouping also allows for specific analysis of the Broadcasting and non-ICT components.

Appendix B

Reforming ANZSCO for ICT Occupations

An alternate option on ANZSCO ICT occupations

	ANZSCO ICT Structure[19]		
Code	**ABS view of ICT occupations**		**Alternate view of ICT occupations**
	Key: (A) -- alternative title, (N) -- occupation in nec category, (P) -- principal title, (S) -- specialisation		
135111	Chief Information Officer (P)	135111	Chief Information Officer (P)
135111	Chief Technology Officer (A)	135111	Chief Technology Officer (A)
135112	ICT Project Manager (P)	135112	ICT Project Manager (P)
135112	ICT Development Manager (S)	135112	ICT Development Manager (S)
135199	ICT Managers nec (P)	135199	ICT Managers nec (P)
135199	IT Service Delivery Manager (N)	135199	IT Service Delivery Manager (N)
135199	Network Manager (N)	135199	Network Manager (N)
223211	ICT Trainer (P)	223211	ICT Trainer (P)
223211	ICT Educator (A)	223211	ICT Educator (A)
223211	Software Trainer (S)	223211	Software Trainer (S)
225211	ICT Account Manager (P)	225211	ICT Account Manager (P)
225212	ICT Business Development Manager (P)	225212	ICT Business Development Manager (P)
225213	ICT Sales Representative (P)	225213	ICT Sales Representative (P)
232411	Graphic Designer (P)		
232411	Graphic Artist (A)		
232411	Exhibition Designer (S)		
232411	Film and Video Graphics Designer (S)		
232411	Publication Designer (S)		
232412	Illustrator (P)		
232412	Animator (S)		
232412	Cartoonist (S)		
232412	Technical Illustrator (S)		
		224711	Management Consultant (P)
		224711	Business Consultant (A)
		224711	Business Analyst (S)
		224712	Organisation and Methods Analyst (P)
		224712	Procedures Analyst (A)
		224712	Change Management Facilitator (S)
		224999	Information and Organisation Professionals nec (P)
232413	Multimedia Designer (P)	232413	Multimedia Designer (P)
232413	Digital Media Designer (A)	232413	Digital Media Designer (A)
232413	Interactive Media Designer (A)	232413	Interactive Media Designer (A)
232413	Instructional Designer (S)	232413	Instructional Designer (S)
232414	Web Designer (P)	232414	Web Designer (P)
261111	ICT Business Analyst (P)	261111	ICT Business Analyst (P)
261111	BA (ICT) (A)	261111	BA (ICT) (A)
261111	Business Consultant (ICT) (A)	261111	Business Consultant (ICT) (A)
261111	Business Systems Analyst (S)	261111	Business Systems Analyst (S)
261112	Systems Analyst (P)	261112	Systems Analyst (P)
261211	Multimedia Specialist (P)	261211	Multimedia Specialist (P)
261211	Electronic Game Developer (A)	261211	Electronic Game Developer (A)
261211	Multimedia Developer (A)	261211	Multimedia Developer (A)
261211	Multimedia Programmer (A)	261211	Multimedia Programmer (A)
261212	Web Developer (P)	261212	Web Developer (P)

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19 Derived from 4 digit "ANZSCO ICT Structure" ABS 2002, extended to 6 digit ANZSCO V1.2 by CIIER

261212	Web Programmer (A)	261212	Web Programmer (A)
261311	Analyst Programmer (P)	261311	Analyst Programmer (P)
261311	Programmer Analyst (A)	261311	Programmer Analyst (A)
261312	Developer Programmer (P)	261312	Developer Programmer (P)
261312	Applications Developer (A)	261312	Applications Developer (A)
261312	ICT Developer (A)	261312	ICT Developer (A)
261312	ICT Programmer (A)	261312	ICT Programmer (A)
261312	Communications Programmer (Systems) (S)	261312	Communications Programmer (Systems) (S)
261312	Database Developer (S)	261312	Database Developer (S)
261312	Database Programmer (Systems) (S)	261312	Database Programmer (Systems) (S)
261312	Network Programmer (S)	261312	Network Programmer (S)
261312	Software Developer (S)	261312	Software Developer (S)
261312	Software Programmer (S)	261312	Software Programmer (S)
261313	Software Engineer (P)	261313	Software Engineer (P)
261313	Software Architect (A)	261313	Software Architect (A)
261313	Software Designer (A)	261313	Software Designer (A)
261313	Computer Applications Engineer (S)	261313	Computer Applications Engineer (S)
261313	Database Designer (S)	261313	Database Designer (S)
261313	Systems Architect (S)	261313	Systems Architect (S)
261314	Software Tester (P)	261314	Software Tester (P)
261399	Software and Applications Programmers nec (P)	261399	Software and Applications Programmers nec (P)
262111	Database Administrator (P)	262111	Database Administrator (P)
262111	Database Operator (A)	262111	Database Operator (A)
262111	Database Specialist (A)	262111	Database Specialist (A)
262111	Database Support (A)	262111	Database Support (A)
262111	DBA (A)	262111	DBA (A)
262111	Database Analyst (S)	262111	Database Analyst (S)
262112	ICT Security Specialist (P)	262112	ICT Security Specialist (P)
262112	Security Administrator (A)	262112	Security Administrator (A)
262112	Information Technology Security Manager (S)	262112	Information Technology Security Manager (S)
262113	Systems Administrator (P)	262113	Systems Administrator (P)
262113	Systems Manager (A)	262113	Systems Manager (A)
263111	Computer Network and Systems Engineer (P)	263111	Computer Network and Systems Engineer (P)
263111	Computer Network Engineer (S)	263111	Computer Network Engineer (S)
263111	Computer Systems Integrator (S)	263111	Computer Systems Integrator (S)
263112	Network Administrator (P)	263112	Network Administrator (P)
263112	Network Specialist (A)	263112	Network Specialist (A)
263112	Network Support (A)	263112	Network Support (A)
263112	LAN Administrator (S)	263112	LAN Administrator (S)
263113	Network Analyst (P)	263113	Network Analyst (P)
263113	Network Designer (A)	263113	Network Designer (A)
263113	Network Strategist (A)	263113	Network Strategist (A)
263113	Network Consultant (S)	263113	Network Consultant (S)
263113	Network Architect (S)	263113	Network Architect (S)
263211	ICT Quality Assurance Engineer (P)	263211	ICT Quality Assurance Engineer (P)
263211	Quality Analyst (ICT) (A)	263211	Quality Analyst (ICT) (A)
263211	Quality Manager (ICT) (A)	263211	Quality Manager (ICT) (A)
263211	Quality Specialist (ICT) (A)	263211	Quality Specialist (ICT) (A)
263211	Computer Systems Auditor (S)	263211	Computer Systems Auditor (S)
263211	Systems Auditor (ICT) (S)	263211	Systems Auditor (ICT) (S)
263212	ICT Support Engineer (P)	263212	ICT Support Engineer (P)
263212	Support Analyst (A)	263212	Support Analyst (A)
263212	Support Architect (A)	263212	Support Architect (A)
263213	ICT Systems Test Engineer (P)	263213	ICT Systems Test Engineer (P)
263213	Systems Tester (A)	263213	Systems Tester (A)
263213	Test Analyst (ICT) (A)	263213	Test Analyst (ICT) (A)
263299	ICT Support and Test Engineers nec (P)	263299	ICT Support and Test Engineers nec (P)
263299	Usability Architect (N)	263299	Usability Architect (N)
263311	Telecommunications Engineer (P)	263311	Telecommunications Engineer (P)
263311	Signals Officer (Army) (NZ) (S)	263311	Signals Officer (Army) (NZ) (S)

263312	Telecommunications Network Engineer (P)	263312	Telecommunications Network Engineer (P)
263312	Communications Consultant (A)	263312	Communications Consultant (A)
263312	Communications Specialist (ICT) (A)	263312	Communications Specialist (ICT) (A)
263312	Telecommunications Consultant (A)	263312	Telecommunications Consultant (A)
263312	Telecommunications Specialist (A)	263312	Telecommunications Specialist (A)
		312411	Communications and Data Systems Drafting Officer (S)
		312411	Control Systems Drafting Officer (S)
		312412	Communications Engineering Technical Officer (S)
		312412	Communications Engineering Technician (S)
		312412	Digital Controls Technical Officer (S)
		312412	Process Control Technician (S)
		312412	Telemetry Technician (S)
313111	Hardware Technician (P)	313111	Hardware Technician (P)
313112	ICT Customer Support Officer (P)	313112	ICT Customer Support Officer (P)
313112	ICT Help Desk Officer (A)	313112	ICT Help Desk Officer (A)
313112	ICT Help Desk Technician (A)	313112	ICT Help Desk Technician (A)
313112	Systems Support Officer (A)	313112	Systems Support Officer (A)
313112	Network Support Technician (S)	313112	Network Support Technician (S)
313112	Operator Command Support Systems (Army) (S)	313112	Operator Command Support Systems (Army) (S)
313113	Web Administrator (P)	313113	Web Administrator (P)
313113	Web Master (A)	313113	Web Master (A)
313199	ICT Support Technicians nec (P)	313199	ICT Support Technicians nec (P)
313199	Applications Packager (N)	313199	Applications Packager (N)
313199	Computer Systems Technician (N)	313199	Computer Systems Technician (N)
313199	Telecommunications Computer Systems Technician (N)	313199	Telecommunications Computer Systems Technician (N)
313211	Radiocommunications Technician (P)	313211	Radiocommunications Technician (P)
313212	Telecommunications Field Engineer (P)	313212	Telecommunications Field Engineer (P)
313213	Telecommunications Network Planner (P)	313213	Telecommunications Network Planner (P)
313214	Telecommunications Technical Officer or Technologist (P)	313214	Telecommunications Technical Officer or Technologist (P)
		342312	Communications Operator (P)
		342312	Communication Information Systems Sailor (Navy) (S)
		342312	Communications and Information Systems Controller (Air Force) (S)
		342312	Operator Specialist Communications (Army) (S)
342411	Cabler (Data and Telecommunications) (P)	342411	Cabler (Data and Telecommunications) (P)
342412	Telecommunications Cable Jointer (P)	342412	Telecommunications Cable Jointer (P)
342412	Fibre Optic Cable Splicer (S)	342412	Fibre Optic Cable Splicer (S)
342412	Fibre Optics Jointer (S)	342412	Fibre Optics Jointer (S)
342413	Telecommunications Line Mechanic (NZ) (P)	342413	Telecommunications Line Mechanic (NZ) (P)
342413	Telecommunications Linesworker (Aus) (P)	342413	Telecommunications Linesworker (Aus) (P)
342413	Operator Bearer Systems (Army) (S)	342413	Operator Bearer Systems (Army) (S)
342414	Telecommunications Technician (P)	342414	Telecommunications Technician (P)
342414	Communications Technician (A)	342414	Communications Technician (A)
342414	Technician Telecommunication Systems (Army) (S)	342414	Technician Telecommunication Systems (Army) (S)

We do not know whether ABS has an updated view on what ANZSCO occupations to include in ICT for the purposes of calculating the ICT contribution to the Digital Economy. So here we have attempted to translate the 4 digit ANZSCO view used by ABS for 8126.0 and the ICT satellite account into the current 6 digit ANZSCO structure.

The entries in red, above, represent where we consider that occupations that ABS has included in the past should be excluded from inclusion in ICT (232411 Graphic Designer; 232412 Illustrator, together with their alternate titles), and those occupations that ABS has not included in the past but that we consider should be considered for inclusion in ICT occupations in the future, as at least one of the variant titles applies to ICT skills, and/or a significant proportion of that occupation are employed in the ICT industry.

224711	Management Consultant (P)	
224711	Business Consultant (A)	
224711	Business Analyst (S)	
224712	Organisation and Methods Analyst (P)	
224712	Procedures Analyst (A)	
224712	Change Management Facilitator (S)	
224999	Information and Organisation Professionals nec (P)	
312411	Communications and Data Systems Drafting Officer (S)	
312411	Control Systems Drafting Officer (S)	
312412	Communications Engineering Technical Officer (S)	
312412	Communications Engineering Technician (S)	
312412	Digital Controls Technical Officer (S)	
312412	Process Control Technician (S)	
312412	Telemetry Technician (S)	
342312	Communications Operator (P)	
342312	Communication Information Systems Sailor (Navy) (S)	
342312	Communications and Information Systems Controller (Air Force) (S)	
342312	Operator Specialist Communications (Army) (S)	

It is noticeable that many of the ICT occupations listed above have multiple alternative titles and specialisations, and that a number of such alternatives may be close to synonymous.

The occupations listed below essentially cover the three primary skills of analysis, design, and programming, but also conflate alternate titles across these skills, and artificially separate those that we consider synonymous, greatly increasing complexity for little gain.

		Primary skill
232413	Multimedia Designer (P)	Design
232413	Digital Media Designer (A)	Design
232413	Interactive Media Designer (A)	Design
232413	Instructional Designer (S)	Design
232414	Web Designer (P)	Design
261111	ICT Business Analyst (P)	Analysis
261111	BA (ICT) (A)	Analysis
261111	Business Consultant (ICT) (A)	Analysis
261111	Business Systems Analyst (S)	Analysis
261112	Systems Analyst (P)	Analysis
261211	Multimedia Specialist (P)	?
261211	Electronic Game Developer (A)	Programming
261211	Multimedia Developer (A)	Programming
261211	Multimedia Programmer (A)	Programming
261212	Web Developer (P)	Programming
261212	Web Programmer (A)	Programming
261311	Analyst Programmer (P)	Analysis
261311	Programmer Analyst (A)	Programming
261312	Developer Programmer (P)	Programming
261312	Applications Developer (A)	Programming
261312	ICT Developer (A)	Programming
261312	ICT Programmer (A)	Programming
261312	Communications Programmer (Systems) (S)	Programming
261312	Database Developer (S)	Design
261312	Database Programmer (Systems) (S)	Programming
261312	Network Programmer (S)	Programming
261312	Software Developer (S)	Programming
261312	Software Programmer (S)	Programming
261313	Software Engineer (P)	Programming
261313	Software Architect (A)	Design
261313	Software Designer (A)	Design
261313	Computer Applications Engineer (S)	Programming

261313	Database Designer (S)	Design
261313	Systems Architect (S)	Design
261314	Software Tester (P)	Programmimg
261399	Software and Applications Programmers nec (P)	Programming

ACS has also suggested that the SFIA nomenclature be considered as an alternate base from which to derive occupation titles, since it has a consistent and logical skills orientation. ACS, which has considerable expertise in the SFIA nomenclature, would be happy to work with the ABS in exploring this option further.

SFIA Index of Skills definitions

Strategy & architecture	Information strategy 15	IT governance 15
		Information management 15
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|		
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Appendix C

Possible ABS misclassifications of ICT technical and professional employment?[20]

	ICT Management and operations	ICT Technical and Professionals	ICT sales	ICT Trades	Electronic Trades and Professionals	ICT Industry admin and logistics support	ICT workers
2013 data	168,322	218,689	33,688	78,360	44,039	93,367	597,699[21]
2012 data	126,880	215,636	26,680	58,326	38,494	111,000	543,992
2011 data	147,170	235,965	40,901	80,086	39,701	44,995	554,669
2010 data	150,689	225,289	32,096	72,786	42,186	58,000	545,556
2009 data	164,478	205,840	34,137	62,331	49,272	58,273	532,564

Last year we noted, in a comparison to the previous year, taken from the Feb 2010 ABS labour-force extract, that there were lower totals for 2011 in each column, other than "ICT Industry admin and logistics support".
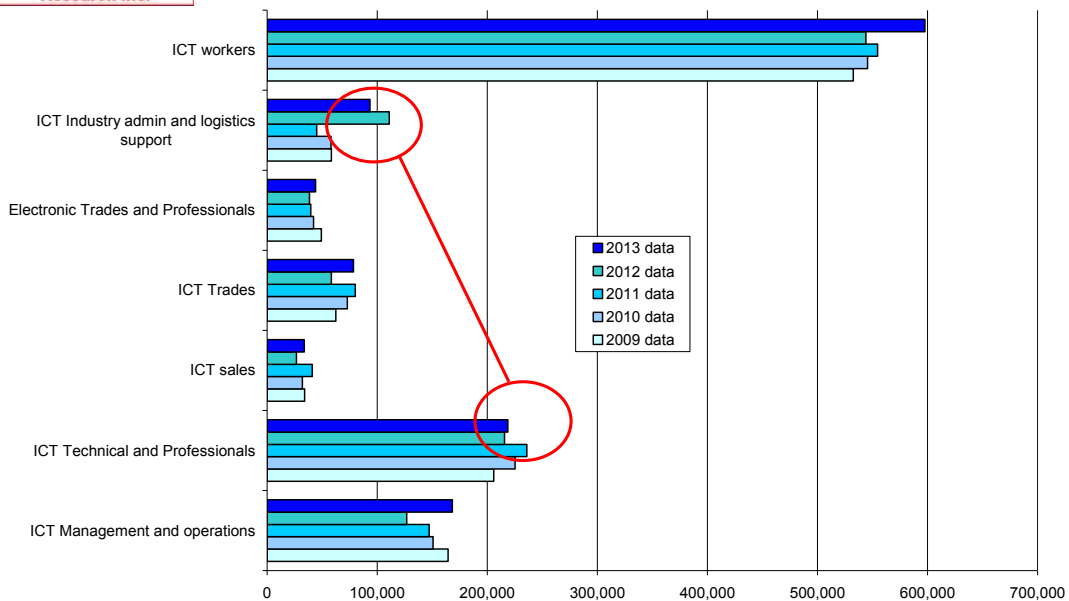
We noted at the time that some of this variation may have derived from an almost doubling in "ICT Industry admin and logistics support." (The total for this is derived from the difference between total employment in the ICT industry, and the total of ICT occupations in those sections of the ICT industry that can be analysed from this data.)

This year's data, taken from the Feb 2013 Labour Force statistics, maintains a similar outcome for this figure to last year, and even shows a statistical decline in ABS estimates of ICT technical and professional employment, after years of steady and consistent growth, whilst overall "ICT worker" numbers continue to grow, by over 12% since 2009.

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20 2013 Australian ICT Statistical Compendium , Australian Computer Society/CIIER

21 Electronics trades only included if in ICT industry sectors

It appears that a significant number of people who were previously included by ABS in ICT occupations are now being classified into non-ICT occupations, with a consequent much lower variation for the total of ICT workers.

In order to test this hypothesis, we requested a further special extract of Labor market data from ABS, detailing the occupations codes for all employees in the definable parts of the ICT industry.

ANZSCO Level 2/ANZSIC Level 3[22]	Telecommunications Services	Internet Service Providers, Web Search Portals and D P Services	Computer System Design and Related Services	Total
26 ICT Professionals	14,027	1,139	82,503	97,669
13 Specialist Managers	10,710	917	23,819	35,446
22 Business, H R and Marketing Professionals	9,690	205	15,086	24,981
31 Engineering, ICT and Science Technicians	6,691	981	13,964	21,636
34 Electrotechnology and Telecommunications Trades Workers	13,926	665	2,931	17,522
23 Design, Engineering, Science and Transport Professionals	2,103	0	12,130	14,233
62 Sales Assistants and Salespersons	8,592	0	2,400	10,992
51 Office Managers and Program Administrators	4,570	369	2,824	7,763
11 Chief Executives, General Managers and Legislators	941	0	5,818	6,759
54 Inquiry Clerks and Receptionists	3,919	739	2,033	6,691
55 Numerical Clerks	2,116	0	3,181	5,297
53 General Clerical Workers	2,943	624	1,692	5,259
14 Hospitality, Retail and Service Managers	2,497	370	426	3,293
59 Other Clerical and Admin Workers	1,201	0	1,405	2,606
21 Arts and Media Professionals	557	356	1,066	1,979
82 Construction and Mining Labourers	1,918	0	0	1,918
27 Legal, Social and Welfare Professionals	884	0	472	1,356
20 Professionals nfd	0	0	1,275	1,275
52 Personal Assistants and Secretaries	378	0	817	1,195
63 Sales Support Workers	444	0	652	1,096
10 Managers nfd	0	0	1,026	1,026
61 Sales Representatives and Agents	642	0	372	1,014
56 Clerical and Office Support Workers	251	0	761	1,012
74 Storepersons	0	442	429	871
81 Cleaners and Laundry Workers	0	0	372	372
89 Other Labourers	310	0	0	310
33 Construction Trades Workers	0	0	250	250
72 Mobile Plant Operators	228	0	0	228
25 Health Professionals	208	0	0	208
	89,746	6,807	177,704	274,257

One clue can be seen in the 35,446 figure for "13 Specialist Managers". Only one category of this (ANZSCO 1351 ICT Managers) is normally treated as an ICT occupation. Whilst ABS were unable to

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22 ABS advise that highlighted Estimates above are subject to sampling variability too high for most practical purposes (Relative Standard Error greater than 25%)

supply a separate figure for this year for detail at this level, last year there were only 4,518 in this category for the three industry groups above, if we assume similar totals for this year, leaving nearly 30,000 "Specialist Managers" working in the ICT industry, who could only be accounted for by putting them into the "ICT Industry admin and logistics" category.

In addition, there are 14,233 group 23 Design, Engineering, Science and Transport Professionals listed above. Only one sub-group (ANZSCO 2324 Graphic and Web Designers, and Illustrators) of these is included in our "ICT technical and professional" grouping. Again, we have no data from ABS for this year, but last years total for the ICT industry sectors was only 854, leaving, if similar to this year, 13,379 "Design, Engineering, Science and Transport Professionals" who work in the ICT industry, but not, apparently, in an ICT, Telecommunications, or Electronics discipline.

Whilst some in Telecommunications may be general engineers, it is doubtful that such skills are required in the software part of the industry.

We therefore consider that, had these employees been properly classified, it is likely that the "ICT Industry admin and logistics" group would be reduced by at least 45,000, back to the levels estimated in 2010, and that these 45,000 people would be more likely to be included in the "ICT Technical and Professional" grouping.
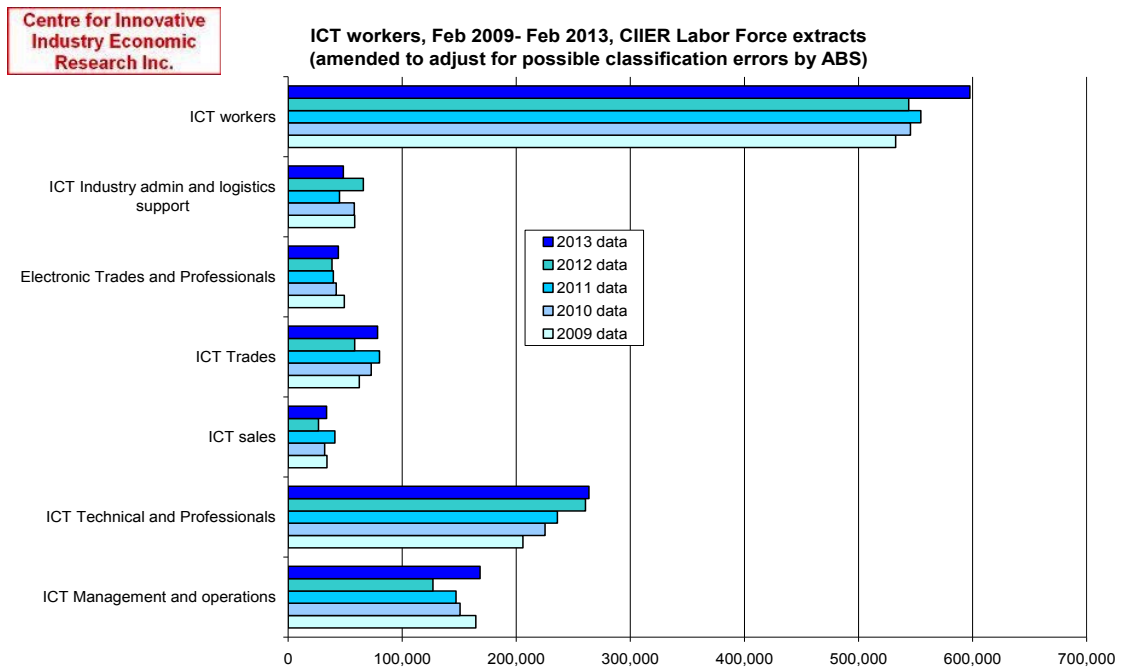
With this adjustment in place we can see a much more logical scenario, with ICT industry admin and logistics in a similar pattern to ICT sales, as one would expect, and the long-term growth in ICT technical and professional employment more accurately reflected.