

Electronic Commerce Statistics Collected by the ABS and Methodological Issues Encountered

Tim Power
Australian Bureau of Statistics
tim.power@abs.gov.au

ABSTRACT

This paper outlines work by the ABS on the collection of statistics on electronic commerce, the methodological issues encountered in their collection and provides an assessment of the impact on Australia's international accounts statistics.

The ABS currently conducts a number of surveys which focus on the demands for Information and Communication Technology (ICT) goods and services covering various sectors. Recently these surveys have included questions on the electronic commerce topic. The paper provides analysis on the methodology issues and results from survey activity in the various sectors.

Section 2 of the paper outlines the background to ABS quarterly household technology surveys and presents some of the findings from the surveys. These surveys have been particularly successful in providing timely and relevant indicators on household Internet usage and on ecommerce activity, as well as enabling more indepth analysis to be undertaken by combining the quarterly surveys.

Section 3 presents information on the ABS 1997-98 business technology survey. Details on problems encountered in running this survey are outlined, together with the main findings on Internet and website use.

Section 4 briefly mentions the ABS 1997-98 general government technology survey, results for which are not yet available.

Section 5 provides some analysis on Internet commerce and its affect on Australia's international accounts statistics.

The ABS will be exploring the possibilities for additional data collection to provide information on e-commerce activities at more frequent intervals, particularly for the business sector.

Keywords: Household, Business, Government, Internet, Electronic commerce, Online, Survey methodology, Survey results.

1. INTRODUCTION

1. The ABS' strategy, until recently, was to collect data about the demands for Information and Communication Technology (ICT) goods and services as part of an overall set of surveys about the ICT sector and related activities, which involved a range of surveys covering various sectors at a minimum of every second year (in respect of the even numbered years). The collections undertaken on the various sectors are outlined below:

- **Household Sector:** Household technology usage surveys have been conducted via the ABS Population Survey Monitor (PSM), in February 1994 and all quarters in 1996 and 1998 and planned for in 1999. The range of information collected has developed over the years from mainly concentrating on computer use in the earlier surveys with the 1999 survey now concentrating on internet use and private ecommerce.
- **Business Sector:** Economy wide technology use surveys have been conducted in respect of 1993-94

(mainly on computer use) and 1997-98 (covering both computer use, internet access, e-commerce activities and barriers to the use of technology). Some technology use questions were included on the ABS 1997-98 Business Growth and Performance Survey. Information was also collected in the ABS 1997-98 Agriculture Commodity Survey on the use of selected technologies (computers, Internet, facsimile machines, mobile phones), barriers to the use of the Internet, future intentions to connect to the Internet and any telephone line problems encountered by farmers. Two Year 2000 (Y2K) surveys have been conducted in respect of October 1998 and June 1999.

- Government Sector: Government technology use surveys (covering federal, state and local government organisations) have been conducted in respect of 1993-94 and 1997-98, with content similar to the business technology surveys.

2. The ABS will be exploring the possibilities for additional data collection to provide information on e-commerce activities at more frequent intervals, particularly for the business sector. A one-off (special) population survey is to be conducted in April 2000 with a main focus on children and their interactions with culture, sport and information technology (IT). Some basic counts of household IT usage will also be obtained. The survey vehicle for this will be the Labour Force Survey (LFS) which has a sample size of about 30,000 households and should provide the ability to output data according to approximately 70 regions across Australia. Comments on further developments are noted in the following sections.

2. HOUSEHOLD SECTOR

Survey Methodology

3. Household technology usage surveys have been conducted via the ABS Population Survey Monitor (PSM) in February 1994 and all quarters in 1996, 1998 and 1999. The PSM is a household survey conducted every three months (in February, May, August and November) and collects information on a range of topics from just over 3,000 households throughout Australia.

4. The survey covers rural and urban areas and has the same scope as other ABS household surveys except that all persons living in non-private dwellings and remote sparsely settled areas are excluded (Statistical Local Areas of fewer than 200 people). The exclusion of households in remote and sparsely settled parts of Australia (approximately 175,000 households) have only a minor impact on any aggregate estimates produced for individual States and Territories, with the exception of the Northern Territory where such persons account for over 20% of the population.

5. The multistage area sample of private dwellings is considered sufficient to provide reasonably detailed information for Australia and fairly aggregated data for States/Territories at an acceptable level of accuracy and reliability. The information is obtained in the PSM by face-to-face interviews with adult members of selected households (ie persons 18 years and older). The 1998 surveys obtained information in respect of 5 frequent computer users aged 5 years and over in each household, whereas the 1999 surveys are obtaining information from only a randomly selected adult in each household. It is currently proposed that the 2000 PSM surveys will be conducted similarly to the 1998 surveys. However the ABS is currently reviewing its household survey program and is expected to discontinue the use of the quarterly PSM vehicle after 2000. It is expected to be replaced by annual household survey vehicles, the General Social Survey to be run one year out of three and the Multi-purpose Household Survey to be run the other two years (the sample size of both surveys is expected to be 17,000 households).

6. Each of the quarterly surveys is independent of the others (ie there is no sample overlap). Accordingly, users are advised to take care when comparing data over surveys as some of the data items have relatively high standard errors of movement, particularly the cross classifications of Internet users by personal characteristics. The ABS, while producing quarterly results for the main aggregates, also produces results which are based on the combination of the four quarterly surveys

conducted in the year. This is done to increase the effective sample size to a total of approximately 13,000 households. Analysis based on the 13,000 observations produces much more reliable results than any of the individual surveys, especially where analysis is focused on small target groups. The effect of the combination of the surveys is a 50% reduction in relative standard errors compared with each of the individual quarterly survey estimates. The combined estimates should be viewed as an average overall for the year. They do not relate to any point in time during that year. Accordingly, when interpreting results for data items which might have changed significantly over the year, eg use of the Internet, users should be aware that estimates may be lower than a point-in-time value observed towards the end of the year.

7. The range of information collected has developed over the years. In the earlier years, the emphasis was generally on use of various technologies, particularly of computers. The range of information collected in the 1998 and 1999 surveys has increased with an expanded number of questions on Internet access and private electronic commerce. A long questionnaire operated throughout 1998 but a much shorter questionnaire is being utilised in 1999. The Internet electronic commerce questions include the following:

- In the last 12 months, have you purchased or ordered goods or services for your own personal use via the Internet? (yes, no)
- Where were you when you purchased or ordered goods or services via the Internet for your own private use? (home, work, other)
- Did you purchase or order goods or services from Australia or overseas? (Australia, overseas, both)
- Did you pay electronically for the goods or services via the Internet? (yes, no)
- Approximately how much have you paid online for goods and services purchased via the Internet in the last 12 months? (\$0-50, \$51-100, \$101-250, \$251-500, \$500+)
- In total, approximately how much have you paid for goods and services purchased via the Internet in the last 12 months? (\$0-50, \$51-100, \$101-250, \$251-500, \$500+)
- How many purchases have you made via the Internet in the last 12 months? (number)
- When did you buy this/these items? (period)
- What types of goods and services did you buy via the Internet in the last 12 months? (category of items).

8. Information was also collected on other electronic transactions such as Internet bill payment, kiosk bill payment, telephone bill payment, EFTPOS bill payment/funds withdrawal and ATM funds withdrawal/transfer.

Summary of Survey Results

9. The survey's results are regarded as being highly relevant by users as the evolving topics covered by questions are measuring current technology changes and the results are released on a timely basis. Details that are available on a quarterly basis from the surveys (with standard errors at an acceptable level) are the main indicators such as home computer use, home Internet access by household type, intentions to gain Internet access by household type, adults with Internet access by a variety of classifications such as place of access, sex, age, labour force status and capital city/other, adult purchases/orders on the Internet and adults other electronic transactions. A variety of these results are outlined below. On the whole, the quarterly surveys have produced estimates that have shown a steady pattern of growth in the various indicators. The only quarter which produced estimates which did not appear to be in line with trends was November 1998.

10. At May 1999, it was estimated that just over 22% of all households in Australia (1.5 million of the nearly 7 million households) had home Internet access, an increase of nearly 10 percentage points since February 1998. Taking into account those households already with Internet access at May 1999 and those households with a computer at May 1999 which intended to acquire home Internet access

in the next 12 months, there should be at least 32% of Australian households with Internet access by May 2000 (an increase of 10 percentage points on May 1999).

11. Households made up of family type 'couple with children' had the highest Internet access rate of 36% at May 1999. Access to the Internet by these types of households is expected to rise to at least 50% by May 2000 (an increase of 14 percentage points on May 1999).

HOUSEHOLDS WITH INTERNET ACCESS, BY FAMILY TYPE (a)						
	Couple with no children	Couple with children	Single parent with children	Single person	Other	Total
Number ('000)						
February 1998	133	460	39	65	157	854
May 1998	196	484	68	75	148	971
August 1998	291	571	62	158	164	1 245
November 1998	247	681	76	126	142	1 272
February 1999	284	671	78	114	131	1 277
May 1999	274	833	91	110	217	1 524
Intended by May 2000 (b)	408	1 180	150	160	311	2 208
Per cent (%)						
February 1998	8.0	19.2	7.4	4.4	21.7	12.6
May 1998	11.6	20.2	11.2	5.0	23.2	14.2
August 1998	17.1	25.1	10.6	9.6	22.1	17.9
November 1998	14.7	27.3	14.5	8.6	21.8	18.6
February 1999	16.3	28.0	12.8	7.0	21.9	18.3
May 1999	16.2	36.3	13.0	8.1	26.4	22.2
Intended by May 2000 (b)	23.7	50.4	21.0	11.6	37.1	31.5

(a) Proportions are of all households in each category.

(b) Details relate to both households currently with home Internet access at May 1999, and to households with a home computer but no home Internet access as at May 1999, but which intend to acquire Internet access by May 2000.

12. In the 12 month period to May 1999, 5.5 million adults (or 40% of adults) had accessed the Internet from any site. Work and home were the most frequently reported places for Internet access by adults (2.7 million adults from work and 2.3 million adults from home). Other popular sites included neighbour's/friend's house (12%) and TAFE/university (8%).

ADULTS ACCESSING THE INTERNET (a) (b)							
	From home	From work	From neighbour's/ friend's house	From TAFE/ university	From public library	From other sites (c)	From any site
Number ('000)							
February 1998	1 038	1 302	806	519	219	661	3 032
May 1998	1 433	1 541	877	777	418	510	3 555
August 1998	1 883	1 903	934	933	395	405	4 233
November 1998	1 670	1 930	1 114	802	413	515	4 192
February 1999	1 681	2 499	1 491	1 018	692	943	5 001
May 1999	2 311	2 733	1 607	1 014	744	1 038	5 465
Per cent (%)							
February 1998	7.7	9.7	6.0	3.9	1.6	4.9	22.6
May 1998	10.7	11.5	6.5	5.8	3.1	3.8	26.4
August 1998	14.0	14.2	6.9	6.9	2.9	2.8	31.5
November 1998	12.3	14.2	8.2	5.9	3.0	3.6	31.0
February 1999	12.4	18.4	11.0	7.5	5.1	6.1	36.8
May 1999	17.0	20.1	11.8	7.5	5.5	7.6	40.2

(a) Proportions are of all adults in each category.

(b) Persons can nominate more than one site.

(c) Includes shops, stores, telecafes, schools, government agency/department shopfronts, telecentres and community or voluntary organisations.

13. Nearly 5% of Australian adults (650,000) used the Internet to purchase or order goods or services for their own private use in the 12 months to May 1999. These Internet shoppers made an estimated

3 million purchases or orders via the Internet and nearly 76% (492,000) of Internet shoppers paid for some of their purchases online. Nearly 71% of Internet shoppers (459,000) were at home when making purchases or orders via the Internet. At May 1999, just over 41% of Internet shoppers made their purchases only from Australia, 43% made them only from overseas, and 16% from a combination of both Australia and overseas. This compares to the situation at May 1998, when only 28% of Internet shoppers made their purchases only from Australia and 7% from a combination of both Australia and overseas. With only slight growth (about 10%) in the number of overseas only purchasers in the year to May 1999, and Australia only purchasers more than doubling in the year, it is possible that a significant proportion of the growth in purchasers accessing both market places relates to purchases within Australia.

14. The differing rates of growth in the past year in the numbers of people using the Internet to access domestic and overseas suppliers probably reflects an early take up of Internet ordering by people traditionally sourcing goods and services overseas. For example, people buying CDs and books from overseas, because they were either cheaper, or more likely not available domestically, have for many years been using their credit cards for a variety of telephone, fax and mail orders to overseas suppliers. The advent of Internet commerce allowed them to shift to a more immediate and convenient method of ordering and payment, but that once the shift was made, subsequent growth in Internet ordering from abroad could be expected to be more modest. The extension of the domestic on-line market place has probably accounted for the much faster growth in Australia only purchasers in the 12 months to May 1999.

ADULTS USING THE INTERNET TO PURCHASE OR ORDER GOODS OR SERVICES FOR PRIVATE USE (a)						
	Purchased or ordered goods/ services (b)	Source of purchases/orders				Goods purchased and paid for online (c)
		Australia only	Overseas only	Both Australia and overseas	Don't know	
Number ('000)						
February 1998	207	*32	157	*18	0	170
May 1998	409	116	254	*29	*10	318
August 1998	425	132	233	*59	0	325
November 1998	286	102	128	*56	0	236
February 1999	480	146	224	105	5	368
May 1999	650	264	281	104	0	492
Per cent (%)						
February 1998	1.5	*15.5	75.8	*8.7	0.0	82.1
May 1998	3.0	28.3	62.2	*7.0	*2.4	77.9
August 1998	3.2	31.0	55.0	*14.0	0.0	76.6
November 1998	2.1	35.6	44.9	*19.5	0.0	82.7
February 1999	3.5	30.5	46.7	21.8	0.9	76.7
May 1999	4.8	40.7	43.3	16.1	0.0	75.7

(a) Relates to private purchases undertaken in the 12 months to reporting date.

(b) Proportions are of all adults.

(c) Proportions are of all adults making purchases or orders via the Internet

15. Of the 650,000 adults undertaking purchases or orders via the Internet in the 12 months to May 1999, 38% reported purchasing books or magazines, 34% reported purchasing computer software or equipment, 14% reported purchasing music and 11% clothing or shoes.

TYPES OF GOODS PURCHASED BY ADULTS FOR PRIVATE USE, USING THE INTERNET (a) (b)				
	February 1999		May 1999	
	Number ('000)	Per cent (%)	Number ('000)	Per cent (%)
Music	94	19.6	91	14.0
Books / magazines	194	40.5	250	38.4
Computer software / equipment	190	39.7	222	34.1
Clothing, shoes, etc	*52	*10.8	*68	*10.5
Sporting equipment	*10	*2.2	*22	*3.5
Holidays	*40	*8.4	*55	*8.5
Entertainment / tickets to events	*30	*6.4	*50	*7.6
Other	143	29.8	148	22.8

(a) Relates to private purchases undertaken in the 12 months to reporting date.

(b) Proportion of all adults making purchases or orders via the Internet

16. Other interesting results on adult Internet shoppers from the May 1999 survey are:

- In the 12 months to May 1999, 30% had made only one purchase/order, 22% had made two purchases, 18% had made three purchases, 30% had made four purchases and 22% had made five or more purchases.
- Internet shoppers also reported that 14% (90,000 adults) had spent up to \$50 on Internet purchases/orders in the 12 months to May 1999, 22% (140,000) had spent \$51 to \$100 on purchases, 21% (135,000) had spent \$101 to \$250 on purchases, 13% (87,000) had spent \$251 to \$500 and 29% (187,000) had spent more than \$500.

17. From these details it has been estimated that adult Internet shoppers in Australia had purchased/ordered around \$230 million worth of goods and services for their own private use via the Internet over the 12 months to May 1999 (with around \$150 million of this being paid for on line). This is, of course, a very small percentage (0.16%) of the \$142,000 million total retail turnover in Australia for the 12 months to May 1999.

18. However, adults in Australia have taken up other forms of electronic transaction facilities such as automatic teller machines (ATMs) and electronic funds transfer at point of sale terminals (EFTPOS) at a rapid rate. In the three months to May 1999, 72% of adults (9.8 million adults) had used an ATM to transfer or withdraw funds, 62% (8.4 million adults) had used EFTPOS to pay bills or withdraw funds and 39% (5.3 million) had used a telephone to pay bills or transfer funds. The popularity of these facilities continues to increase in line with their greater public availability. The major growth in these facilities has been in the number of EFTPOS terminals in Australia as more retailers provide a means to transfer funds electronically at the point of sale (utilising either debit or credit cards). At June 1999 there were 265,391 EFTPOS terminals and 9,387 ATM machines in Australia (ATMs generally provide multi bank/credit union access). This compares with 136,645 EFTPOS terminals and 7,718 ATM machines at June 1996.

19. Interestingly, there is a higher usage of ATM and EFTPOS facilities by younger adults than older adults. Only 29% of persons aged 55 years or older used EFTPOS and only 40% an ATM, whereas 80% of persons aged 18 to 24 years had used EFTPOS and 92% had used an ATM. Gender does not seem to be a significant influence in the use of ATMs and the telephone. A similar proportion of males and females used the telephone to transfer funds or pay bills (40% and 39% respectively) or to use an ATM (73% and 71% respectively). However a slightly higher proportion of females (64%) used EFTPOS than males (60%).

ADULTS UNDERTAKING OTHER SELECTED ELECTRONIC COMMERCE TRANSACTIONS (a) (b)					
	Paid bills or transferred funds via internet	Paid bills via an information kiosk	Paid bills or transferred funds via phone	Paid bills or withdrew funds via EFTPOS	Transferred or withdrew funds via ATM
Number ('000)					
February 1998	*44	69	3 929	7 755	8 858
May 1998	*73	*51	4 020	7 893	9 134
August 1998	162	*62	4 690	8 164	9 332
November 1998	112	*43	4 845	8 225	9 265
February 1999	217	325	5 230	8 733	9 666
May 1999	270	221	5 335	8 425	9 757
Per cent (%)					
February 1998	*0.3	0.5	29.3	57.8	66.0
May 1998	*0.6	*0.4	29.9	58.7	67.9
August 1998	1.2	*0.5	34.9	60.7	69.4
November 1998	0.8	*0.3	35.8	60.7	68.4
February 1999	1.6	2.4	38.5	64.3	71.2
May 1999	2.0	1.6	39.3	62.0	71.8

(a) Proportions are of all adults.

(b) Period covers the 3 months to reporting date.

20. Utilising the Internet to pay bills or transfer funds is only just commencing in Australia with a number of banks establishing this facility. For the three months to May 1999, only 2% of adults had used this facility, with the figures showing a slightly higher proportion of males (nearly 3%) using this facility than females (less than 2%).

21. There is some administrative by product information available from the Reserve Bank of Australia on banks debit and credit cards transactions in Australia. In the three months to May 1999, there were 108 million debit card transactions (involving \$18,077 million) and 8 million credit card transactions (involving \$1,930 million) undertaken through ATMs. There were also 146 million debit card transactions (involving \$8,181 million) and 105 million credit card transactions (involving \$9,908 million) undertaken through EFTPOS terminals in the three months to May 1999. There has been a substantial increase in the use of credit cards through EFTPOS terminals when comparing details for May 1998 with those for May 1999 (39% increase in number of transactions and 89% increase in value of transactions).

BANKS DEBIT CARDS TRANSACTIONS (a)				
Period (b)	Cash withdrawals from ATMs (c)		EFTPOS terminals transactions (d)	
	Number of transactions ('000)	Value of transactions (\$m)	Number of transactions ('000)	Value of transactions (\$m)
February 1998	99 380	15 822	133 165	7 372
May 1998	99 705	15 801	134 167	7 310
August 1998	101 547	16 771	139 023	7 714
November 1998	104 821	17 292	146 103	8 206
February 1999	102 739	17 496	150 205	8 637
May 1999	107 888	18 077	145 773	8 181

(a) Source: Reserve Bank of Australia.

(b) Period covers the 3 months to month shown.

(c) Includes ATMs and similar 'pin number' machines

(d) Includes cash withdrawals in conjunction with other purchases

BANKS CREDIT CARDS TRANSACTIONS (a)						
Period (b)	Cash withdrawals from ATMs (c)		Manual voucher transactions		EFTPOS terminals transactions	
	Number of transactions ('000)	Value of transactions (\$m)	Number of transactions ('000)	Value of transactions (\$m)	Number of transactions ('000)	Value of transactions (\$m)
February 1998	7 522	1 668	21 717	2 593	77 740	6 912
May 1998	7 566	1 718	21 377	2 615	75 215	6 840
August 1998	8 134	1 925	23 473	2 917	81 808	7 781
November 1998	8 152	1 882	20 294	2 551	95 263	8 873
February 1999	7 700	1 785	18 298	2 245	103 046	9 620
May 1999	8 229	1 930	23 293	2 833	104 683	9 908

(a) Source: Reserve Bank of Australia.

(b) Period covers the 3 months to month shown.

(c) Includes ATMs and similar 'pin number' machines

22. Combining the sample of the four quarterly surveys conducted in a year allows more reliable results to be produced, particularly on small population groups. Annual estimates for a number of indicators can be provided by Australian States and Territories and for finer data item dissections (such as home Internet access by State/Territory by household income). Annual results for 1998 on adult Internet shoppers and adults willing to access online services from home are shown below.

23. Of the more than four million adults who had accessed the Internet in 1998, there were 347,000 (2.6% of all adults) who had used the Internet to make an estimated 1.4 million purchases for private use, which is an average of four purchases per Internet shopper. Of these Internet shoppers, 81% had paid for some of their Internet purchases online and 52% had purchased or ordered goods or services from only overseas. A slightly higher proportion of 25 to 39 year olds (3.7% of all adults) made purchases via the Internet.

ADULTS USING THE INTERNET TO PURCHASE OR ORDER GOODS OR SERVICES FOR PRIVATE USE (a)					
Number ('000)	Purchased or ordered goods/ services (b)	Source of purchase/orders			Goods purchased and paid for online (c)
		Australia only	Overseas only	Both Australia and overseas	
18-24 years	50	*16	31	*3	38
25-39 years	158	53	88	*17	134
40-54 years	117	38	50	29	85
55+ years	*22	*6	*12	*4	22
Total	347	112	181	53	279
Per cent (%)					
18-24 years	2.8	*31.5	62.0	*6.6	74.8
25-39 years	3.7	33.3	55.7	*10.9	85.3
40-54 years	3.1	32.2	42.8	25.1	72.8
55+ years	*0.6	*28.6	*55.2	*16.2	100.0
Total	2.6	32.4	52.2	15.4	80.5

(a) Period covers 12 months

(b) Proportions are of all adults

(c) Proportions are of all adults making purchases or orders via the Internet

24. While the actual number of adults using the Internet to make purchases or orders in 1998 was very low, a high proportion of Australia's adult population expressed interest in accessing online services such as shopping and banking from home. Of Australia's adult population in 1998, 37% expressed interest in online banking from home (29% in 1996) and 28% expressed interest in online shopping from home (21% in 1996). In the 1998 surveys, questions on the willingness of adults to access online educational services and online government information or form lodgement services were asked. It was found that 49% of adult Australians were interested in accessing online education

services from home and 44% expressed interest in accessing online government information services or online form lodgement services. Across all the States and Territories of Australia, there was a high level of interest in accessing online services such as shopping, banking, educational and government information or form lodgement from home.

	ADULTS WILLING TO ACCESS ONLINE SERVICES FROM HOME, 1998(a)								
	NSW	Vic.	Qld	SA	WA	Tas.	NT(b)	ACT	Aust.
Number ('000)									
Shopping from home	1 298	886	732	247	360	84	29	82	3 717
Banking from home	1 649	1 218	1 019	319	499	113	37	103	4 958
Gambling from home	182	123	144	43	45	7	3	8	554
On-line educational services	2 273	1 584	1 313	496	620	161	56	130	6 637
Accessing government information, or form lodgment	2 039	1 422	1 163	427	552	157	47	132	5 938
Per cent (%)									
Shopping from home	28.4	26.2	29.7	22.7	28.3	24.8	31.6	37.8	27.7
Banking from home	36.1	35.9	41.3	29.4	39.4	33.6	40.1	47.5	36.9
Gambling from home	4.0	3.6	5.8	3.9	3.5	2.0	3.4	3.5	4.1
On-line educational services	49.7	46.8	53.2	45.7	48.9	47.7	61.1	60.1	49.4
Accessing government information, or form lodgment	44.6	42.0	47.1	39.4	43.5	46.3	51.1	61.0	44.2

(a) Proportions are of all adults

(b) Refers to mainly urban areas only

3. BUSINESS ENTERPRISE SECTOR

Survey Methodology

25. The ABS has conducted economy wide surveys on the use of Information Technology and Telecommunications (IT&T) by employing businesses in respect of 1993-94 and 1997-98. The 1993-94 survey mainly focused on issues related to computer use, while the 1997-98 survey collected a broader range of data with particular emphasis on Internet use by business (but also covering computer use, electronic commerce activities and barriers to the use of technology). The 1997-98 questions covering the electronic commerce topic comprised the following:

- Which of the following functions were undertaken using the Internet during 1997-98
 - Purchase of goods and services
 - Placing purchase orders
 - Receiving invoices
 - Making payments
 - Sales of goods and services
 - Marketing/promotional activities
 - Receiving sales orders
 - Sending invoices
 - Receiving payments
 - Coordinating delivery arrangements
 - Other transactions
 - Email
 - Lodging government forms/tenders
 - Other
- Estimate the value of sales orders received via the Internet during 1997-98
- Estimate the percentage of these sales orders paid for online via the Internet during 1997-98
- Provision of EFTPOS facilities to clients.

26. The 1997-98 survey consisted of a stratified random sample of 6,800 businesses recorded on the ABS Business Register, with the population frame consisting of all business units in the Australian economy except for:

- agricultural businesses (defined in Division A of ANZSIC)
- education organisations (defined in Division N of ANZSIC)
- businesses classified to the General Government Sector (noting that Public Trading Enterprises are included in the survey)
- non-employing businesses in all industries.

27. The unit for which statistics were reported in the survey was the management unit. The management unit is the highest-level accounting unit within a business or organisation, having regard to the required level of industry homogeneity, for which a set of accounts is maintained. In most cases it coincides with the legal entity owning the business (ie. company, partnership, trust, etc.). However, in the case of large diversified businesses, there may be more than one management unit, with each coinciding with a 'division' or 'line of business'. A division or line of business is recognised where separate and comprehensive accounts are compiled for it.

28. Particular attention was given to the reporting by business ancillary corporate units (which are classified to ANZSIC 7855 - Business management services, 7854 - Business administrative services and 7834 - Computer consultancy services) to ensure that expenses of operational units within the group were reflected correctly in ancillary units.

29. Attention was also given to the reporting of web sites by multi management unit enterprises to ensure consistency of reporting.

30. Many problems encountered in the 1997-98 survey resulted from either an inadequate sample size for the level of detail required, the nature of some of the questions which proved difficult for respondents to answer, or in a small number of cases, to inadequate design of questions. Regardless of this, the survey has produced some very useful estimates on business use of the Internet and e-commerce activity.

31. Unfortunately, many of the publication tables contain details affected by high standard errors mainly because the details relate to small population groups coupled with a small sample. This is particularly so in tables presenting an industry dissection. Estimates for the Electricity, gas and water supply industry were a particular concern and are considered unreliable due to the small sample size in the survey for this industry. It is considered that the data relating to the various penetration rates for this industry are not representative of the whole population and have been suppressed.

32. Responses to a number of data items were considered of insufficient quality to publish. Only 315 of the 6,800 employing businesses selected answered positively to receiving sales orders via the Internet. Of this number, only 300 were able to give the value of sales orders received with a large percentage of these having made estimates as primary data were not available. Only 79 were able to provide a percentage of sales orders paid for online. Some of the larger respondents could not supply reliable data mainly because at the time the survey was conducted, many of these services were newly established and their systems had not been changed to be able to separately identify Internet sales (payments made by credit card could not be distinguished from other sources of credit card payments). For other respondents, the value of Internet transactions was very small compared with their total transactions.

33. Because the survey attempted to collect a variety of information including employment, income and expense details, in addition to technology use details, it took longer for respondents to complete the questionnaires and for ABS to process the information (various reporting problems were encountered). Overall, the timeliness for release of the results was poor for the 1997-98 survey.

34. Given the expected rapid increase in e-commerce, the current biennial survey strategy is not considered to be sufficiently responsive. It is proposed to conduct more frequent collections with

data items, methodology and procedures designed to allow rapid processing and dissemination of at least key survey results.

35. ABS proposes to conduct the next business use of technology survey in respect of 1999-00, and thereafter on an annual basis. As the sample is expected to be substantially greater than the 1997-98 survey (in order to address the issue of measuring small population groups), a number of survey methodological issues are being examined. The possibility of conducting the survey on a more targeted basis or on a two phase basis, with the first phase mainly involving tick box type questions on technology usage, barriers to use of IT, e-commerce activity and similar questions is being considered. The second phase could collect data on the more difficult questions on intensity of use (how is IT being used and what are the benefits), value of electronic transactions, expenditure on IT&T and IT&T employment, which may be better run on a CATI system.

Summary of Survey Results

36. The results from the survey which outline business use of the Internet and their e-commerce activities are shown below. There were 29% of employing businesses with Internet access at the end of June 1998, with just over half of these having gained access before July 1997. About 16% of businesses had gained access prior to July 1997 and another 13% gained access during 1997-98. A further 14% of businesses were intending to gain access to the Internet during 1998-99, lifting the expected rate of access to the Internet to 43% of employing businesses by June 1999. Based on intentions reported at June 1998, it is estimated that at June 1999, 94% of businesses employing 100 or more persons would have had access to the Internet, compared to 71% of businesses employing 20-99 persons, 50% of businesses employing 5-19 persons and 36% of businesses employing 1-4 persons.

37. While 29% of businesses had access to the Internet, only 6% of businesses had a web site/home page at June 1998. A further 15% of businesses were intending to establish a web site/home page during 1998-99, lifting the expected proportion of businesses with a web site/home page to 21% of employing businesses by June 1999. Based on intentions reported at June 1998, it is estimated that at June 1999, 83% of businesses employing 100 or more persons would have had established a web site/home page, compared to 50% of businesses employing 20-99 persons, 25% of businesses employing 5-19 persons and 16% of businesses employing 1-4 persons.

	BUSINESS USE OF THE INTERNET, BY EMPLOYMENT SIZE						
	Number of employing businesses ('000)	With technology at June 1998			Without technology but intended to adopt by June 1999		
		Internet access		Total %	Website/ Homepage %	Internet access %	Website/ Homepage %
		Gained prior to July 1997 %	Gained During 1997- 98 %				
1 - 4 persons	390	13	11	24	4	12	12
5 - 19 persons	171	18	14	32	8	18	17
20 - 99 persons	37	32	24	56	21	15	29
100+ persons	5	36	51	87	58	7	25
Total	603	16	13	29	6	14	15

38. Access to the Internet at the end of June 1998 was highest in Mining (46%), Communication services (45%), and Property and business services (44%). In contrast, industries such as Accommodation, cafes and restaurants (14%), Retail trade and Construction (both with 17%) and Transport and storage and Personal and other services (both with 20%) had the lowest proportion of Internet access. The highest incidence of web site/home page occurred in Mining (19%), Cultural and recreational services and Communication services (both with 13%) and Finance and insurance (12%) industries.

39. Agricultural businesses were not within scope of the 1997-98 Business Technology Survey and are therefore not included in any of the tables. However, information on the use of IT&T by farms was collected in ABS' 1997-98 Agriculture Commodity Survey, results of which indicate that of the 145,000 farms in Australia at March 1998, an estimated 11% had Internet access. An additional 4% of farms were intending to acquire access to the Internet by March 1999, lifting the expected rate of access to the Internet to 15% of farms by March 1999. The current farm survey for 1998-99 includes questions on location of Internet access, frequency of access, cost of Internet services, importance of particular Internet services and Internet shopping activity, results of which will be available in March 2000. It is proposed that future farm surveys will include only core items (unless user funding is available). The core items will be on use of computers and the Internet and an Internet intentions question. This survey is able to provide good regional information (down to Australian Statistical Division level at least).

BUSINESS USE OF THE INTERNET BY INDUSTRY					
	Number of employing businesses (^{'000})	With technology at June 1998		Without technology but intended to adopt by June 1999	
		Internet access %	Website/ home page %	Internet access %	Website/ home page %
		Mining	2	46	19
Manufacturing	48	31	8	14	15
Electricity, gas & water supply (a)	n.p.	n.p.	n.p.	n.p.	n.p.
Construction	78	17	*4	15	10
Wholesale trade	43	38	10	18	24
Retail trade	110	17	*2	9	9
Accommodation, cafes & restaurants	31	14	*5	13	10
Transport and storage	31	20	5	15	14
Communication services (b)	3	45	*13	**13	*17
Finance & insurance	18	39	*12	*11	*10
Property & business services	142	44	8	15	21
Health & community services	49	33	*5	16	14
Cultural & recreational services	15	33	13	16	19
Personal & other services	33	20	9	9	11
Total	603	29	6	14	15

(a) Not available separately but included in totals - small sample size has affected quality of estimates
(b) Includes telecommunications services and postal and courier services

40. At the end of June 1998, 15% (92,000) of employing businesses offered Electronic Funds Transfer Point of Sale (EFTPOS) facilities to clients. A large number of these businesses (77%) were in the Retail trade (44,000 businesses), Accommodation, cafes and restaurants (13,000), Health and community services (8,000) and Wholesale trade (6,000) industries. The use of this technology varied with the size of the business with 9% of businesses employing 1-4 persons offering EFTPOS compared with 32% of businesses employing 100 or more persons. There was a higher incidence of the use of EFTPOS than other technologies, with only 6% of businesses using barcoding/scanning systems, 3% using video conferencing/teleconferencing and 2% using interactive voice response.

OTHER TECHNOLOGIES USED, AS AT JUNE 1998, BY EMPLOYMENT SIZE		
	Interactive voice response %	EFTPOS %
1 - 4 persons	*2	9
5 - 19 persons	*2	25
20 - 99 persons	*3	27
100+ persons	7	32
Total	2	15

41. Most employing businesses with access to the Internet at the end of June 1998 used the Internet for email (92%). The proportion of businesses using the Internet for email did not vary greatly with

the size of the business. Of the 174,000 employing businesses with access to the Internet at the end of June 1998, 16% used the technology to place purchase orders and 10% to receive sales orders. Invoices were sent via the Internet by 7% of businesses with access to the Internet, and were received by 8% of businesses. While 8% of businesses with access to the Internet made payments over the Internet, only 2% of such businesses received payments over the Internet.

42. Marketing and promotional activities on the Internet were carried out by 23% of businesses with Internet access. This was more prevalent in businesses with Internet access employing more than 100 persons, where 44% carried out marketing and promotional activities, as compared with 16% of businesses employing 1-4 persons. Other uses of the Internet included coordinating delivery arrangements (9% of businesses with Internet access) and lodging government forms or tenders (7%).

BUSINESS USE OF THE INTERNET FOR SELECTED ACTIVITIES AT JUNE 1998, BY EMPLOYMENT SIZE					
	1-4 persons	5-19 persons	20-99 persons	100+ persons	Total
Marketing & promotional activities (%)	16	26	41	44	23
Placing purchase orders (%)	16	18	15	17	16
Receiving sales orders (%)	8	10	*17	10	10
Sending invoices (%)	9	*5	*1	*3	7
Receiving invoices (%)	*8	9	*4	4	8
Making payments (%)	*8	9	*7	5	8
Receiving payments (%)	*1	*3	*1	*2	*2
Coordinating delivery arrangements (%)	*7	13	10	9	9
Lodging government forms/tenders (%)	*4	9	*10	16	7
Email (%)	90	94	93	94	92
Other transactions (%)	16	12	*12	17	14
Number of businesses with Internet access ('000)	94	54	21	5	174

43. Because of the small sample size for the survey and the small number of businesses involved in the various Internet activities, industry details for the above table are subject to sampling variability too high for most practical purposes and have not been included in this report.

4. GENERAL GOVERNMENT SECTOR

Survey Methodology

44. Technology use surveys of general government organisations were conducted in 1993-94 and 1997-98 and have been designed to complement the business surveys of technology use. The surveys cover federal, state/territory and local government organisations recorded on the ABS Business Register classified to the General Government (including the Reserve Bank of Australia) class of the Standard Institutional Sector Classification of Australia (SISCA).

45. Government units are unique kinds of legal entities, established by political processes, which have legislative, judicial or executive authority over other institutional units within a given area. The principal functions of government units are to assume responsibility for the provision of goods and services to the community or to households, and to finance their provision out of taxation or other incomes; to redistribute income and wealth by means of transfers; and engage in non-market production. They also include unincorporated enterprises owned by government units, provided they are not recognised as quasi-corporations. Exclusions from the population frame were:

- Education organisations (defined in Division N of ANZSIC);
- Foreign Government Representation (defined as ANZSIC 8130)
- Businesses classified to the Corporations, Financial sectors, Non-Profit Institutions and Households (defined as SISCA).

46. A number of methodology issues were encountered with this survey. The main issues concerned the quality of the frame and sample selection procedures, coverage of reporting by government

departments and reporting of some of the data.

47. The delineation of boundaries for government organisations was complicated by the variety of ways in which these organisations arranged their IT operations. In addition, departments responded in a variety of ways, including covering statutory authorities coming under their umbrella (potential for double counting) and excluding decentralised operations or certain IT operations (potential for under counting). Some of the data requested was not readily available from the government organisations, particularly on IT&T employees and IT&T expenditure. A reasonable amount of effort has been required to clarify and confirm details with respondents and this has delayed release of results. Results from the 1997-98 Government Technology Survey are expected to be available in early November 1999.

48. The content of the questionnaires have followed very closely that of the technology surveys of businesses. The 1997-98 questions covering the electronic commerce topic comprised the following:

- Which of the following functions were undertaken using the Internet during 1997-98
 - Purchase of goods and services
 - Placing purchase orders
 - Receiving invoices
 - Making payments
 - Sales of goods and services
 - Marketing/promotional activities
 - Receiving sales orders
 - Sending invoices
 - Receiving payments
 - Coordinating delivery arrangements
 - Other transactions
 - Email
 - Lodging government forms/tenders
 - Other
- Provision of EFTPOS facilities to clients.

49. Although many of the current data items requested are relevant to government organisations, there is a need to focus more on the types of services that are being provided online by government. By using on-line services, government becomes a key driver of growth of the information economy as well as enabling government to become more efficient. Various goals in the Australian context are that all government services are to be offered on-line by 2001, a single point of access to government services and establishment of an on-line authentication framework. Therefore it is proposed to review the range of data to be collected on a biennial basis from government organisations and to include questions on capability of government organisations to offer services on-line. However, ABS has, and will continue to, collect information on use of government services by households, businesses and farms.

5. INTERNET COMMERCE AND AUSTRALIA'S INTERNATIONAL ACCOUNTS

50. Significant, and rapidly evolving, market place developments often pose both challenges and opportunities for statisticians in measuring and reporting on economic phenomena. The challenges relate both to: the adequacy of existing data sources (including survey frames) and compilation methods to capture and report on existing economic measures (such as national and international accounting aggregates); and the need to develop new statistical measures to reflect on the market place developments that policy may need to address.

51. The ABS does not consider that current and expected developments in Internet commerce pose a significant threat to the quality and accuracy of Australia's national and international accounts statistical series that are compiled for broad interpretation and policy analysis. The ongoing adaptation of existing data sources by the ABS to its changing context are expected to deal effectively with the implications of Internet commerce.

52. This section of the paper looks at a few instances where Internet commerce might be expected to impact on the international accounts (balance of payments, international investment and merchandise trade), and discusses the significance for the statistics and the ABS response.

Administrative data sources

53. The ABS relies very heavily on the administrative records of other government agencies in the development of its macroeconomic statistics. Chief among these sources for the international accounts, and one which might be affected by Internet commerce, is the international trade records of the Australian Customs Service (ACS).

54. Currently, goods entering or leaving Australia do not require (but often are accompanied by) customs documentation if the value is low (for postal parcels the limits are \$2,000 for exports and \$1,000 for imports; for other than postal shipments, the current thresholds are \$500 for exports and \$250 for imports). Many of these low value shipments are small value gifts, for which omission from ABS international trade in goods statistics is matched by the omission of the measurement of the gift in current transfers so that the international accounts remain in balance. This matched omission is relatively small in absolute size and is not considered significant for the analysis and interpretation of balance of payments statistics. The ABS analyses the scale of low value customs entries being processed and keeps a watching brief on possible structural changes (such as changes in the reporting thresholds, and the significance of activity below the thresholds) that might affect the quality of these by-product data.

55. The following paragraphs explain the implications for measuring the goods trade of the different possibilities for purchases of goods from overseas via the Internet, and the likely scale of some of those possibilities. Our conclusion from this analysis is that, to date, the Internet has not emerged as a quality concern, nor is it expected to do so.

56. Where the goods are purchased by households (traditionally by mail order or over the telephone) then payment will generally be effected through a credit or debit card transaction. In Australia's balance of payments these expenditures are reflected in statistics as if they were payments made abroad for goods and services acquired by Australian residents when travelling abroad. The offsetting settlements are recorded in the financial account using data obtained through surveying the financial institutions that participate in the net settlements involved. In other words, the commodity details in the Australian balance of payments make no distinction between using a credit card while abroad, and using it to make purchases from abroad over the Internet. Conceptually the goods ordered and paid for over the internet should be recorded as merchandise goods rather than as travel goods and services. The amounts are not yet large (see below), and alternative compilation methods, using existing data sources, are being investigated to both monitor its growth and to prepare for reclassification of the expenditures should the amounts become significant.

57. Households may use stored value cards or network money (unaccounted electronic cash that eliminates the need for a third party to intermediate transaction settlement), either to achieve anonymity or simply as a payment preference. Cross-border expenditures by households using these modes of payment, for products delivered either electronically or as low value goods shipments, would not be readily captured by existing sources as purchases of goods and services in Australia's balance of payments. The financing side of the transactions would be reflected indistinguishably in broad interbank positions. However, a *Discussion Report of the Australian Taxation Office (ATO)*

Electronic Commerce Project (August 1997) notes, in paragraph 5.2.3, that credit cards were then still the preferred method of payment by Australian Internet users.

58. Regardless of the payment instrument used, from the household survey discussed above in Section 2 of this paper, it is estimated that overseas Internet purchases by Australian households in the 12 months to May 1999 was in the order of \$80 million to \$90 million per annum, and probably grew by 10% to 15% through the year from the level of purchases from overseas observed in May 1998. Much of these Internet purchases are in the traditional mail order categories (books, music, clothing) and probably reflects a significant amount of traditional mail order business being replaced by Internet purchases for the same products. Currently, international parcel delivery costs over long distances to Australia may hinder the growth of this small parcel activity, regardless of the ease of Internet ordering and payment.

59. Where goods are purchased by businesses from abroad in small lots below the existing administrative thresholds, and the businesses use credit/debit cards for settlement, then the measurement and treatment issues in the balance of payments are the same as for households, i.e., customs entries may not be lodged and the purchases may be recorded as travel goods and services. If a business uses a chequing or similar settlement arrangement (other than credit/debit card), then these acquisitions still may not be captured in customs records (although many such entries are currently reported to the ACS), nor will they be captured indirectly as travel expenditures. In either case, the financing side of the transactions will be indistinguishably included in broader measures. The ABS does not consider that this undocumented importing activity is currently large, nor is it likely to expand rapidly in the short term, as a result of Internet commerce. And again, the current costs of international parcel delivery to Australia may hinder growth.

60. Whether goods are ordered by households or business, if the form of commerce is that the goods are ordered internationally but distributed locally from consolidated shipments, then the traditional administrative source will capture these larger shipments.

ABS surveys

61. The ABS conducts several surveys, primarily of businesses, that provide information for the compilation of the international accounts as well as providing other important and related information. Generally the statistical inquiries to these businesses ask about their cross-border trade in services and their international investment activity without regard to the medium for either delivery of the service or settlement for the transactions. Where services are acquired or delivered by businesses, either as digital download or more traditionally through other media after being negotiated/settled on the Internet the ABS surveys will continue to capture these cross-border services transactions from the businesses involved. Shifting the ordering, delivery and payment from traditional methods and onto the Internet has no direct bearing on the measurement of the underlying cross-border transactions.

62. The introduction in Australia of a goods and services tax from 1 July 2000 offers the prospect of more accurately identifying all businesses engaged in cross-border trade in services, and therefore providing improved coverage of the cross-border trade regardless of the addition of the Internet as a medium of delivery and payment.

63. However, if Internet commerce were to increase on a substantial scale, existing compilation difficulties regarding the measurement of foreign financial assets held directly by households may be exacerbated (currently only partially captured through business surveys of the counterparties involved). Some methodologies may require adjustment. For example, Internet commerce may make it easier for households to maintain overseas bank accounts and use these accounts in the settlement of transactions both domestically and with non-residents. What is already a difficult area to measure in Australia's international investment position may become both more difficult and

perhaps more significant. Current investigations into using partner country information and global cooperation in collecting and sharing statistical data on cross-border financial claims have not yet identified any significant coverage deficiency in this area. The increased pace of global cooperation in this area is expected to plug any developing gap in coverage sources.

64. Another area of compilation difficulty surrounds the new types of traded services being developed. In developing both price indexes and volume estimates for trade in services, the novelty and rapidly changing nature of the services, and the changing share of activity that they represent, will pose measurement issues for the ABS. It may be necessary to conduct specific data collection and measurement activities to address these issues in coming years.

Related microeconomic analyses

65. While the major international accounts series have data sources that can cope with the impact of Internet commerce, there are areas of statistical analysis that could be adversely affected. For example, analyses of the music industry currently can examine the extent of compact disc imports in estimating import penetration, competitiveness and developing market demand. If more and more CDs enter as parcel post packages, or the music is downloaded directly from abroad, they will be included indistinguishably in the balance of payments as imports of goods and services, but possibly without detailed commodity identification, and some market intelligence may be lost. Residual approaches may have to be developed, such as measuring total household expenditure on CDs and downloaded music, and using local supply to impute import levels.

66. The ABS has already recognised the user interest in information about the extent of Internet activity, ie., understanding how businesses, households and government are using the net is an issue about which the community needs to have information. The ABS programs of information, technology and telecommunications statistics addressing this need are discussed in Sections 2 to 4 above. Any additional areas of user interest will need to be examined to ascertain whether: existing analyses are suffering over time; alternative approaches are necessary; or the priority no longer exists for a particular form of analysis under the new paradigm of Internet commerce.

6. REFERENCES

Business Use of Information Technology, Australia, 1997–98 (Cat. no. 8129.0)

Government Information Technology, Australia, 1993–94 (Cat. no. 8119.0)

Household Use of Information Technology, Australia, 1998 (Cat. no. 8146.0)

Use of the Internet by Householders, Australia, May 1999 (Cat. no. 8147.0)

Use of Information Technology on Farms, Australia, 1997-98 (Data report no. 8150.0.40.001)

7. SYMBOLS AND OTHER USAGES

n.p.	not available for publication but included in totals where applicable
*	subject to sampling variability too high for most practical purposes
**	subject to sampling variability too high for practical purposes