

Business Use of the Internet in Australia*

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Abstract

This paper provides summary statistics of Internet usage by Australian businesses using several data sources. Aggregate statistics are provided from the Australian Bureau of Statistics (ABS) *Business Use of Information Technology*. More detailed information on firm characteristics and Internet usage are provided from the *Melbourne Institute Business Survey*, conducted by the Melbourne Institute of Applied Economic and Social Research. Despite being a relatively new phenomenon, the academic research to date has already generated some general observations. The first of these is that Internet use is only beneficial to the organisation if it is incorporated into an overall strategy. Evidence from the *Melbourne Institute Business Survey* shows organisations that were strong in at least one competitive strategy (that is, operational excellence, customer intimacy or product leadership) were more likely to use particular features of the Internet than the rest of the sample. The academic research also indicates that there are significant differences in Internet adoption depending on the type of industry the organisation operates in. Again, the *Melbourne Institute Business Survey* shows that Internet usage does indeed vary across industries, with manufacturers more likely to use the Internet for the co-ordination of delivery arrangements, whereas the service industries are more likely to use the Internet for customer self-service and personnel benefits.

1. Introduction

This paper provides summary statistics of Internet usage by Australian businesses using several data sources. Use of the Internet by Australian businesses and households is now quite extensive, increasing from 29 per cent of businesses and 16 per cent of households in 1998 to 69 per cent of businesses in 2001 and 33 per cent of households in 2000. It is not completely clear however what types of businesses are at the forefront of this push to utilise the Internet, and what types of Internet usage businesses find most useful. The information provided in this paper aims to fill part of this gap.

Several different data sources will be used to give an overview of the characteristics of Australian businesses and their Internet usage. Aggregate statistics are provided from the Australian Bureau of Statistics (ABS) *Business Use of Information Technology*. More detailed information on firm characteristics and Internet usage are provided from the *Melbourne Institute Business Survey*, conducted by the Melbourne Institute of Applied Economic and Social Research.

Section 2 contains a brief discussion of why the Internet has generated so much interest in the academic, policy and business arenas, including a short review of some of the more salient points of the academic literature to date. Section 3 then provides some aggregate information for Australia. More detailed information from the Melbourne Institute Business Survey is provided in Section 4, including a breakdown by industry, competitive strategy, management style and innovativeness. Section 5 outlines some of the barriers to greater adoption of the Internet, and Section 6 concludes.

2. Why the Interest in the Internet?

The strong growth in US productivity over the past decade has coincided with the rapid take-up of new developments in IT, particularly the use of e-commerce as a business to customer tool, where 'customers' refer to final consumers and/or businesses along the supply chain (McAfee 2001). Partly in response to this phenomenon, the US has been at the forefront of attempts to measure and analyse how extensive use of e-commerce is, with the census bureau now publishing retail e-commerce sales and providing several papers for discussion and comment on measuring the electronic economy.¹ They also have a supplement incorporated

¹ See for example, <http://www.census.gov/econ/www/ebusiness614.htm>.

into their survey of manufacturing businesses designed to measure integration of E-commerce and E-business into manufacturing plant day-to-day operations and business processes.

Following the failure of a significant number of dot.com companies, most commentators and analysts have taken a step back in order to realistically assess what is and is not possible with the Internet. There is no question that it is a significant technological development. The sheer flexibility of the Internet enables it to be used for an extremely large and diverse range of business activities. Porter (2001) provides an outline of how the Internet can be used in each stage of the supply process, and identifies several prominent applications of the Internet. These include firm infrastructure; human resource management; technology development; procurement; inbound logistics; operations; outbound logistics; marketing and sales; and after-sales service.

Exactly how to extract the benefits of this technological development is a more difficult question to answer. While it has so far been difficult to quantify the cost savings from utilising the Internet (Pilat and Lee 2001), estimates from the US indicate that they could be in the order of between 1 to 5 per cent of GDP (Kenney and Curry 1999; Litan and Rivlin 2001), or an annual contribution to baseline productivity growth of 0.2 to 0.4 per cent (Litan and Rivlin 2001). In Australia, it has been suggested that there could be a 25-50 per cent saving in procurement costs, which represents a 10-15 per cent saving in product costs (Boston Consulting Group 2001, p. 6). While cost savings are important, the use of e-commerce may also lead to new opportunities for innovation and value creation, as well as opportunities for Australian firms to become producers of e-commerce technology. By 2010, it is estimated that e-business will potentially be worth \$30-35 billion per year (Boston Consulting Group 2001, p. 6-7). However, early discussions in the Australian context indicate that Australian business and government will have to adopt a focused strategy to ensure that the Australian economy can benefit from e-commerce. According to the Business Council of Australia, Australians have adopted the new technology at a relatively rapid rate (compared to the rest of the world) but still lag the rest of the world in terms of innovation across the economy, generating e-commerce technologies and developing the necessary skill base through the education system (Boston Consulting Group 2001, p. 2).

The interest in the Internet has spawned several new journals dedicated to electronic commerce and the Internet, in addition to articles in established journals. Topics covered range from the effect of the Internet on competition to the Internet and property rights.

Despite being a relatively new phenomenon, this research has already generated some general observations. The first of these is that Internet use is only beneficial to the organisation if it is incorporated into an overall strategy (Litan and Rivlin 2001; Porter 2001; Schlauch and Laposa 2001). A direct outcome of this observation is that small to medium enterprises are less likely to successfully adopt Internet technologies—in terms of giving them an advantage over their competitors—as such firms generally adopt the Internet for communication requirements rather than strategic reasons (Sadowski, Maitland et al. 2002). As such, the adoption of different types of competitive strategy, which is examined in Section 4.2, are likely to show significant differences in Internet usage.

The research to date has also shown that there are significant differences in the types of Internet usage depending on the industry the organisation operates in (Cheng, Cheung et al. 2002). Manufacturers tend to use the Internet for supply-chain management issues, such as information sharing, interaction with suppliers, sharing of production schedules, product development, and procurement (Fine and Raff 2001; Litan and Rivlin 2001). In contrast, finance, health and government services are more likely to use the Internet for the purposes of lowering transaction costs, and would therefore find areas such as customer self-service and on-line sales more suited to their needs (Clemons and Hitt 2001; Danzon and Furekawa 2001; Fountain 2001). Section 4.1 looks in more detail at Internet usage by industry to determine whether there are indeed any differences in usage across large Australian organisations.

3. Aggregate Statistics on Internet Usage²

The ABS first started publishing statistics on Internet usage in 1999, with the release of *Business Use of Information Technology, 1997-98*.³ Table 1 uses three of these surveys, and shows that in 1998, 29 per cent of businesses were using the Internet, a figure that has since increased to 69 per cent of businesses in 2001. Although comparable statistics are not available across the three years available (1998, 2000, 2001), Table 1 indicates that the most

² Unfortunately, there is limited information available to make meaningful statistical comparisons across countries. Therefore, this paper does not include statistical inter-country comparisons of business use of the Internet.

³ Although there was a 1997 release of *Business Use of Information Technology*, this publication referred to statistics collected in 1993-94, and had no record of Internet usage, only computer usage in general.

utilised function of the Internet has been for Email. Information searches are also a relatively high-use item.

Table 1: Business Use of the Internet

	1998	2000	2001
Selling related activities			
Advertising or promoting goods & services (%)	-	-	26
Receiving orders for goods & services from customers (%)	10	15	13
Receiving payments & orders for goods & services from customers (%)	2*	7	7
Sending invoices to customers (%)	7	9	14
Delivery of products electronically (%)	-	3	8
Providing after sales service (%)	-	11	10
Purchasing related activities			
Searching for availability or cost of goods & services (%)	-	-	44
Ordering goods & services from other organisations (%)	16	18	29
Receiving invoices from other businesses (%)	8	9	18
Receiving products electronically (%)	-	-	15
Seeking after sales service (%)	-	-	14
Government services			
Accessing any government service (%)	-	44	57
Electronic lodgement of:			
Taxation forms or payments (%)	-	-	20
Claims for grants or benefits (%)	-	-	2
Applications for licences or permits (%)	-	-	5
Payments (e.g. rates, licence fees) (%)	-	-	13
Seeking information or services relating to:			
Taxation (%)	-	-	39
Employment (%)	-	-	20
Regulation (%)	-	-	25
General activities			
Email (%)	92	91	92
Information searches (%)	-	85	80
Banking & financial services (%)	-	36	59
Advertising or promoting the business (%)	23	27	27
Businesses with Internet access ('000)	174	361	482
Total number of businesses ('000)	603	641	698
Businesses with Internet access (% of total businesses)	29	56	69

Source: *Business Use of Information Technology*, ABS Cat. No. 8129.0, various issues.

*Estimates have a relative standard error between 25% and 50%

In some areas, growth in rates of use is relatively slow, if it increases at all. Selling related activities appear to be particularly affected. For example, receiving orders and/or payments for goods and services from customers, providing after-sales service, and advertising or promoting the business (listed under “general activities”) have all been relatively steady. On the other hand, businesses are getting more mileage out of purchasing related activities, although for some of these uses, information is available only for 2001. Ordering goods and

services from other organisations has increased from 18 to 29 per cent of businesses in the space of a year, and receiving invoices from other businesses has doubled over the same time period. 44 per cent of businesses now use the Internet to search for the availability or cost of goods and services. Banking and financial services have also risen rapidly in importance, from just over a third of businesses in 2000 to more than half in 2001.

In recognition of the important role that the Internet plays for government services (Fountain 2001), the most recent issue of *Business Use of Information Technology* provides a more detailed breakdown of how businesses use the Internet to access government services. More than half of businesses now use the Internet to access any government service, and one-fifth use it for the electronic lodgement of taxation forms or payments.

Table 2 shows that just under a third of businesses with Internet access also have a web page for their business, representing 22 per cent of all Australian businesses. The majority of businesses with a web page indicate that they use it to provide information about the business, advertise the business' own products, and provide an enquiry or contact facility for their customers.

Between 2000 and 2001, there was relatively little growth in the extent of Internet usage across most functions. The primary exception is the advertising of other businesses on their web page. While there is no detail as to what types of businesses are advertised, it could probably safely be assumed that such advertising is of businesses that are complementary to their own, or who are taking advantage of a Web page that is visited frequently by a large portion of the population. For example, the Telstra White Pages website (www.whitepages.com.au) has several different advertisements on the front page, some of which are complementary—such as www.whereisit.com.au (a map service)—and some of which appear to be pure advertising, such as Land Rover, CitySearch and eBay.

Table 2: Web Based Functions

	2000	2001
Information		
Information about the business (%)	88	91
Advertising of the business' own products (%)	79	73
Recruitment information (%)	9	9
Search facility (%)	-	20
Relationship with other organisations		
Advertising other business' (%)	9	20
Links to other web sites (%)	37	38
Relationship with customers		
Inquiry or contact facility (%)	-	73
Customer account information (%)	4	4
Facility to track orders (%)	2	2
Personalised page for repeat customers (%)	2*	2
Selling related activities		
Online ordering (%)	14	14
Shopping cart facilities (%)	3	4
Online payment capabilities (%)	5	5
Capability for secure access or transaction (%)	6	5
Integration with back end systems (%)	4	3
Other (%)	5	3
Businesses with Internet access ('000)	361	482
Total number of businesses ('000)	641	698
Businesses with a Web presence ('000)	103	153
Businesses with a Web presence (% of businesses with Internet access)	29	32
Businesses with a Web presence (% of total businesses)	16	22

Source: *Business Use of Information Technology*, ABS Cat. No. 8129.0, various issues.

*Estimates have a relative standard error between 25% and 50%

The ABS also provides aggregate statistics on business perceptions of the benefits of Internet usage, and the effects of Internet selling. Table 3 presents summary statistics on the benefits of Internet usage, and indicates that of the 20 per cent of businesses that use the Internet for purchasing, half indicated that it reduced business or transaction costs, and 87 per cent indicated that it saved time. Table 4 presents summary statistics on the effects of Internet selling, and indicates that the same benefits were not as apparent for the 9 per cent of businesses that use the Internet for selling—only around a quarter of respondents indicated that it reduced business costs, with a similar number reporting that it *increased* business costs. Nevertheless, 86 per cent of businesses indicated they obtained some benefit from utilising the Internet for selling their products and services, and 96 per cent reported they obtained a benefit from purchasing via the Internet, primarily through its time saving properties.

Table 3: Benefits of Internet Usage, 2001

<i>Benefits of Internet Selling</i>	
Increased quality of customer service (%)	56
Reduced business costs (%)	26
Increased sales or customers (%)	52
Increased efficiency of business procedures (%)	57
Increased competitiveness (%)	55
Increased trading outside normal business hours (%)	61
Increased trading outside local area (%)	63
Businesses receiving a benefit from Internet selling (%)	86
Businesses earning income via the Internet or Web ('000)	61
<i>Benefits of Internet Purchasing</i>	
Reduced business or transaction costs (%)	50
Time saving (%)	87
Increased access to, and awareness of, suppliers (%)	47
Ability to track orders (%)	17
Compliance with supplier requirements (%)	10
Keeping pace with competitors (%)	17
Businesses receiving a benefit from Internet purchasing (%)	96
Businesses purchasing via the Internet ('000)	140

Source: *Business Use of Information Technology*, ABS Cat. No. 8129.0, 2001.

Businesses were allowed to choose multiple benefits

Table 4: Effects of Internet Selling (per cent of businesses earning income via the Internet or Web)

	Decreased	Increased	No change	Not applicable
Quality of customer service	2*	56	36	6
Business costs	26	25	43	6
Sales or customers	1	52	44	3
Efficiency of business procedures	2*	57	35	6
Competitiveness	1*	55	38	6
Trading outside normal business hours	—	61	31	8
Trading outside local area	—	6	28	9

Source: *Business Use of Information Technology*, ABS Cat. No. 8129.0, 2001.

— nil or rounded to zero (including null cells)

*Estimates have a relative standard error between 25% and 50%

To summarise:

- Internet usage has increased from 29 per cent of businesses in 1998 to 69 per cent in 2001;
- The key areas of growth in usage include ordering goods and services from other organisations, receiving invoices from other businesses, and utilising banking and financial services;

- 22 per cent of all Australian businesses have a web page for their business, which is primarily used to provide information about the business;
- The vast majority of businesses using the Internet for purchasing and/or selling indicated that they gained some benefit from doing so.

4. What the Melbourne Institute Business Survey Says About Internet Usage

Despite the apparent potential of Internet technology, there is a paucity of publicly available data that would allow a more thorough investigation of who uses the Internet and why.⁴ In order to fill part of this gap, questions regarding Internet use were incorporated into the Melbourne Institute Business Survey, which surveyed the top 1000 enterprises (as measured by total revenue) on issues ranging from industrial relations to management style.⁵ Based on initial calls, 813 surveys were mailed out, with 281 useable surveys returned to the Melbourne Institute, representing a response rate of 28 per cent, which is consistent with surveys of this type. The distribution of responses across industries does not differ markedly from the initial selected population implying that the responses should not be biased towards a particular group. The main exceptions are a slight over-representation of electricity, gas and water suppliers, transport and storage and education, with a corresponding under-representation of organisations from wholesale trade and finance and insurance.

An initial pilot study of Porters original wording by one of the research team revealed that it was too unwieldy to use in the survey instrument. The statements were finally narrowed down such that the statements in Table 5 represented the prominent applications.

⁴ The primary public data sources are the 1997 and 1998 waves of the ABS Business Longitudinal Survey (which is now somewhat out-of-date) and ABS Cat. No. 8129.0, *Business Use of Information Technology* (1998, 2000, 2001).

⁵ The survey was part of a collaborative research program entitled *The Impact of Enterprise and Workplace Focused Industrial Relations on Employee Attitudes and Enterprise Performance*. The project was supported by the Australian Research Council, the Business Council of Australia, the Committee for the Economic Development of Australia and IBISWorld.

Table 5: The Supply Process and Internet Usage

Section of the supply process	Internet usage
Firm infrastructure	Sharing & dissemination of organisation information
Human resource management	Self-service personnel, benefits administration or training
Technological development	Knowledge directories, and procedure or process manuals
Procurement	Internet-enabled linkage of purchase, inventory & forecasting systems with suppliers
Inbound logistics	Collaborative product design/service coordination across locations
Operations	Coordination of delivery arrangements
Outbound logistics	Real-time transaction of orders (availability/delivery time)
Marketing and sales	Sharing & dissemination of competitor information
Marketing and sales	On-line sales channels including Web sites & Internet marketplaces
After-sales service	Customer self-service via Web sites & intelligent service request processing

Source: Adapted from Porter (2001)

Respondents were asked to rank the extent to which they used a variety of Internet-enabled business practices, where 1 represented ‘not at all’ and 7 represented ‘a very great extent’. Only three respondents indicated that they did not use the Internet for any of the listed options. Most respondents used the Internet extensively for the sharing and dissemination of organisation information, as seen from Table 6. This is in line with the view held by Tchokogue and Boisvert (2002) that websites (at least in Quebec) are predominantly used for promotional purposes (what they refer to as a ‘virtual business card’), rather than to change the way a product or service is delivered. Table 2 corroborates these findings, indicating that, in 2001, 91 per cent of businesses used the Web to provide information about the business.

Table 6: Internet enabled business practices, full sample

	Not at all						A very great extent
	1	2	3	4	5	6	7
Self-service personnel, benefits administration or training	17	20	15	12	22	12	2
Sharing and dissemination of organisation information	2	2	7	13	22	35	20
Sharing and dissemination of competitor information	15	15	17	24	16	7	5
Collaborative product design/service coordination across locations	15	17	16	19	18	12	3
Knowledge directories, and procedure or process manuals	4	6	9	11	33	24	14
Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	13	17	13	17	23	12	5
Real-time transaction of orders (availability/delivery time)	15	15	14	14	23	14	5
Co-ordination of delivery arrangements	17	16	11	18	22	12	4
On-line sales channels including Web sites and Internet marketplaces	18	19	13	12	15	16	6
Customer self-service via Web sites and intelligent service request processing	18	18	11	16	17	13	6

Note: The questions on Internet enabled business practices were derived from Porter (2001).

Use of the Internet for knowledge directories, and procedure or process manuals also ranked highly. Responses were broadly spread for the rest of the Internet-enabled businesses

practices, with the sharing and dissemination of competitor information considered the least likely application of the Internet.

It is likely the estimates from the full sample mask differences in usage across various organisations. The Melbourne Institute Business Survey allows an examination of the form of Internet usage undertaken by different types of organisations. Considered below are differences in Internet usage by industry, competitive strategy, management style and degree of innovativeness. To analyse the different responses, a difference in means test was undertaken. This test calculates the difference in the average response of the rest of the sample to the group in question, and determines whether this difference is significantly different from zero. As it is calculated as the sample minus the control group, a negative coefficient indicates that the control group is more likely to adopt a particular practice than the rest of the sample.

4.1. Industry

Information from the 2001 *Business Use of Information Technology* shows that industries with above average use of Internet commerce (where above average refers to greater than the total sample) include manufacturing, utilities, wholesale trade, finance and insurance, property and business and cultural and recreational services. Table 7 provides results from the Melbourne Institute Business Survey, which gives more information regarding the extent to which firms in different industries adopt particular features of the Internet compared to the rest of the sample.

There is considerable variation in the types of usage that firms in different industries adopt. Firms engaged in manufacturing are significantly less likely to use the Internet for self-service personnel, benefits administration or training, sharing and dissemination of organisation information, on-line sales, or customer self-service. On the other hand, they are significantly more likely to utilise the Internet for the co-ordination of delivery arrangements, an important part of the supply process for manufacturers. In contrast to expectations based on the discussion in Section 2, procurement (Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers) and product development were not any more important for manufacturers. This could reflect the fact that the manufacturing industry is made up of a broad range of manufacturers, covering everything from food processing to car manufacturing.

Table 7: Internet enabled business practices, difference in means by industry

	Manufacturing	Mining, Construction	Utilities	Wholesale trade	Retail trade
Self-service personnel, benefits administration or training	0.471**	-0.196	-0.292	0.476	0.792**
Sharing and dissemination of organisation information	0.500***	-0.517*	-0.374	-0.271	0.979***
Sharing and dissemination of competitor information	0.049	0.564	0.063	-1.269***	0.171
Collaborative product design/service coordination across locations	-0.100	-0.392	0.605**	-0.941***	0.588
Knowledge directories, and procedure or process manuals	0.330	-0.014	-0.481	-0.100	0.371
Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	-0.281	-0.267	0.055	-0.326	-0.471
Real-time transaction of orders (availability/delivery time)	-0.189	0.069	0.355	-0.579	0.142
Co-ordination of delivery arrangements	-0.590***	0.116	0.426	-0.611*	0.025
On-line sales channels including Web sites and Internet marketplaces	0.428*	-0.420	0.470	-0.663*	-0.025
Customer self-service via Web sites and intelligent service request processing	0.878***	0.005	-0.168	-0.374	0.179

Note: *, **, and *** represent significant at the 10 per cent, 5 per cent and 1 per cent level respectively

	Accommodation, Cultural & Personal Services	Transport, Communication	Finance, Property	Education, Health
Self-service personnel, benefits administration or training	-0.377	0.258	-0.503*	-0.813***
Sharing and dissemination of organisation information	0.376	0.246	-0.343	-0.573***
Sharing and dissemination of competitor information	0.264	0.638*	-0.070	0.039
Collaborative product design/service coordination across locations	0.054	0.654	0.303	-0.496
Knowledge directories, and procedure or process manuals	0.056	0.571*	-0.212	-0.329
Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	0.336	0.329	0.620**	-0.050
Real-time transaction of orders (availability/delivery time)	-0.256	0.608	0.256	-0.083
Co-ordination of delivery arrangements	-0.221	0.292	0.499*	0.486
On-line sales channels including Web sites and Internet marketplaces	0.410	-0.025	-0.568*	0.020
Customer self-service via Web sites and intelligent service request processing	-0.181	0.713	-0.742***	-0.734**

Note: *, **, and *** represent significant at the 10 per cent, 5 per cent and 1 per cent level respectively

Perhaps indicative of the growing recognition that Internet usage is going to be more important in the production process of goods, rather than in sales of goods to the final consumer (Bailey 2001), retailers reported they were not any more likely to use the Internet for on-line sales than the rest of the sample. According to Gertner and Stillman (2001), it is primarily vertically integrated specialty retailers, such as The Gap, that have been able to take advantage of on-line sales. Results from the 2000 *Household Use of Information Technology* show that use of the Internet by adults to purchase goods or services for private use only increased from 3 per cent in 1998 to 7 per cent in 2000. Retailers were more likely to rank use of the Internet for self-service personnel, benefits administration or training and sharing and dissemination of organisation information *lower* than the rest of the sample.

In line with the aggregate statistics, wholesale traders were more likely to use the Internet for a range of different functions compared to the rest of the sample. Particularly significant were the sharing and dissemination of competitor information, and collaborative product design/service coordination across locations, the later of which may be linked to inventory management across warehouses. There was weaker evidence that wholesalers extensively used the Internet for the co-ordination of delivery arrangements or on-line sales.

In contrast to the manufacturing industry, the finance, insurance, property and business service industry rate usage of the Internet for customer self-service very highly, which is in line with the recent growth in Internet banking and the BPAY system, and corroborates evidence from the US (Clemons and Hitt 2001). According to the 2000 *Household Use of Information Technology*, household use of the Internet to pay bills or transfer funds has increased from 1 per cent of Australian adults in 1998 to 9 per cent in 2000, a higher proportion than those using the Internet to purchase goods or services. This is linked to the general growth of electronic transactions as a means by which consumers make their payments. There is also weak evidence that firms in this industry make greater use of the Internet for self-service personnel, benefits administration or training, and on-line sales. In line with the fact that this industry does not require inventory stocks to deliver its service, they are significantly less likely to make use of the Internet for Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers.

A similar pattern is evident for the education, health and community services industries. Firms in these industries are significantly more likely to take advantage of the Internet using

self-service personnel, benefits administration or training, sharing and dissemination of organisation information, and customer self-service. This is in line with the observation that the majority of respondents in the education sector are universities—organisations that have traditionally utilised this method to communicate information to both staff and current and prospective students. Recent anecdotal evidence suggests that universities are encouraging their staff to utilise the Internet for making changes to their personal information (including banking options and annual leave applications), as well as encouraging students to submit tutorial preferences and request exam results on-line. Research by Danzon and Furekawa (2001) also indicate that the health industry is most likely to benefit from Internet usage where paper records and claims processing can be moved on-line, which is where self-service personnel and customer self-service come in.

Several industries are not particularly different from the overall sample population. Organisations in mining and construction were marginally more likely to use the Internet extensively for the sharing and dissemination of organisation information. In contrast to the aggregate estimates, organisations in utilities were significantly less likely to use the Internet for collaborative product design/service coordination across locations. Firms in the accommodation, cultural, recreational, personal and other services industry do not have significantly different types of usage of the Internet compared to the rest of the sample. There is only weak evidence (at the 10 per cent level of significance) that firms in the transport and communication sectors are less likely to use the Internet for the sharing and dissemination of competitor information and knowledge directories, procedure or process manuals.

4.2. Competitive strategy

Four different scales are used to measure competitive strategy, based on responses to a range of questions included in the Melbourne Institute Business Survey (see the survey questions in the Appendix), which are in turn based on Treacy and Wiersema (1995). The first competitive strategy is operational excellence, and is calculated using the first three statements (that is, (a) to (c)) under 'competitive strategy' in the Appendix. This variable is designed to capture the extent to which organisations focus on the efficiency of the organisation. The second is customer intimacy, and calculated using statements (d) to (f) under competitive strategy. This variable is designed to capture the extent to which organisations are customer focussed. Product leader is the third competitive strategy, and is calculated using statements (g) to (j) under competitive strategy. Finally, the last competitive

strategy is commodity seller, which captures the extent to which the organisation is a price taker. This variable is calculated using statements (k) to (m) under competitive strategy in the Appendix. Respondents are given a one if they reported five and above for the questions relevant to the competitive strategy in question, and a zero otherwise.

The results of the difference in means tests are presented in Table 8. Organisations that are focussed on operational excellence are significantly more likely to use the Internet for primary activities in the value chain, that is, collaborative product design/service coordination across locations; real time transaction of orders; co-ordination of delivery arrangements; and on-line sales. The only support activity that was significantly utilised was knowledge directories and procedure or process manual.

Interestingly, those organisations that were characterised as being customer focussed were not any more likely than the rest of the sample to utilise the after-sales service option, that is, customer self-service. It may be the case that such organisations prefer to develop their customer relationship through personal relationships, rather than via the Internet. However, they did make extensive use of two other marketing and sales options through the Internet, that is, the sharing and dissemination of competitor information, and on-line sales.

Table 8: Internet enabled business practices, difference in means by competitive strategy

	Operational excellence	Customer intimacy	Product leader	Commodity seller
Self-service personnel, benefits administration or training	-0.314	-0.051	-0.129	-0.130
Sharing and dissemination of organisation information	-0.271	-0.013	-0.240	-0.190
Sharing and dissemination of competitor information	-0.369	-0.818***	-0.579***	-0.186
Collaborative product design/service coordination across locations	-0.623***	-0.566***	-0.848***	0.105
Knowledge directories, and procedure or process manuals	-0.563***	-0.097	-0.449**	0.030
Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	-0.373	-0.550***	-0.603***	-0.253
Real-time transaction of orders (availability/delivery time)	-0.797***	-0.790***	-0.442*	-0.049
Co-ordination of delivery arrangements	-0.567***	-0.908***	-0.725***	-0.028
On-line sales channels including Web sites and Internet marketplaces	-0.588***	-0.315	-0.596**	0.113
Customer self-service via Web sites and intelligent service request processing	-0.415	-0.129	-0.767***	-0.190

Note: *, **, and *** represent significant at the 10 per cent, 5 per cent and 1 per cent level respectively

Organisations characterised as product leaders used more Internet options compared to the sample as a whole. In particular, they utilised the Internet for two of the four support activities, that is, knowledge directories and procedure or process manuals, and Internet links

with suppliers. Commodity sellers were not any more likely than the rest of the sample to utilise particular features of the Internet.

4.3. Management style

Related to competitive strategy is the management style that characterises organisations. Two types of management style are listed in Table 9, bold and intuitive. Bold organisations favour high-risk projects, and take an aggressive attitude towards initiating change through new products and research and development. This variable is constructed using questions 1a through to 2c under ‘management style’ in the Appendix. Organisations that have the second type of management style, intuitive, are characterised as relying on intuitive information rather than formal and extensive quantitative analysis for making decisions. This variable is constructed using questions 3a to 3d under ‘management style’ in the Appendix.

Bold organisations are more likely to make extensive use of most features of the Internet than the rest of the sample, from inbound logistics through to technological development. In several cases, they are, on average, more than one point further up the 7-point scale. These include the use of real-time transaction of orders, the coordination of delivery arrangements, on-line sales channels, and Internet links with suppliers. The introduction of any new technology is a risky business, although it becomes less so as more organisations make it standard practice. Nevertheless, it is likely to be those businesses that take an aggressive and risky approach to business that would be more willing to adopt new technologies that could give them a competitive advantage, an observation that is borne out by these data.

Table 9: Internet enabled business practices, difference in means by management style

	Bold	Intuitive
Self-service personnel, benefits administration or training	-0.413	0.145
Sharing and dissemination of organisation information	-0.283	0.336
Sharing and dissemination of competitor information	-0.800**	0.876***
Collaborative product design/service coordination across locations	-0.843**	1.002***
Knowledge directories, and procedure or process manuals	-0.700***	1.173***
Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	-1.013***	0.836**
Real-time transaction of orders (availability/delivery time)	-1.578***	0.832**
Co-ordination of delivery arrangements	-1.365***	1.386***
On-line sales channels including Web sites and Internet marketplaces	-1.239***	0.127
Customer self-service via Web sites and intelligent service request processing	-0.696*	1.114***

Note: *, **, and *** represent significant at the 10 per cent, 5 per cent and 1 per cent level respectively

In contrast, intuitive organisations are considerably less likely to make use of most of the Internet-enabled business practices. Again, in several cases, they are more than a point further

down the 7-point scale. The areas where they are considerably less likely to take advantage of the Internet are the use of knowledge directories and procedure or process manuals, collaboration across locations, customer self-service, and the coordination of delivery arrangements. Again, given that such organisations are relying on intuition, ‘rules-of-thumb’ and lessons learned from past experience, it is unlikely they would be willing to adopt new technology such as the Internet without first having determined how it has worked for other organisations within their industry.

4.4. Degree of innovativeness

The sample was also divided into those organisations that were regarded as process and product innovators. Process innovators are those that indicated they had devoted relatively large amounts of resources (above the neutral level of 4) to organisational and managerial change. Product innovators are those that indicated they had introduced new, or had made major changes to existing, products or services (see the Appendix under ‘degree of innovativeness’ for the exact wording of the questions).

Regardless of the practice in question, organisations that are more innovative are more likely to make extensive use of all of aspects of the Internet (as listed here) compared to the full sample. The differences are not as great as some of the other categories however, with only one—customer self-service—more than a point up the 7-point scale.

Table 10: Internet enabled business practices, difference in means by innovativeness

	Process innovation	Product innovation
Self-service personnel, benefits administration or training	-0.686***	-0.540***
Sharing and dissemination of organisation information	-0.711***	-0.487***
Sharing and dissemination of competitor information	-0.834***	-0.642***
Collaborative product design/service coordination across locations	-0.550***	-0.790***
Knowledge directories, and procedure or process manuals	-0.718***	-0.658***
Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	-0.484**	-0.688***
Real-time transaction of orders (availability/delivery time)	-0.752***	-0.999***
Co-ordination of delivery arrangements	-0.549***	-0.730***
On-line sales channels including Web sites and Internet marketplaces	-0.865***	-0.761***
Customer self-service via Web sites and intelligent service request processing	-0.645***	-1.058***

Note: *, **, and *** represent significant at the 10 per cent, 5 per cent and 1 per cent level respectively

5. What prevents greater use of the Internet?

The pervasiveness of the Internet will soon (if it has not done so already) mean that firms that do not adopt the technology may not survive, although it should be noted this adoption does not necessarily confer an automatic advantage over competitors without it being part of an overall strategy (Porter 2001). Given this importance, what are some of the factors that prevent greater use of the Internet? The Melbourne Institute Business Survey does not include such questions on the survey form, but some idea can be gleaned from examining *Business Use of Information Technology*.

Table 11: Barriers to Internet Access and Having a Website or Homepage

	Barriers to Internet access			Barriers to having a website or homepage	
	Per cent of businesses without Internet access			Per cent of businesses without a website or homepage	
	1998	2000	2001	2000	2001
Not suited to nature of business	60	54	44	53	48
Lack of interest	n.a.	26	18	22	16
Lack of skills or appropriate training	24	23	15	18	12
Costs	32	19	10	14	13
Businesses without Internet access	428,000	126,000	216,000	126,000	216,000
Businesses without website	567,000	383,000	545,000	383,000	545,000

Source: *Business Use of Information Technology*, ABS Cat. No. 8129.0, various issues.

Table 11 shows that reasons cited by businesses for not having Internet access or a website have declined over the past few years. Not being suited to the nature of the business is by far the most important reason, although as businesses become more educated about the possibilities that Internet usage provides, this can be expected to drop further. In line with the decline in costs in the information technology sector, costs as a reason for not having Internet access has fallen from around one-third of businesses to 10 per cent in 2001. Lack of interest rates second, which is a bit concerning if Internet usage does provide competitors with an opportunity to gain some sort of competitive advantage over their rivals.

6. Conclusion

Internet usage by Australian businesses has grown markedly since 1998, corresponding with a fall in several of the major (perceived) barriers to adopting Internet technology. However, the aggregate statistics mask important differences in the way in which the Internet is utilised by large Australian organizations.

Despite being a relatively new phenomenon, the academic research to date has already generated some general observations. The first of these is that Internet use is only beneficial to the organisation if it is incorporated into an overall strategy. Evidence from the *Melbourne Institute Business Survey* shows organisations that were strong in at least one competitive strategy (that is, operational excellence, customer intimacy or product leadership) were more likely to use particular features of the Internet than the rest of the sample. Management style also made a difference to Internet usage, with bold organisations more likely to make extensive use of most features of the Internet than the rest of the sample. In contrast, intuitive organisations are considerably less likely to make use of most of the Internet-enabled business practices. Organisations that are characterised as innovative are more likely to make extensive use of all of aspects of the Internet compared to the full sample.

The academic research also indicates that there are significant differences in Internet adoption depending on the type of industry the organisation operates in. Again, the *Melbourne Institute Business Survey* shows that Internet usage does indeed vary across industries, with manufacturers more likely to use the Internet for the co-ordination of delivery arrangements, whereas the service industries are more likely to use the Internet for customer self-service and personnel benefits.

Notwithstanding the apparent importance of the Internet for general business operations, there are a significant number of Australian businesses that still do not utilise this technology. However, it is expected that this proportion will continue to diminish over time as businesses become more aware of the benefits of utilising the Internet, particularly if their suppliers and customers require these changes as part of doing business.

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Appendix: Selected Questions from the Melbourne Institute Business Survey

Internet usage

To what extent does this workplace use the following internet-enabled business practices?

(On each row, circle one number on the 1 to 7 scale.)

	<i>Not at all</i>								<i>A very great extent</i>
a. Self-service personnel, benefits administration or training	1	2	3	4	5	6	7		
b. Sharing and dissemination of organisation information.....	1	2	3	4	5	6	7		
c. Sharing and dissemination of competitor information	1	2	3	4	5	6	7		
d. Collaborative product design/service coordination across locations.....	1	2	3	4	5	6	7		
e. Knowledge directories, and procedure or process manuals	1	2	3	4	5	6	7		
f. Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	1	2	3	4	5	6	7		
g. Real-time transaction of orders (availability/delivery time)	1	2	3	4	5	6	7		
h. Co-ordination of delivery arrangements	1	2	3	4	5	6	7		
i. On-line sales channels including Web sites and Internet marketplaces	1	2	3	4	5	6	7		
j. Customer self-service via Web sites and intelligent service request processing	1	2	3	4	5	6	7		

Competitive strategy

To what extent do the following statements best describe your workplace's competitive strategy?

(On each row, circle one number on the 1 to 7 scale.)

	<i>Not at all</i>								<i>A very great extent</i>
a. Increases operating efficiencies.	1	2	3	4	5	6	7		
b. Develops new process innovations that reduce costs.....	1	2	3	4	5	6	7		
c. Focuses on increasing productivity.....	1	2	3	4	5	6	7		
d. Tailors and shapes products/services to fit customers' needs.	1	2	3	4	5	6	7		
e. Develops customer loyalty.....	1	2	3	4	5	6	7		
f. Has the flexibility to quickly respond to customer needs.	1	2	3	4	5	6	7		
g. Produces a continuous stream of state-of-the-art products/services.....	1	2	3	4	5	6	7		
h. Is 'first to market' with new products/services.	1	2	3	4	5	6	7		
i. Responds to early market signals concerning areas of opportunity.	1	2	3	4	5	6	7		
j. Develops products/services which are considered the best in the industry.	1	2	3	4	5	6	7		
k. Produces products/services at a cost level lower than that of our competitors.....	1	2	3	4	5	6	7		
l. Prices below competitors	1	2	3	4	5	6	7		
m. Produces products/services for lower-priced market segments.....	1	2	3	4	5	6	7		

Management style

1. In general, the top managers of my organisation favour...

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|--|
| a. A strong emphasis on the marketing of tried and true products and services. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | A strong emphasis on R&D, technological leadership, and innovation. |
| b. Low-risk projects with normal and certain rates of return. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | High-risk projects with chances of very high returns. |
| c. A cautious, 'wait and see' posture in order to minimise the probability of making costly decisions when faced with uncertainty. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | A bold, aggressive posture in order to maximise the probability of exploiting potential when faced with uncertainty. |

2. In dealing with its competitors, my organisation...

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|
| a. Typically responds to actions which competitors initiate. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Typically initiates actions to which competitors then respond. |
| b. Is very seldom the first organisation to introduce new products/ services, operating technologies, etc. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Is very often the first organisation to introduce new products/services, operating technologies, etc. |
| c. Typically seeks to avoid competitive clashes, preferring a 'live-and-let- live' posture. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Typically adopts a very competitive, 'undo-the-competitor' posture. |

3. To what extent do the following statements best describe your workplace's competitive strategy?

(On each row, circle one number on the 1 to 7 scale.)

- | | | | | | | | | | |
|--|---|---|---|---|---|---|---|--------------------------|-----------------------|
| | | | | | | | | <i>Strongly disagree</i> | <i>Strongly agree</i> |
| a. Our major operating and strategic decisions nearly always result from extensive quantitative analysis of data..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| b. Our major operating and strategic decisions are nearly always detailed in formal written reports. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| c. We rely principally on experienced-based intuition (rather than quantitative analysis) when making major operating and strategic decisions..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| d. In general, our major operating and strategic decisions are much more affected by industry experience and lessons learned than by the results of formal research and systematic evaluation of alternatives..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| e. Our major operating and strategic decisions rely on 'rules of thumb' developed from the success of past decisions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |

Degree of innovativeness

During the past 3 years, how many resources (e.g. time, money, labour) have been devoted by this workplace to... (On each row, circle one number on the 1 to 7 scale.)

- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|-------------|--------------|
| | | | | | | | | <i>None</i> | <i>A lot</i> |
| b. Organisational change (e.g. restructuring, changes in work practices)..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| c. Managerial change (e.g. new management techniques)..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |

E2. How innovative has your workplace been in the past 3 years? (On each row, circle one number on the 1 to 7 scale.)

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|
| a. No new lines of products or services | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Many new lines of products or services |
| b. Minor changes in product or service lines | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Major changes in product or service lines |

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