APPENDIX A

KEY FINDINGS OF ICT USAGE SURVEY 1999
ON THE ICT ADOPTION OF BUSINESSES IN SINGAPORE

Methodology

A total of 747 companies were interviewed. To ensure that there were a minimum number of interviews in each industry and size class, a stratified random sampling method was used. The sample breakdown is shown overleaf.

Interviews were conducted via telephone and a screening process was used to verify the presence of computers. This served to measure the computerization proportion among organizations in Singapore.

Individuals were qualified to speak about the site's overall computing activities. For medium/ large sites, they were CIOs, IT Directors, or IT Managers. For small sites, they were the IT Managers or Owners.

Weights derived from the entire population of establishments by size and industries were applied in the analysis. This weighting process creates a shift in the balance of responses towards actual population mix.

Sample Demographics

Characteristics of Sample

Table 1 depicts the characteristics of the 747 sites in the sample. These representations are unweighted, thus providing a stratified view of establishment sizes and industries covered in the survey.

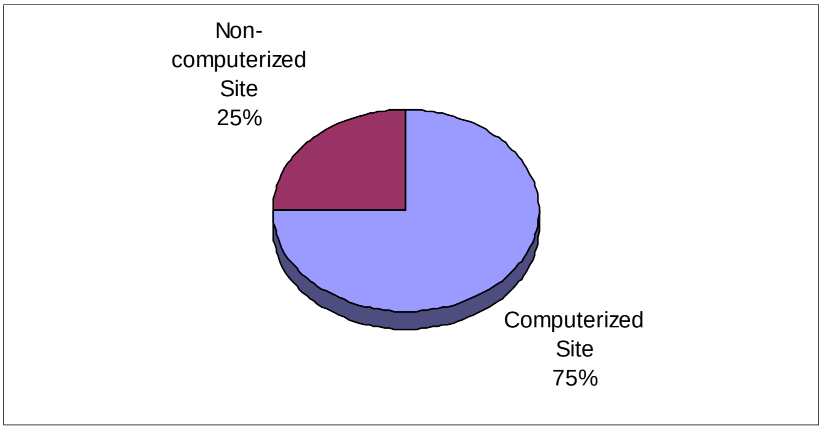
Table 1
Range of Employees at Site by Industry – 1998

	<25 employees	25-99 employees	100-199 employees	200-499 employees	>500 employees	Total Sites	Total Sites
IT Industry (Includes IT manufacturing)	35.00%	15.00%	21.67%	16.67%	11.67%	100.00%	60
Banking/Finance	15.25%	30.51%	23.73%	22.03%	8.47%	100.00%	59
Construction	28.57%	23.81%	26.98%	14.29%	6.35%	100.00%	63
Education	40.63%	20.31%	20.31%	9.38%	9.38%	100.00%	64
Government	11.86%	27.12%	16.95%	27.12%	16.95%	100.00%	59
Health	45.31%	15.63%	7.81%	17.19%	14.06%	100.00%	64
Manufacturing(Non ICT products)	16.39%	29.51%	27.87%	18.03%	8.20%	100.00%	61
Retail/Distribution	54.17%	6.94%	16.67%	16.67%	5.56%	100.00%	72
Telecommunications	47.54%	4.92%	16.39%	19.67%	11.48%	100.00%	61
Transportation	25.81%	22.58%	22.58%	24.19%	4.84%	100.00%	62
Tourism/Leisure	25.86%	22.41%	13.79%	31.03%	6.90%	100.00%	58
Others	37.50%	10.94%	20.31%	23.44%	7.81%	100.00%	64
Total	32.53%	18.88%	19.54%	19.81%	9.24%	100.00%	747

Computerization Levels

Computerization is defined as - any site with at least a single standalone PC present at

Figure 1
Computerization at All Sites -- 1998



site. Overall the entire population yields a 75% computerization level.

For the remaining 25% without computer usage, the primary reason for non-adoption was indicated as “No need for it”. Other less common reasons were “High cost” and “No computer knowledge. This 25% is essentially represented by small sized businesses (less than 25 employees) within industries such as Retail/Distribution and Manufacturing.

IT Spending Patterns

Average IT Spending in Sites

Table 2
Average IT Spending by Establishment Size -- 1998

	Average IT Spending at Organization
<25	$18,942
25-99	$219,667
100-199	$343,344
200-499	$906,649
>500	$3,578,981
Total	$54,514

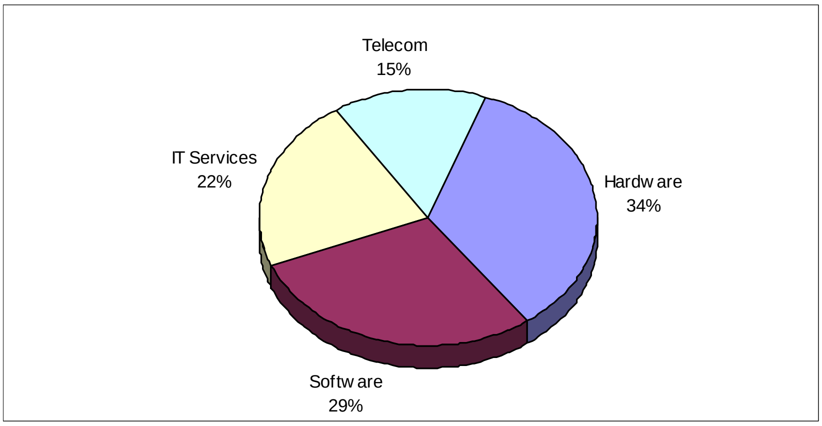
IT spending for 1998 reveals an average of S$54,514 per site. By industry, Banking/Finance, Government, IT industry and Telecommunication sectors have by far the largest IT budgets and contrarily Construction, Education, Retail/Distribution and Transportation sectors appear at the opposite end of the scale with more languished budgets.

Internal Vs External IT Spending Distribution in SME and Non-SME Sites

An analysis of the distribution of IT spending into internal (e.g. personnel, facilities) and external spending (e.g. spending with vendors) shows an even split at 50:50 ratio overall. Large to medium businesses tend to dedicate a slightly higher budget to internal IT spending whilst small businesses allocate slightly higher overheads for external IT spending.

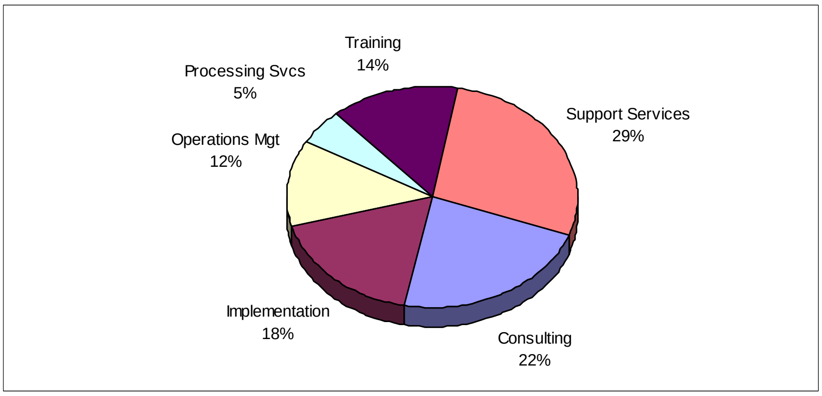
By industry, sites showing a greater proportion of internal IT spending comes from the IT industry. In contrast, sites dedicating more to external IT spending comes predominantly from the Transportation and Tourism/Leisure sectors.

Figure 2
Distribution of External IT Spending in All Sites -- 1998



Distribution of External IT Spending

Figure 3
Distribution of IT Services Operating Budget in Site -- 1998



The distribution of IT Services spending reveals the majority of spending allocated to support services. Main contributors to this are from the Construction, Telecommunications and Tourism/Leisure sectors. The second largest segment, consulting, reveals spending primarily from the Transportation and Tourism/Leisure industries.

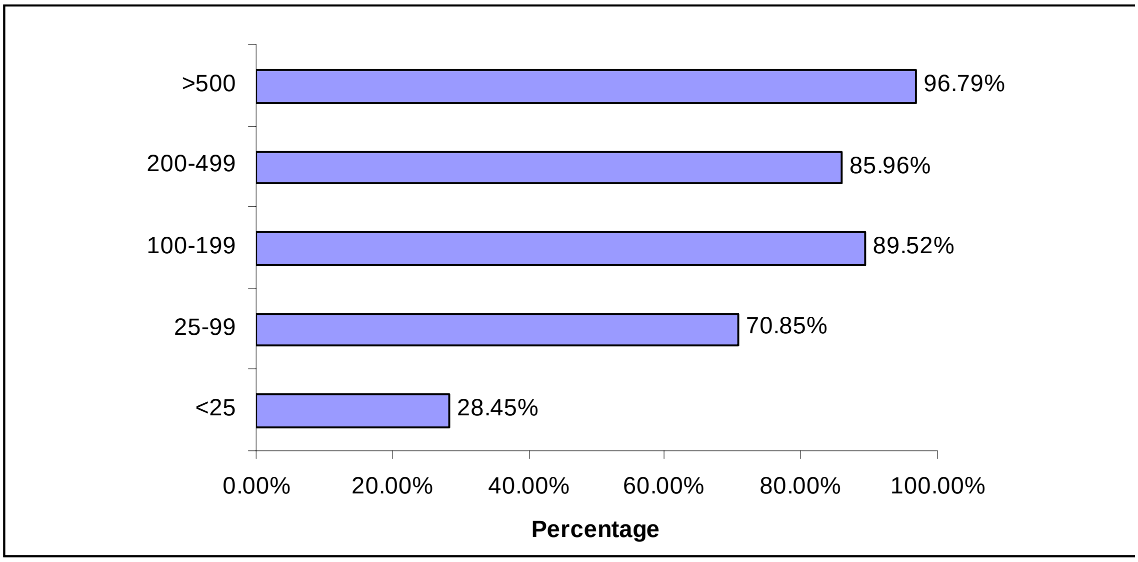
Outlook for IT Spending Budgets

For 1999, business sites indicate an average expectation to increase IT spending by 8%. For the following two years, business sites indicate an expected rate of increase year-on-year at a slightly lower figure of 5%. This reduced rate of increase is possibly more reflective of unclear budget forecasts for individual sites rather than an actual retraction in IT spending.

IT Infrastructure

LAN Utilization

Figure 4
LAN Utilization by Establishment Size-- 1998



LAN installations show a sharp contrast between small sites, with less than 25 employees, and sites with more than 25 employees. For the latter, LAN utilization reaches 70% or more, with the largest sized sites (500 or greater employees) reaching almost 100% of sites with LAN connectivity.

Sites from the IT industry and Government sectors are the most abundant contributors to high LAN usage. In comparison, Health and Banking/Finance show the lowest proportion of LAN connected sites.

Internet Access

Table 3
Site Access to the World Wide Web by Establishment Size – 1998

	Yes	No	Total
<25	80.01%	19.99%	100.00%
25-99	86.53%	13.47%	100.00%
100-199	99.70%	0.30%	100.00%
200-499	97.72%	2.28%	100.00%
>500	100.00%	0.00%	100.00%

Table 3
Site Access to the World Wide Web by Establishment Size – 1998

	Yes	No	Total
Total	80.80%	19.20%	100.00%

Out of the total population over 81% currently have access to the World Wide Web (WWW). For the largest sites (500 employees or greater) there is an optimal 100% of sites with WWW access. In comparison, smaller sites do not lag too far behind, with 80% sites accessing the Internet.

The Banking/Finance and IT Industry sectors reveal the highest percentage of sites with WWW access. In contrast, Health and Construction sectors have the lowest.

Table 4
Site Access to the Internet by Industry - 1998

	Yes	No	Total	Total Sites (Unweighted Valid N)
IT Industry (Includes IT manufacturing)	99.2%	0.80%	100%	57
Banking/Finance	99.64%	0.36%	100%	59
Construction	66.19%	33.81%	100%	58
Education	93.12%	6.88%	100%	57
Government	94.40%	5.60%	100%	58
Health	62.74%	37.26%	100%	59
Manufacturing(Non ICT products)	72.77%	27.23%	100%	57
Retail/Distribution	82.03%	17.97%	100%	56
Telecommunications	85.66%	14.34%	100%	58
Transportation	87.63%	12.37%	100%	59
Tourism/Leisure	85.31%	14.69%	100%	54
Others	86.18%	13.82%	100%	58
Total	80.80%	19.20%	100%	690

Table 5
Distribution of Method of Internet Access by Establishment Size -- 1998

Dial access through a modem	78.50%
ISDN	3.01%
Leased line (64Kbps)	7.84%

Leased line (>64K,<2M)	0.64%
Leased line (2M or more)	0.35%
Frame relay	0.20%
Via Data VPN	0.01%
xDSL	0.03%
Cable Modem	2.94%
Other	6.49%
Total	100.00%

In general, although almost all sites utilize the WWW, a large proportion of sites however, including medium to large sized sites, still gain access through a dial-up modem (average 79%).

By industry, the greatest proportion of leased line WWW access reported are in the IT Industry, Manufacturing and Government sectors. With regard to the ISDN method of access, Government, Telecommunications and Retail/Distribution sectors are the largest contributors.

Home Page Implementation

Table 6

Organizational Home Page by Establishment Size – 1998

	Yes	No	Don't know	Total
<25	28.78%	70.09%	1.14%	100.00%
25-99	46.28%	53.72%	0.00%	100.00%
100-199	63.68%	36.32%	0.00%	100.00%
200-499	77.64%	21.85%	0.51%	100.00%
>500	85.55%	12.97%	1.48%	100.00%
Total	30.80%	68.16%	1.04%	100.00%

Despite a high proportion of sites with WWW access, from small to large sized establishments (Table 6), it appears that many sites, particularly the smaller businesses (99 employees or less) currently have not implemented their own homepage

For the portion of sites currently without a homepage, almost 50% will begin implementing one by year 2001. IT industry, Manufacturing, Tourism/Leisure, Transportation and Education all comprise a sizeable percentage of sites expecting to implement a homepage by year 2001.

Table 7 Organizational Home Page by Industry - 1998					
	Yes	No	Don't know	Total	Total Sites (Unweighted Valid)
IT Industry (Includes IT manufacturing)	67.41%	32.59%	0%	100%	57
Banking/Finance	47.59%	52.41%	0%	100%	57
Construction	14.22%	85.78%	0%	100%	58
Education	54.16%	45.84%	0%	100%	57
Government	92.07%	7.93%	0%	100%	58
Health	19.89%	80.11%	0%	100%	59
Manufacturing(Non ICT products)	38.79%	61.21%	0%	100%	57
Retail/Distribution	31.46%	63.53%	5.01%	100%	57
Telecommunications	49.62%	50.38%	0%	100%	58
Transportation	14.43%	85.54%	0.04%	100%	59
Tourism/Leisure	50.94%	49.06%	0%	100%	54
Others	31.88%	68.10%	0.02%	100%	58
Total	30.80%	68.16%	1.04%	100%	689

Activities/Services Offered on Home Page

Table 8 Activities Available on Organization Home Page by Establishment Size -- 1998						
	<25	25-99	100-199	200-499	>500	Total
Detailed Product Information	97.92%	86.64%	94.60%	91.30%	97.46%	96.57%
Customer Service/Support	51.34%	58.39%	61.01%	66.41%	75.55%	52.65%
Sales Transactions	4.44%	1.99%	8.64%	15.13%	1.52%	4.39%
Reorder or Deliver (recurrent sales)	0.16%	1.72%	4.63%	2.11%	0.81%	0.46%
Call for Quotation & Specification (Internet Procurement)	0.00%	0.00%	0.00%	2.60%	0.00%	0.03%
Transactional Services (Stock Trading, Banking, Appointment/Ticket Booking, etc.)	0.00%	0.56%	1.54%	3.95%	0.71%	0.15%

For the large majority of sites, who have implemented a homepage, a variety of activities or services are offered. The most popular activities appearing on organizational homepages is, by far, detailed product information and customer service support. More sophisticated services, particularly relating to E-commerce, have yet to develop at any significant levels throughout all establishment sizes and industry.

Figure 4
Mean Ratings for Barriers to E-Commerce Adoption by Establishment Size and Industry -- 1998

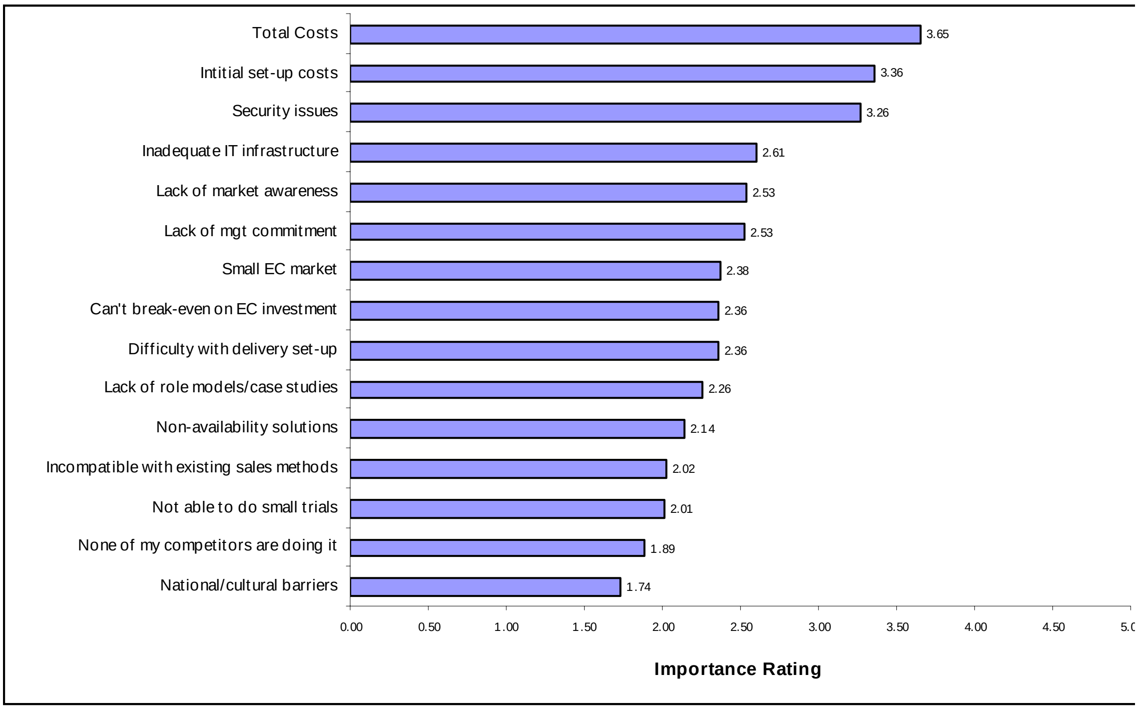


Figure 4 reveals some reasons why E-Commerce is not readily adopted. On a rating of 1 to 5 for importance; Total cost, Set-up costs and Security issues appear at the top of the list as most important.

Table 9

Importance Ratings for Impediments to Computerization by Establishment Size -- 1998

	<25	25-99	100-199	200-499	>500	Total
Total costs	3.5	3.4	3.4	3.3	3.4	3.5
Lack of IT expertise	3.4	3.1	2.7	2.8	2.4	3.3
Rapid technological change	3.2	2.9	2.4	2.7	2.2	3.1
Insufficient training	3.1	3.0	2.4	2.7	2.6	3.1
IT Manpower shortage	3.1	3.1	2.9	3.2	3.2	3.1
Inadequate IT infrastructure	2.8	2.6	2.3	2.3	2.1	2.8
Poor support from vendors	2.7	2.6	2.1	2.4	2.3	2.7
Lack of management commitment	2.6	2.8	2.6	2.7	2.3	2.6
Non-availability of solutions	2.6	2.5	2.2	2.2	1.9	2.6
Lack of IT awareness	2.4	2.6	2.2	2.3	2.0	2.4
Resistance to change	2.1	2.8	2.5	2.4	2.4	2.2

The most significant impediments to computerization throughout the sample are Total cost, Lack of IT expertise, Rapid technological change and Insufficient training. Lack of IT expertise, Insufficient training and Rapid technological change, all of which are relevant to concerns regarding insufficient IT skills, produces more apprehension from smaller sized sites than their larger counterparts.