

University of Waikato Management School
Research Report Series
ISSN 1175-5571

**Adoption and Implementation of E-Business in New Zealand:
Comparative Empirical Results for 2001 and 2002**

Delwyn Clark, Stephen Bowden and Patricia Corner

2002-1

Department of Strategic Management & Leadership
University of Waikato Management School
Private Bag 3105
Hamilton, New Zealand

Phone: 64 (7) 838 4594
Fax: 64 (7) 838 4356
Email: dnclark@mngt.waikato.ac.nz

May 2002

WAIKATO MANAGEMENT SCHOOL
Te Raupapa

Executive Summary

A large scale, multi-industry empirical survey was conducted to collect evidence of E-Business practices in New Zealand-based organisations in 2001 and 2002. This report outlines and compares the major descriptive results on E-Business adoption and implementation from both surveys. A comprehensive four-page postal questionnaire was designed and pilot tested for this project. Questionnaires were mailed to senior executives using a three-phase mail out process. In the 2001 survey, a total of 1229 complete and usable replies were received by March 2001 (20.9 % response rate). In 2002, a total of 1057 complete and usable responses were received by May 2001 (19.2% response rate). Key findings from these surveys include:

E-Business Adoption

- Levels of computer use increased from 92.4% in 2001 to 95.3% in 2002; proportions with websites increased 8.8% to 63.4% in 2002.
- Computer use and website presence increase with increasing size of the organisation.
- Frequencies for electronic communication activities (e.g. email and information exchanges) were very high.
- Approximately one in five companies were doing B2B and B2C sales in 2002.
- Most websites were providing lists of products/services (94%) and company data (68%); transaction capabilities were much lower (e.g. 1 in 5 websites were capable of secure transactions and 1 in 7 websites were receiving payments on-line).
- Mean age of websites was 3.3 years and the mean number of website upgrades was 2.1 in 2002.
- The scale of current activities was low for both on-line purchases and web sales and these reduced in 2002 (to 4.7% and 5.1% respectively); 41% of products were on-line in 2002.
- Estimates for average growth in website activities for sales, purchases and products on-line, reduced from 15% to 11% in 2002. Growth expectations from 2001 were not achieved by 2002.
- Motivations for E-business activities reflected proactive strategic positioning to improve performance through efficiency, new markets and new sales channels; mean importance values increased for the efficiency motivations in 2002.
- Significant benefits from E-Business were identified by the website companies in line with their strategic aspirations; these included opportunities to enhance company image, improve efficiency, expand business scope, and improve service, communications and relationships with customers.
- There is considerable scope for New Zealand organisations to develop their E-Business activities further and to move beyond the introductory electronic activities such as listing their products and company data on websites.

E-Business Implementation

- E-Business activities, although IT-based, require integrated business solutions and extensive managerial acumen for effective implementation.
- Resources and types of advice needed for implementation of E-Business initiatives reflect the full spectrum of management and technological expertise.
- Many different types of advisors, including web-page developers, software vendors, other technical support providers and business contacts, were consulted for assistance with E-Business implementation; in 2002, the proportions of companies consulting the IT companies increased (by an average of 4%).

- 40% of the companies with websites consulted their customers for assistance.
- Utilisation of Government sources of advice on E-Business was limited.
- A wide range of internal and external factors inhibit E-Business implementation.
- For the website companies, the two top inhibitors in 2001 and 2002 were ‘low customer use of E-Commerce’, and the ‘high costs of computing and network technology’.
- Companies without websites were more concerned with feasibility issues linked to financial returns, market size and resources (specifically time and costs).
- The lack of readiness for E-Business by other key players, including partners, customers and suppliers, were perceived as major difficulties by the non-website businesses.
- There were many structural and educational issues to be addressed at national, regional and industry levels to improve the uptake and effectiveness of E-Business in New Zealand.
- Improving ‘telecommunications infrastructure’, ‘consumer access to the Internet’ and ‘improved security’ were considered most important by the website companies in 2002.
- ‘Improved security’, ‘telecommunications infrastructure’ and the provision of ‘training for E-Business’ were the three most important factors for non-website companies in 2002.

Further Analysis

- Further analysis of this database will examine the impacts of scale and scope on E-Business activities, identify trends in each industry, explore adoption enablers and inhibitors, and evaluate business strategies and competitive positioning of E-Business initiatives.
- Further research on the cost/benefit tradeoffs of ICT investments for small and medium enterprises is proposed.
- These results will provide an invaluable independent source of information for the government’s emerging E-Commerce strategy; key findings will be summarised for policy developers and provide guidelines on E-Business for managers.

Table of Contents

Executive Summary	ii
1.0 Introduction	1
2.0 Methodology	3
3.0 E-Business Adoption in New Zealand	6
3.1 Electronic Business Activities	8
3.2 Website Features	10
3.3 Motives for E-Business	14
3.4 Impacts of E-Business	14
4.0 E-Business Implementation in New Zealand	16
4.1 Resources	16
4.2 Types of Advice	17
4.3 Sources of Assistance	18
4.4 Inhibiting Factors	20
4.5 Measures to Improve Uptake	22
5.0 Conclusions and Further Research	24
Acknowledgements	26
References	27
Appendix	29

List of Tables

Table 2.1	Profile of Respondents	5
Table 3.1	Frequencies of Electronic Business Activities, 2002	8
Table 3.2	Website Features in 2001 and 2002	10
Table 3.3	Ten Most Important Impacts of E-Business	15
Table 3.4	Five Least Important Impacts of E-Business	16
Table 4.1	Assistance with E-Business Implementation	19
Table 4.2	Difficulties with E-Business Implementation: Website Companies	20
Table 4.3	Difficulties with E-Business Implementation: Non-Website Companies	21
Table 4.4	Measures to Improve E-Business Uptake: Website Companies	22
Table 4.5	Measures to Improve E-Business Uptake: Non-Website Companies	23

List of Figures

Figure 3.1	E-Business Adoption in 2001 and 2002	7
Figure 3.2	E-Business Adoption by Size, 2002	7
Figure 3.3	B2B and B2C Sales, 2002	9
Figure 3.4	Website Age Distribution, 2002	11
Figure 3.5	Website Age by Size, 2002	12
Figure 3.6	Website Upgrades by Size, 2002	13
Figure 3.7	Scale of Website Activity in 2001 and 2002	14
Figure 3.8	Primary Motives for E-Business Initiatives	17
Figure 4.1	Resources Needed for E-Business Implementation	18
Figure 4.2	Advice Needed for E-Business Implementation	17

1.0 Introduction

Electronic business is a major force in the global economy. According to the Gartner Group, worldwide business-to-business (B2B) electronic commerce was projected to reach US\$7.29 trillion by 2004, with a 155% growth rate in the Asia/Pacific region. The Boston Consulting Group estimated that B2B E-Commerce in Australasia would increase from A\$17 billion in 2000 to A\$235 billion in 2005; however New Zealand businesses were predicted to contribute only 9% (\$21 billion) of this volume (Wetenhall, Sutherland & Boven, 2000). Such phenomenal growth rates signal major changes in the way business is conducted, in the face of challenges from new types of electronic markets and electronic business models. There are numerous ways in which web technologies can be adopted and adapted to improve the performance of organisations at all levels: from small businesses and communities, through to global networks and nations. The ability to respond to these challenges is therefore of considerable interest to senior executives, managers, government officials and politicians around the globe. Initiatives to gauge the level of readiness for an Internet-based economy are being conducted to provide information for policy development and decision-making at national, regional and industry levels. In this dynamic context, there is also a need for research to describe and explain the impacts of these changes on managers and to develop theories incorporating the new E-Business practices.

Several major descriptive studies have been conducted internationally on the nature of E-Business and its impacts. PriceWaterhouseCoopers (2000) polled Conference Board executives in 78 leading multinational companies from many industries around the globe. Its recommendations for successful E-Business initiatives stressed the importance of planning and flexibility, the need for integrated solutions, and taking full advantage of business partner and alliance relationships. Commenting on E-Business growth opportunities, PWC noted: "The E-Business growth of the past year has raised the stakes so dramatically that it is more important now than ever that companies act proactively to address this exiting opportunity."

The Asia Pacific Economic Cooperation (APEC) Telecommunications Working Group study of E-Commerce focused on Small and Medium Enterprises (SMEs) in all 21 APEC member countries (TEL05/97T, 1999). Noting the importance of SMEs for economic growth and productivity in APEC economies, this study emphasised the role and opportunities for smaller firms:

SMEs that can demonstrate their capabilities to use electronic commerce will have a competitive advantage in the B2B marketplace. For example, most of the large firms currently developing and implementing B2B E-Commerce strategies typically engage SMEs in their supply chains. For these large firms, the rate at which SMEs adopt E-Commerce and enhance their capabilities could affect the scope and timing of their B2B E-Commerce implementation. Alternatively, SMEs that do not keep pace with electronic commerce may be marginalised as suppliers.

Reporting on emerging E-Business developments in Australia and New Zealand, the Boston Consulting Group observed that companies have rushed to set up e-marketplaces (Wetenhall, Sutherland & Boven, 2000). However, it cautioned that many of the 283 e-marketplaces would fail, as transaction fees fall and global players reach 'down under'. Finding a dominant 'defensive' approach to E-Business initiatives in Australasia, BCG advised, "The real value of E-Commerce will derive from restructuring distribution and supply chains, and embracing deep collaboration with trading partners."

In the past two years, a series of research projects have been initiated to identify the levels of E-Business activities in New Zealand and understand the impacts of information and communication technologies (ICTs). This research includes surveys commissioned by MED (MED, 2000, 2001) and projects by other interested researchers including Deloitte Touche Tohmatsu (2000), and Boston Consulting Group (Wetenhall, Sutherland and Boven, 2000). The New Zealand Institute for International Competition and Regulation (ISCR, 2001) prepared a scoping study on E-Commerce Performance Research. The Foundation for Research Science and Technology (FRST) recognised the need for further research in the broad area of socio-economic impacts of information and communication technologies (ICTs). Waikato Management School researchers developed a series of projects for this FRST funded programme (www.mngt.waikato.ac.nz/ict) including a comprehensive survey of E-Business practices (Clark et al, 2001). This large scale, multi-industry survey was conducted in 2001 and has provided empirical evidence of E-Business adoption and implementation in New Zealand-based organisations. Descriptive results from this initial survey were widely disseminated to participants, academics, industry, and government advisors, in a series of reports, conference papers and presentations. The project has contributed new understanding of the status of E-business practices and the uptake of new technologies in New Zealand.

This research has also been used to support corporate strategy decisions, for international benchmarking of the economy, and to provide advice for managers.

This research programme was designed to contribute to New Zealand government's emerging E-Commerce Strategy, which was launched at a special E-Commerce Summit in November 2000. The Ministry of Economic Development (MED) has taken an active role in the encouraging the development of E-Commerce capabilities for New Zealand companies, and participated in the APEC E-Readiness initiative. A national E-Commerce Action Team (ECAT) was established with a series of regional coordinating teams to provide a network to communicate and facilitate the emerging national E-Strategy, and to disseminate information on E-Commerce events and activities (www.ecommerce.govt.nz/ecat). Projects were also initiated to review and enhance the telecommunications infrastructure and introduce new legislation for electronic trade.

In 2002, the major empirical survey on E-Business practices was replicated to provide comparative and longitudinal data. The major objectives of this research were:

- To identify the nature and extent of E-Business activities in New Zealand;
- To examine the motives for initiating E-Business activities;
- To examine the impacts of E-Business activities on organisational processes and performance;
- To investigate the factors enhancing and inhibiting E-Business uptake and implementation in New Zealand;
- To identify trends, patterns and changes in E-Business activities and their impacts.

This paper reports comparative descriptive results from both surveys on these objectives relating to the adoption and implementation of E-Business activities in New Zealand.

2.0 Methodology

A postal questionnaire was designed to collect empirical evidence of current E-Business practices. Questions were developed to obtain data for key descriptors of E-Business adoption, implementation, impacts and strategies. The questionnaire was pilot tested in November 2000, using feedback from 18 managers and 6 academics to clarify and improve the questions. A three-phase mail out of the survey was implemented in the period November

2000 - February 2001, and this was repeated in January – March 2002 to obtain longitudinal data (Dillman, 1978). Initially, questionnaires were mailed accompanied by personalised cover letters and reply-paid return envelopes. Two weeks later follow up postcards were sent out to all of the managers to acknowledge the efforts of respondents and prompt further replies. In the third phase of the mail out process, a further letter and another copy of the questionnaire was sent to all of the non-respondents after another four weeks.

The latest version of the Kompass Database was used to provide a target population of New Zealand-based organisations across all of the ANSZIC Industry codes for each survey. (November 2000, November 2001). The database identified the senior executive in each organisation with the title of Chief Executive, General Manager, Managing Director or Senior Partner. Questionnaires were mailed to 5,870 executives in 2000/2001 and 5,510 in 2002.

In the first survey, 1562 responses were received and processed (by 21 March 2001), representing a 26.6% response rate; of these 1229 were complete and usable, giving a 20.9% usable response rate. In the second iteration, very similar responses levels were achieved – 1410 completed questionnaire were received and processed (by 21 May 2002), representing a 25.6% response rate; of these 1057 were complete and usable, giving a 19.2% usable response rate. These response levels are very good and consistent with other surveys of senior executives (Finkelstein & Hambrick, 1996). The complexity and comprehensiveness of the four-page instrument and the timing of the first survey at a very busy time for many organisations were other factors influencing the response. Response rates for the second iteration of the survey were particularly strong, reflecting goodwill of managers in this population towards this research topic.

An additional telephone survey of non-respondents was conducted to check for non-response bias. Data was collected from 100 firms chosen randomly from companies that had received questionnaires but not responded. Analysis of this data on key variables including computer usage, website adoption and size, revealed no differences between these 100 firms and the survey respondents.

A profile of the respondents in both surveys is provided in Table 2.1 showing key characteristics including the type of organisation, size, ownership, geographic scope and revenue sources. The final sample was broadly representative of the population of New

Zealand companies. The multi-industry sample included organisations from all seventeen of the Australian and New Zealand Standard Industry Codes (ANZSIC) with a distribution that was similar to the industry distribution in the population (Appendix).

Table 2.1 Profile of Respondents

Characteristics	2001 Percentage	2002 Percentage
Organisation Type		
• Listed limited liability company	30.2	33.4
• Non-listed limited liability company	52.0	49.9
• Partnership	7.0	6.2
• Sole trader	1.2	1.3
• Other	9.6	9.2
Organisation Size		
• 0-9 full time equivalent employees	12.1	9.2
• 10-49 full time equivalent employees	59.9	57.3
• 50-99 full time equivalent employees	12.2	14.6
• 100 + full time equivalent employees	15.8	18.9
Ownership		
• Family-owned or operated	41.9	46.7
• Not family-owned or operated	58.1	53.3
• New Zealand interests	84.4	84.5
• International interests	15.6	15.5
Geographic Scale		
• Local	15.2	13.3
• Regional	19.1	20.2
• National	31.6	33.1
• International	34.0	33.4
Annual Revenue Sources		
• New Zealand sources	82.9	84.0
• International sources	17.1	16.0

Descriptive results on key issues influencing E-Business adoption and implementation are outlined and discussed in the next two sections of this report.

3.0 E-Business Adoption in New Zealand

The adoption of E-Business in New Zealand was considered in this survey by examining the use of computers for business activities, the types of business activities performed electronically, the existence of websites and the functionality of websites. Motives for involvement with E-Business initiatives and the most important impacts of E-Business on firm performance were also investigated.

Computer use for business activities was found to be almost universal. Over 92% of the respondents in 2001 indicated involvement with computers in their organisations, and by 2002, this proportion had increased to 95%. The proportion of New Zealand organisations with a website was much lower, as illustrated in Figure 1. Approximately half of the respondents (54.8%) had websites in 2001; however, website existence had increased to 63.6% by 2002. The introduction of a website provides a simple measure of E-Business adoption and the functionality of the website indicates E-Business capabilities (NOIE, 2000).

To gauge the level of E-Business capabilities, the number and types of website functions were evaluated (Berryman, 2000; PriceWaterhouseCoopers, 1999). Using two of the core transaction activities as an indication of the sophistication of web-based business activities, approximately one in five of these New Zealand organisations have websites capable of taking orders and one in twelve can also handle payments on-line. Although levels of computer use and website presence increased from 2001 to 2002, the proportions of these transaction capabilities had not changed over this period. Further, business-to-business sales (B2B) and business-to-consumer (B2C) sales have remained at the same levels in 2002, with approximately one in five companies reporting involvement with these activities. Overall, these results indicate that there is considerable scope for New Zealand organisations to increase the sophistication of their web-based business activities.

The impact of organisational size on these key indicators of E-business adoption has been evaluated. This was seen as an important consideration for the New Zealand economy given that approximately 99% of New Zealand businesses are micro, small or medium (Cameron & Massey, 1999). Historically, SMEs have lagged behind large companies in E-Business adoption (NOIE, 2000). Five categories of size were created based upon the numbers of full-time equivalent employees (FTEE) as shown in Figure 3.2. This analysis shows that computer use is lowest (86%) in the smallest organisations (<10 FTEE). The proportion of

companies with websites increases with increasing size of the organisation from 44% in the smallest companies (0-9 FTEE) to 87% of largest companies (100+ FTEE). However, for the two measures of website transaction capabilities, the results do not follow a linear relationship with size.

Figure 3.1 E-Business Adoption in 2001 and 2002

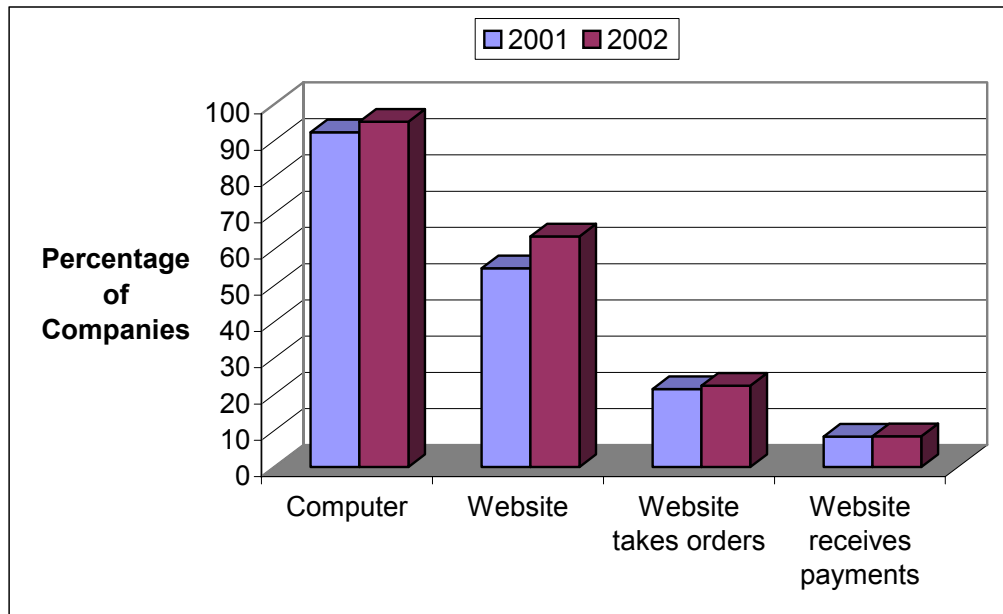
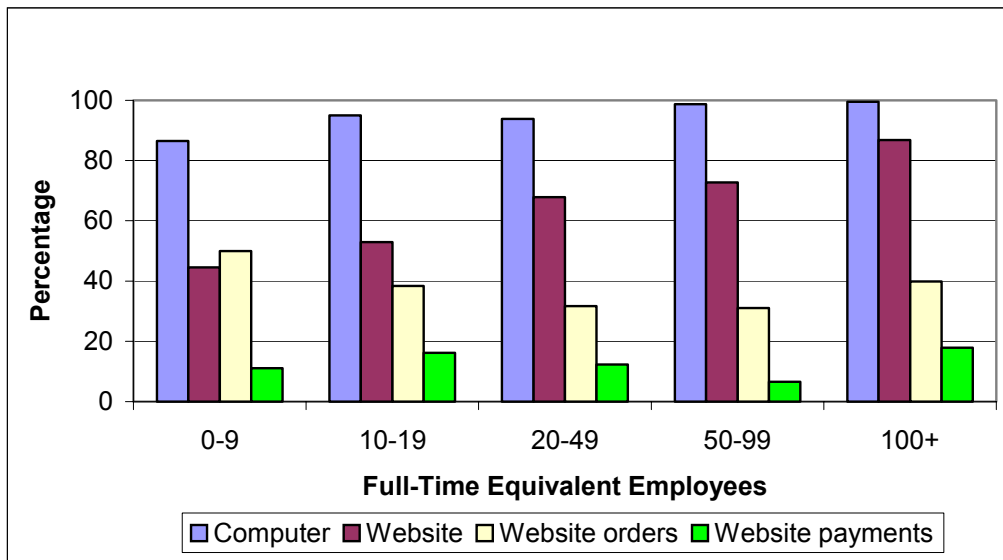


Figure 3.2 E-Business Adoption by Size, 2002



3.1 Electronic Business Activities

For organisations using computers, the range and frequency of electronic business activities being conducted were examined. Table 3.1 summarises the frequency of performing these business activities electronically in 2002. External email was a key feature for all organisations with computers and it was an hourly activity for 66% of the respondents. Three quarters of the companies were also very frequent users (hourly/daily) of internal email. Two other electronic information exchange/retrieval tasks were performed frequently by over 85% of the companies; i.e. sending/receiving data files and searching for information. Two thirds of the companies reported checking prices on-line on a monthly, weekly, or daily basis.

Table 3.1 Frequencies of Electronic Business Activities, 2002

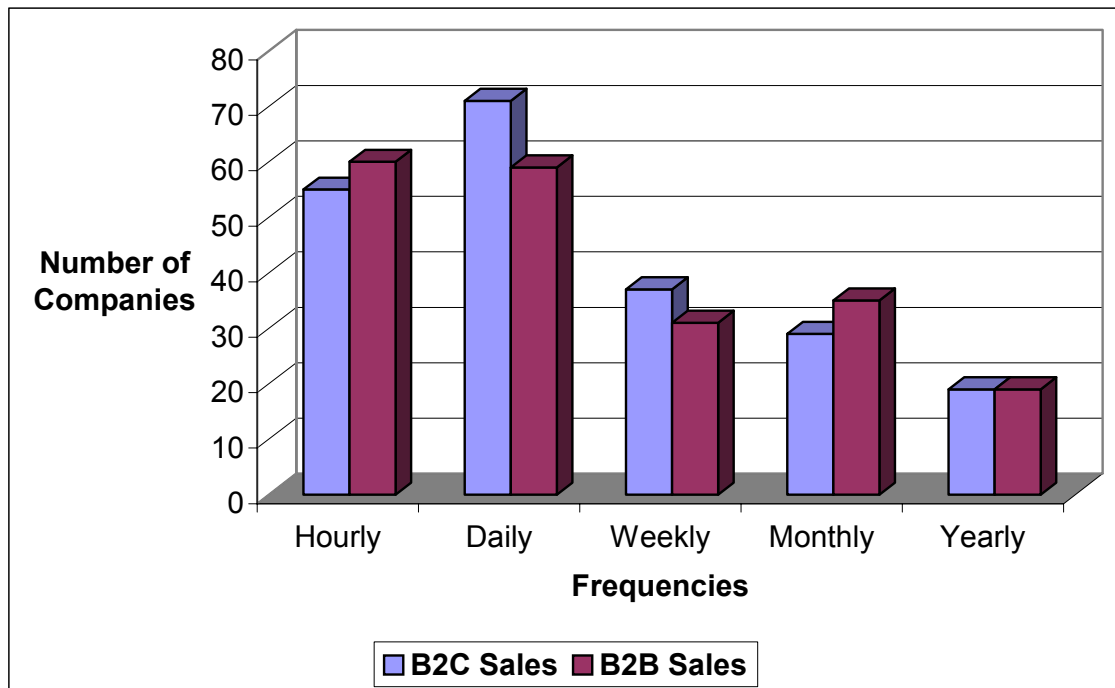
	Never %	Yearly %	Monthly %	Weekly %	Daily %	Hourly %
External Email	0.9	0.0	1.0	2.4	30.1	65.6
Internal Email	17.9	0.6	0.8	2.4	18.3	60.5
Sending/receiving data files	5.6	0.9	7.9	15.2	42.2	28.1
Searching for information	1.3	0.7	7.6	23.7	40.3	26.3
E-financial transactions	38.2	0.7	8.1	14.1	32.3	6.5
Internal Intranet	56.1	0.3	0.5	3.4	13.3	25.3
Checking prices on-line	22.0	3.9	17.5	24.2	23.7	8.8
Extranet links to key partners	66.1	1.6	6.2	6.1	12.0	8.1
E-advertising/promotion	58.3	4.6	12.2	6.4	10.2	8.3
After-sales service on-line	69.1	2.0	3.9	7.3	11.0	6.7
E-delivery coordination	73.7	1.2	3.5	6.5	10.3	4.8
Purchasing supplies on-line	38.2	8.6	20.1	17.0	11.8	4.4
Market research on-line	46.1	7.1	18.0	15.8	10.2	2.9
On-line sales to consumers	76.2	2.1	3.3	4.2	8.0	6.2
On-line sales to businesses	76.4	2.2	4.0	3.6	6.8	6.9
E-competitor intelligence	52.1	7.7	20.9	12.6	5.3	1.5
Staff recruitment on-line	64.3	13.4	12.6	4.6	3.1	2.0
Staff training on-line	78.4	4.1	8.3	4.0	3.3	1.9

Approximately half of the organisations were involved with electronic financial transactions on a monthly, weekly or daily basis; including 303 companies doing daily e-transactions. Similarly, half of the organisations were purchasing supplies on-line and doing market research on-line on a monthly, weekly or daily basis. The most frequent category for companies doing these activities, and others such as e-competitor intelligence and e-

advertising/promotion, was monthly. Electronic links to partners via an extranet were reported by one third of the companies and 107 of these companies used these links on a daily basis. After-sales service was provided on-line by 30% of the computer-using organisations and 26% were doing electronic delivery coordination. In 2002, staff recruitment on-line increased by 9.8% although this was still primarily a monthly or yearly activity; only one third of the companies were doing electronic recruitment. Staff training on-line was practised in less than 25% of these organisations. While New Zealand organisations may not make it a high priority to undertake electronic HRM activities, it is interesting to note that leading IT companies, such as Cisco Systems, make extensive use of electronic business to employee (B2E) activities.

The frequencies of B2B and B2C sales in 2002 are shown in Figure 3.3. Altogether, 204 organisations reported involvement with B2B sales and 211 were doing B2C sales. Estimates by Gartner Group, and other forecasters of ICT growth activities, signal that globally B2B transactions occur on a much larger scale than B2C. This suggests that there is considerable scope for expansion of B2B activity in New Zealand.

Figure 3.3 B2B and B2C Sales, 2002



3.2 Website Features

The features of websites were investigated and the importance of each function was rated by the active companies (i.e. those doing each website activity). The proportions of the website companies implementing each function and the mean importance ratings in 2001 and 2002 are summarised in Table 3.2. At this aggregate level, the 2002 results show small decreases in proportions for ten of these activities, however these changes do not impact on the sequence of 2001 rankings for the functionalities. The most frequent website functions are clearly communication features that enable information-sharing on the company and create links to key stakeholders (e.g. customers and alliance partners). A list of products or services was reported for almost every website and company data was provided on three quarters of the websites. Approximately half of the websites featured generic promotions, and one third reported having customised promotions. Reflecting the importance of strategic alliances and networks, links to alliance partners were featured on half of the websites. However, only 58 companies reported links to an electronic trading hub in 2002, which indicates that current levels of involvement in electronic marketplaces were very low.

Table 3.2 Website Features in 2001 and 2002

Features	2001 Percentage	2002 Percentage	2001 Mean Importance* [^]	2002 Mean Importance* [^]
Lists products/services	94.0	94.2	3.89 ²	4.34 ¹
Provides company data	75.2	68.4	3.36	3.69
Provides generic promotions	54.2	50.3	3.36	3.59
Links to alliance partners	48.7	45.6	3.27	3.42
Receives customer orders	39.2	35.2	3.61 ⁴⁼	3.95 ⁵
Provides after-sales support	33.2	33.5	3.54	3.75
Provides customised promotions	33.0	31.8	3.58	3.76
Provides secure transactions	22.8	20.6	4.06 ¹	4.32 ²
Receives payments on-line	15.3	13.4	3.61 ⁴⁼	3.93
Maintains account records	12.8	11.0	3.81 ³	4.00 ³
Tracks delivery services	12.0	11.5	3.44	3.97 ⁴
Links to e-trading hub	8.6	8.6	3.30	3.25
Sends bills on-line	7.7	6.3	3.32	3.50

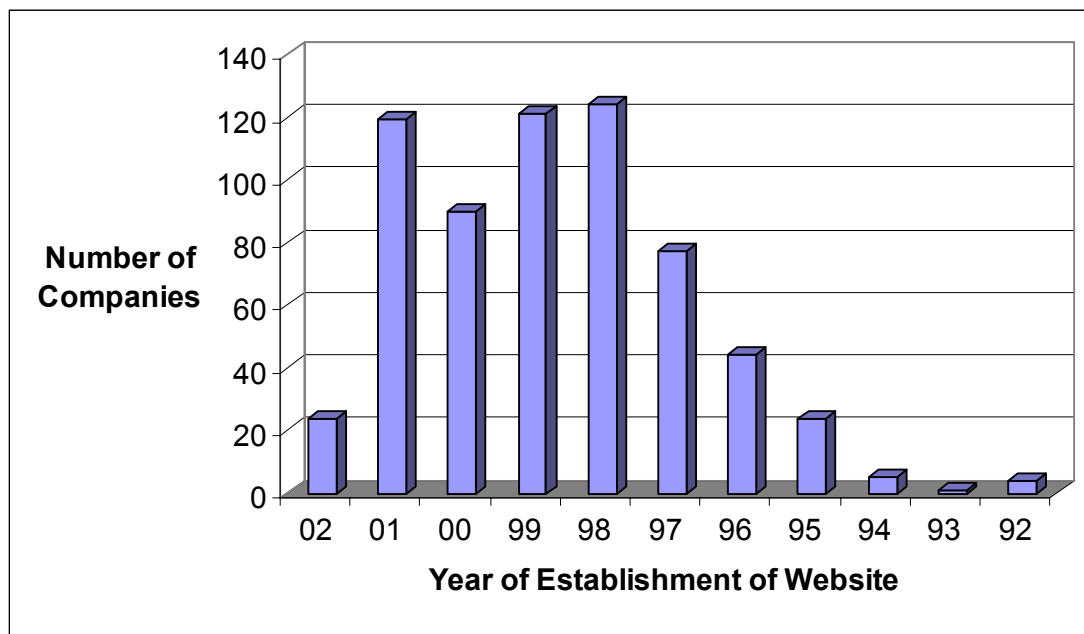
Note * Importance ratings were made on a scale of 1 – 5, where 1 is very low, 3 is moderate and 5 is very high.

[^] Mean importance rankings are provided as superscripts for the top 5 website features.

The mean importance ratings for each website feature in 2001 and 2002 are also provided in Table 3.2. Interestingly, the five most important website features all have higher means than in the 2001 survey. Although only one in five websites were capable of providing secure transactions, this feature received the highest mean importance rating in 2001. Listing products/services was the second most important website function in 2001; however, this basic communication feature achieved the highest average mean importance rating in 2002. Other website features with relatively high mean ratings focus on transaction processing capabilities, including maintaining accounts, taking customer orders, tracking delivery services and receiving payments on-line.

Additional information was collected in 2002 on the age of the websites and the number of major upgrades that have been made to the websites. Figure 3.4 shows the age distribution of the websites over the preceding 10-year period. Approximately 120 companies had websites aged 1, 3 or 4 years. A further 90 companies had established their websites 2 years prior to the survey (i.e. in 2000).

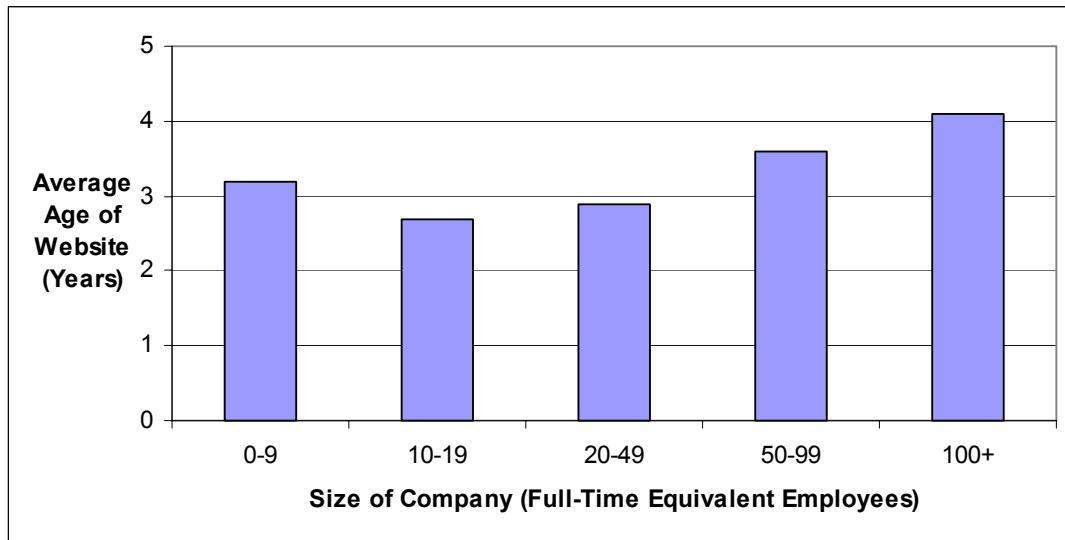
Figure 3.4 Website Age Distribution, 2002



Further analysis of the website age distribution examined the impact of organisational size (in terms of FTEE). Figure 3.5 shows the average age of the websites for each of the five size categories. The mean website ages ranged from 2.7 to 4.1 years, with a mean average of 3.3

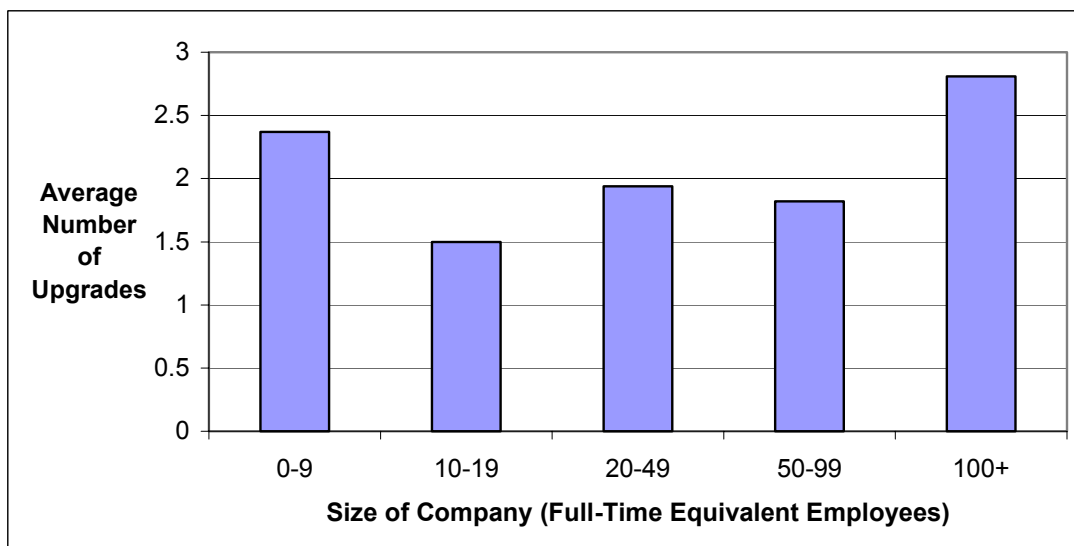
years. Apart from the smallest category (0-9 FTEE), the average website age appears to increase with organisational size. This means that larger organisations appear to have adopted websites earlier.

Figure 3.5 Website Age By Size, 2002



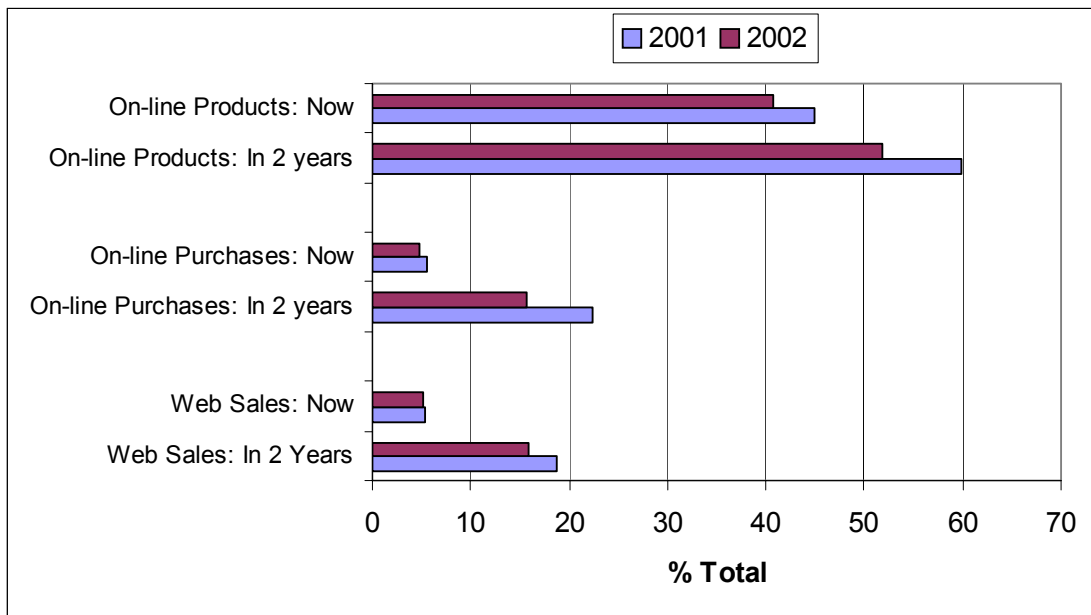
Data was collected on the numbers of major upgrades made to websites. Figure 3.6 shows the average number of upgrades for each of the organisational size categories. The mean number of upgrades ranged from 1.5 (10-19 FTEE) to 2.81 (+100 FTEE), with a mean average of 2.1 upgrades. The relationship between website upgrades and size requires further investigation as it does not appear to be direct or linear.

Figure 3.6 Website Upgrades by Size, 2002



Further data on the scale of website activities were collected in 2001 and 2002. Specifically, website companies were asked to estimate the proportions of their total business activities that were conducted via websites in three areas: (1) on-line products, (2) on-line purchases, and (3) web sales. Figure 3.7 shows the estimated mean percentages reported for the current period (i.e. Now), and for the future (i.e. In 2 years time). The 2001 results showed that the scale of current activities was low for both on-line purchases and web sales (approximately 5.5 % of total purchases/sales). By 2002, these proportions had decreased to 4.7% for on-line purchases and 5.1% for web sales. These results are interesting as the website companies were optimistically estimating growth of nearly 17% and 14% respectively for these activities in 2001. By 2002, the estimates of future growth for these activities had been trimmed to 11%. Although, the proportions of total product lines on-line were much higher (45% in 2001), the same pattern of results was reported. By 2002, the average estimate was 40% of total products were on-line and future growth was expected to achieve 52% within two years. The average estimate of 15% growth in on-line activities for all three of these key areas of business was clearly not achieved by 2002.

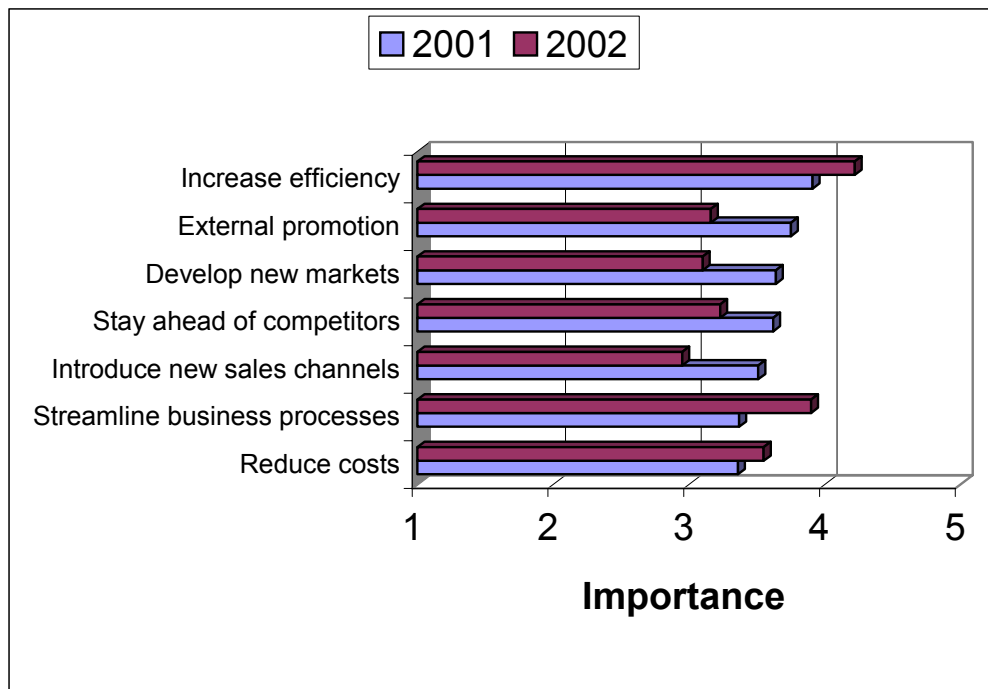
Figure 3.7 Scale of Website Activity in 2001 and 2002



3.3 Motives for E-Business

The primary motives for involvement with E-Business initiatives were examined for the organisations with websites in 2001 and 2002. Figure 3.8 shows the top six factors ranked according to 2001 mean importance values. These factors reflect the broad spectrum of strategic positioning to improve performance through efficiency, new markets, and new sales channels. A proactive stance to stay ahead of competitors was perceived to be more important than was the reactive approach of keeping up with competitors. Increasing efficiency was the most important motivation for initiating E-Business initiatives in 2001 and 2002. Interestingly, the mean importance values for efficiency factors (including streamlining business processes and reducing costs) increased in 2002, while means for the marketing and strategic factors decreased (by 0.5 on average). The factor that rated as the least important motivator for E-Business initiatives was providing employment (mean 1.6).

Figure 3.8 Primary Motives for E-Business Initiatives



3.4 Impacts of E-Business

The impacts of E-Business activities on the operations and performance of New Zealand organisations were evaluated by the companies with websites. A comprehensive series of potential benefits and opportunities were identified, including financial factors, market positioning, customer services, supplier relationships, communication issues and productivity

measures. Respondents rated all of the factors (41 in 2001, 36 in 2002) that were applicable to their organisations on a scale from 1 to 5 (where 1 is very low importance and 5 is very high importance). The ten most significant impacts of E-Business activities are listed in Table 3.3 according to their mean importance rating in 2001. Mirroring the strategic motivations identified above, five of these key factors focus directly on customers, communications and relationship building, and three represent opportunities to expand the scope of the business. Achieving gains from improving efficiency was also recognised by these website companies. ‘Enhancing company image’ was rated as the most important benefit of participation in E-Business activities in 2001 and 2002. The top ten factors were essentially the same in both surveys. However, the mean importance rating of ‘removing geographic barriers’ decreased markedly in 2002. Significant increases were found in 2002 for other efficiency measures (decreasing order processing costs, reducing internal operating costs), customer services (improving delivery of services), and relationship building (improving relationships with suppliers).

Table 3.3 Ten Most Important Impacts of E-Business

2001 Ranking	Factor	2001 Mean Importance	2002 Mean Importance[^]
1	Enhancing company image	3.93	3.98 ¹
2	Improving information exchange with customers	3.77	3.76 ²
3	Faster response to customers	3.64	3.49 ⁵
4	Improving competitive position	3.56	3.44
5	Creating new business opportunities	3.56	3.37
6	Providing access to new customers	3.55	3.50 ⁴
7	Improving customer service	3.53	3.61 ³
8	Increasing efficiency of business processes	3.48	3.47
9	Removing geographic barriers	3.48	2.44
10	Building customer relationships	3.43	3.45

Note: [^] Mean importance rankings are provided as superscripts for the top 5 impacts in 2002.

To provide a contrast, the five factors with the lowest mean importance ratings from the list of factors evaluated by the website companies are provided in Table 3.4. Participation in E-Business activities was perceived to have limited direct impact on these activities that include specific financial, staffing, and purchasing tasks.

Table 3.4 Five Least Important Impacts of E-Business

2001 Ranking	Factor	2001 Mean Importance	2002 Mean Importance
1	Reducing the number of suppliers	1.79	1.93
2	Attracting new investment	2.00	2.03
3	Increasing staff retention	2.02	1.98
4	Increasing buying power	2.14	2.15
5	Increasing flexibility to change product portfolio	2.39	2.38

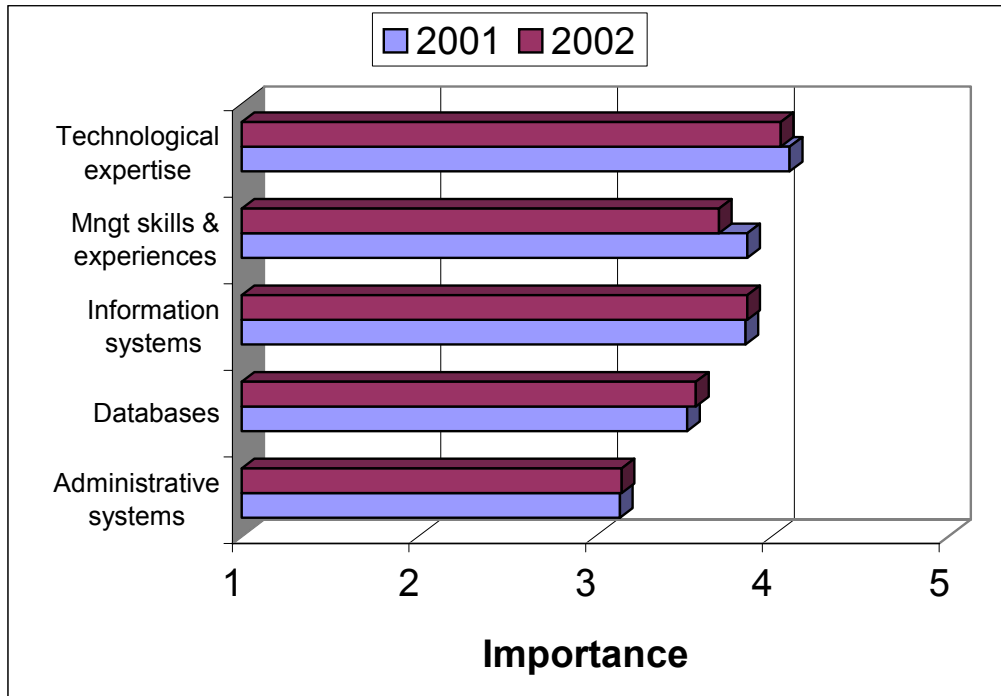
4.0 E-Business Implementation in New Zealand

The implementation phase is critical for the effective uptake of any new IT-based business processes or systems. Implementation of E-Business initiatives was considered in this survey by examining the specific resources required, the types of advice needed, the sources of assistance utilised, the major difficulties involved, and the measures required to improve uptake of E-Business.

4.1 Resources

The importance of a series of specific resources for implementation of E-Business initiatives was examined for the website companies in 2001 and 2002. Figure 4.1 shows the five most important resources for E-Business implementation, listed in order of their mean ratings in 2001. Not surprisingly, 'technological expertise' scored the highest mean rating in both surveys. Other key resources included a mix of management skills, technical resources, and administrative systems. The same pattern of results was found in 2001 and 2002. These findings indicate that implementation of E-Business initiatives depends upon a business solution that integrates across management, administration and technical systems. Furthermore, these managers are recognising that implementation of E-Business requires much more than just technical and technological resources.

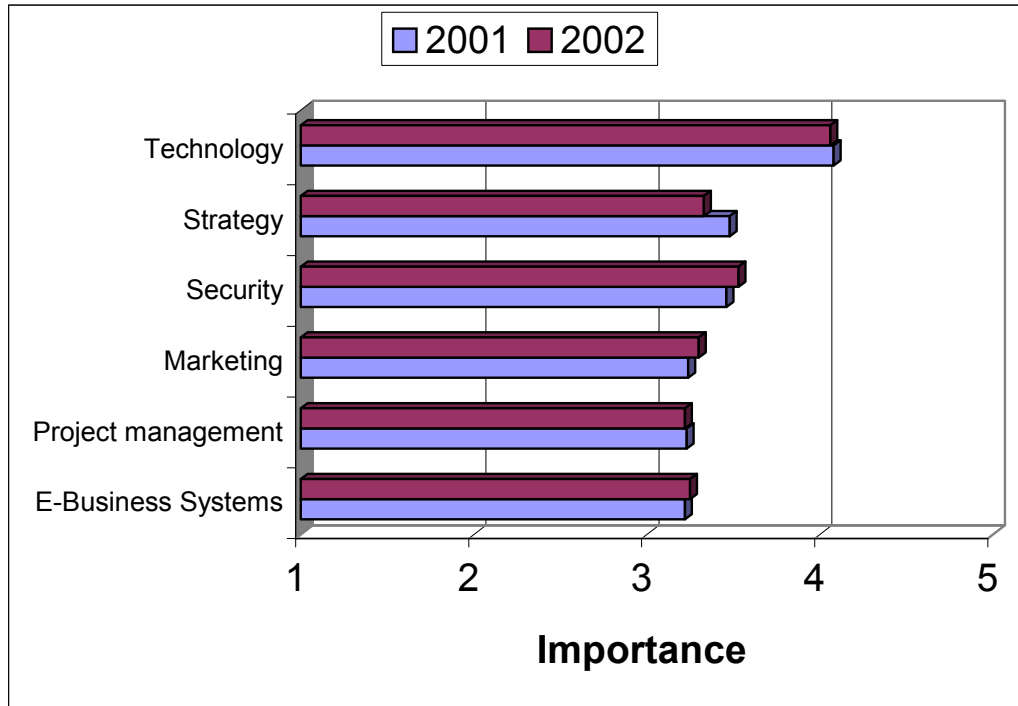
Figure 4.1 Resources Needed for E-Business Implementation



4.2 Types of Advice

The types of advice needed for the implementation of E-Business initiatives were evaluated by the website companies in 2001 and 2002. Figure 4.2 shows the five most important types of advice for E-Business implementation, which reflect the full spectrum of management expertise, listed in order of their mean ratings in 2001. These results are consistent with the findings reported above on resources, and also with the previous E-business survey by Deloitte (2000), signalling requirements for integrated business solutions. The same pattern of results was found in 2001 and 2002. Technology solutions rated as the most important type of advice needed for E-Business implementation in 2001 and 2002. At the other end of the spectrum, supply chain management advice was ranked last with a mean importance rating of 2.3 (on a scale from 1-5) in both surveys.

Figure 4.2 Advice Needed for E-Business Implementation



4.3 Sources of Assistance

Twenty potential sources of assistance with implementation of E-Business initiatives were investigated in 2001 and 2002. Managers in the website companies indicated the advisors they had consulted and rated the importance of these advisors to implementation of their E-Business projects. Table 4.1 shows the proportions of the website companies consulting each type of advisor and the associated mean importance ratings in 2001 and 2002. The leading source of assistance was web-page developers, consulted by over 70% of these organisations. Other key technical sources included software vendors, Internet service providers, hardware vendors and computers services companies. In 2002, the proportions of website companies consulting these technical IT companies for assistance had increased (by an average of 4%).

Contrary to the Deloitte (2000) findings, only one in five companies indicated that they used consultants (c.f. Deloitte 43.4%) or their current business advisors for their E-business initiatives. Interestingly, 40% of these New Zealand organisations consulted their customers for advice with their E-Business developments, signalling a key focus on service delivery and relationship building. In 2002, 164 companies reported obtaining assistance from their ‘informal networks’.

Table 4.1 Assistance with E-Business Implementation

Source of Assistance Consulted	2001 Percentage	2002 Percentage	2001 Mean Importance ^{*^}	2002 Mean Importance ^{*^}
Web page developers	70.8	75.5	3.97 ¹⁼	4.06 ³
Software vendors	58.3	61.1	3.97 ¹⁼	4.02 ⁴
Internet service providers	58.2	64.2	3.41	3.55
Computer services, solutions	49.9	55.3	3.78 ⁴	4.09 ¹
Hardware, solutions vendor	49.9	51.4	3.69	3.74
Customers	40.3	40.9	3.87 ³	3.78 ⁵
Informal networks	28.8	26.8	3.22	3.27
Other companies doing E-Commerce	24.3	25.1	3.15	3.01
Consultants	24.3	22.2	3.58	3.60
Current business advisors	23.0	21.3	3.28	3.37
Parent or related companies	21.4	19.2	3.70 ⁵	3.74
Current suppliers	19.7	19.3	3.33	3.51
Alliance partners	18.9	16.2	3.38	3.21
Distributors	14.7	13.2	3.45	3.46
Industry association personnel	12.7	12.4	3.27	3.41
Key investors	7.8	10.4	3.39	4.07 ²
Trade New Zealand	3.0	3.4	2.56	2.47
Government advisors	2.0	2.1	3.60	3.11
BIZ or BIZInfo	1.9	2.5	2.27	3.13
Technology New Zealand	1.9	1.5	2.71	2.00

Notes * Importance ratings were made on a scale of 1 – 5, where 1 is very low, 3 is moderate and 5 is very high.

[^] Mean importance rankings are provided as superscripts for the top 5 sources of assistance.

Mean importance values were higher in 2002 for most of the sources of assistance. Notable increases were reported for ‘computer services, solutions’ (moving to the highest ranking source in 2002), ‘Internet service providers’, ‘key investors’ (moving to the second highest ranking in 2002) and ‘BIZ or BIZInfo’.

In both surveys, the proportions of companies seeking E-Business advice from government advisors, BIZ Info, Technology New Zealand and Trade New Zealand were very low. While each of these public sources of information and support target different market segments, these findings suggest that government sources of assistance on E-Business could be utilised more widely.

4.4 Inhibiting Factors

The effective implementation of E-Business initiatives is influenced by many organisational and environmental factors. To investigate the difficulties involved with E-Business implementation, we asked all of the respondents from computer-using organisations to rate the importance of a series of potentially inhibiting factors (30 factors in 2001, reduced to 26 in 2002) on a scale from 1 to 5 (where 1 is very low importance and 5 is very high importance). Although, most of the top twelve factors were the same for the website companies as the non-website companies in 2001, the ranking of these factors varied between these two groups. The same pattern was found in the 2002 results. Mean importance values were higher for many of these inhibiting factors for the non-website companies and the differences were found to be statistically significant. Table 4.2 lists the mean importance values for the top twelve factors in 2001 and 2002 for the companies with websites. Overall, the respondents rated the same twelve factors as the most important inhibitors of their E-Business initiatives in both surveys.

Table 4.2 Difficulties with E-Business Implementation: Website Companies

	2001 Mean Importance Rating* and Ranking	2002 Mean Importance Rating* and Ranking
Low customer use of E-commerce	3.25 1 st	3.15 1 st
High costs of computing & network technology	3.00 2 nd	3.10 2 nd
Limited knowledge of technologies	2.98 3 rd	2.89 5 th
Uncertainty of financial benefits	2.89 4 th	2.87 6 th
Concerns about security aspects	2.88 5 th	3.01 3 rd
Lack of time to start new projects	2.87 6 th	3.00 4 th
Lack of experienced IT staff	2.85 7 th	2.86 7 th
Limited knowledge of E-Business models	2.81 8 th	2.59 12 th
Business partners not ready	2.79 9 th	2.69 10 th
Limited size of target market	2.77 10 th	2.77 8 ^{th=}
Low supplier use of E-Commerce	2.73 11 th	2.67 11 th
Concerns about the quality of telecommunications infrastructure	2.70 12 th	2.77 8 ^{th=}

Note * Importance ratings were made on a scale of 1 – 5, where 1 is very low, 3 is moderate and 5 is very high.

However, differences in the mean ratings have changed the rankings of these factors in 2002. Most of the mean values decreased in importance rating, reflecting a reduction in the influence of these inhibitors.

Two of the factors with higher mean values, signalling a greater importance in 2002, were ‘concerns about security’ and ‘high costs of computing and network technology’. Overall, the most important difficulties for website companies, which were rated as moderately important on average, focus on low customer usage, technological issues, and security concerns.

For companies without websites, the mean importance values for the top twelve factors are shown in Table 4.3. The top inhibiting factors were feasibility issues linked to financial returns, market size and resources (specifically time and costs). The role of partners, customers and suppliers in E-Business implementation was recognised and the lack of readiness of these groups to do business electronically was perceived as a major source of difficulties by the non-website businesses. These findings also indicate that the inhibitors of E-Business adoption and implementation extend beyond the technological resources required, to incorporate a wide range of internal organisational and external contextual factors.

Table 4.3 Difficulties with E-Business Implementation: Non-Website Companies

	2001 Mean Importance Rating* and Ranking	2002 Mean Importance Rating* and Ranking
Uncertainty of financial benefits	3.49 1 st	3.19 3 rd
Limited size of target market	3.41 2 nd	3.24 1 st
Lack of time to start new projects	3.25 3 rd	3.14 4 th
Business partners not ready	3.19 4 th	2.92 12 th
Low customer use of E-commerce	3.14 5 th	3.03 9 th
Low supplier use of E-Commerce	3.11 6 th	3.06 7 th
Limited knowledge of E-Business models	3.10 7 th	2.94 11 th
Lack of experienced IT staff	3.07 8 ^{th=}	3.05 8 th
Cannot see the benefits yet	3.07 8 ^{th=}	3.12 5 th
Concerns about security aspects	3.05 10 th	3.08 6 th
High costs of computing & network technology	2.93 11 th	3.21 2 nd
Limited knowledge of technologies	2.89 12 th	2.95 10 th

Note * Importance ratings were made on a scale of 1 – 5, where 1 is very low, 3 is moderate and 5 is very high.

4.5 Measures to Improve Uptake

The uptake and effectiveness of E-Business activities is influenced by many contextual factors beyond an organisation's boundaries and control. All of the respondents from computer-using organisations were asked to rate the importance of twelve potentially key factors. In 2001, the rankings of the measures to improve uptake of E-Business factors for the website and non-website companies were quite different. Further, the differences in mean importance values were found to be statistically significant for half of these factors. This same pattern was found in the 2002 results. Accordingly, these results are presented separately for these two groups of companies. Table 4.4 lists the mean importance values for all of these factors in 2001 and 2002 for the companies with websites. Overall, the pattern of results for the website companies is consistent in both surveys, as shown by very similar rankings of these factors.

Table 4.4 Measures to Improve E-Business Uptake: Website Companies

	2001		2002	
	Mean Importance Rating* and Ranking		Mean Importance Rating* and Ranking	
Telecommunications infrastructure	3.71	1 st	3.84	1 st
Consumer access to the Internet	3.58	2 nd	3.68	2 nd
Improved security	3.54	3 rd	3.64	3 rd
Training for E-Business	3.53	4 th	3.46	5 th
Business access to the Internet	3.42	5 th	3.54	4 th
Promotion of E-Business use	3.40	6 th	3.37	6 th
Consumer protection legislation	3.13	7 th	3.15	8 th
National strategy for E-Business	3.05	8 th	3.00	10 th =
Provision of web-page facilities	3.03	9 th	3.17	7 th
Legal issues	2.86	10 th	3.00	10 th =
Tax incentives	2.82	11 th	3.09	9 th
Government services on-line	2.74	12 th	2.95	12 th

Note * Importance ratings were made on a scale of 1 – 5, where 1 is very low, 3 is moderate and 5 is very high.

In 2002, nine of these measures to improve uptake had higher mean importance values than was found in 2001. Interestingly, the biggest mean increases (ranging from 0.14 to 0.27) were found in the four factors ranked at the bottom of the list (from 9th – 12th). The top three factors also increased in importance (by 0.10 or more) in 2002, reflecting an increase in recognition of their importance by the website companies.

As in the APEC study of E-commerce in SMEs (1999), improving the ‘telecommunications infrastructure’ was rated as the number one factor by the website companies, with the highest mean importance value in both surveys. Mirroring their top inhibiting factor, website companies rated ‘Consumer access to the Internet’ as the second most important measure to improve uptake of E-Business.

Table 4.5 lists the mean importance values for all of these factors in 2001 and 2002 for the companies without websites. ‘Improved security’ ranked as the most important measure to improve E-Business uptake in both surveys; the mean increased in 2002 signalling a greater perceived importance of security issues. ‘Training for E-Business’ and the ‘telecommunications infrastructure’ ranked second and third respectively in 2001, but reversed their sequence in 2002 based on changes in their mean values.

Table 4.5 Measures to Improve E-Business Uptake: Non-Website Companies

	2001 Mean Importance Rating* and Ranking	2002 Mean Importance Rating* and Ranking
Improved security	3.70 1 st	4.00 1 st
Training for E-Business	3.67 2 nd	3.57 3 rd
Telecommunications infrastructure	3.48 3 rd	3.75 2 nd
Consumer access to the Internet	3.37 4 th	3.49 6 th
Promotion of E-Business use	3.35 5 ^{th=}	3.30 9 th
Consumer protection legislation	3.35 5 ^{th=}	3.53 4 ^{th=}
Business access to the Internet	3.29 7 th	3.53 4 ^{th=}
Provision of web-page facilities	3.22 8 th	3.20 10 th
National strategy for E-Business	3.14 9 th	3.09 11 th
Legal issues	3.03 10 th	3.42 7 th
Tax incentives	3.02 11 th	3.36 8 th
Government services on-line	2.80 12 th	3.06 12 th

Note * Importance ratings were made on a scale of 1 – 5, where 1 is very low, 3 is moderate and 5 is very high.

‘Business access to the Internet’ and ‘consumer protection legislation’ were perceived to be more important for the non-website companies in 2002. Legislative requirements for areas such as tax and legal issues were at the bottom of the non-website companies’ rankings in 2001. However, the perceived importance of these factors increased markedly in 2002. Mean importance differences for both groups of companies were statistically significant in both

years. The government's own e-services were rated 12th and perceived to be moderately important to improve E-Business uptake.

5.0 Conclusions and Further Research

A series of key results from a state-of-the-art survey on E-Business practices in New Zealand-based organisations in 2001 and 2002 were outlined in this report. These findings confirm and extend the previous telephone survey commissioned by the Ministry of Economic Development (2000). While the levels of computer use increased from 92.4% in 2001 to 95.3% in 2002, the proportion of companies with websites grew by 8.8% in 2002 to 63.4%. Both computer use and website presence were found to increase with increasing size of the organisation. Frequencies for basic electronic communication activities (e.g. email and information exchanges) were very high. Most websites were providing lists of products/services (94%) and company data (68%). However, transaction capabilities were much lower, as only 1 in 5 websites were capable of secure transactions and 1 in 7 websites were receiving payments on-line. Approximately one in five companies were doing B2B and B2C sales in 2002.

For both on-line purchases and web sales, the scale of current activities was low and these reduced in 2002 (to 4.7% and 5.1% respectively). However, the average proportion of products on-line in 2002 was 41%. Estimates for the average growth in website activities for sales, purchases and products on-line, reduced from 15% in 2001 to 11% in 2002. Further, it was interesting to find that growth expectations in 2001 for these key areas had not been achieved by 2002.

Motivations for E-business activities reflected proactive strategic positioning to improve performance through efficiency, new markets and new sales channels. In 2002, the mean importance values increased for several of the efficiency motivations including 'streamlining business processes' and 'reducing costs'. Significant benefits from E-Business were identified by the website companies in line with their strategic aspirations; these included opportunities to enhance company image, improve efficiency, expand business scope, and improve service, communications and relationships with customers. However, there is considerable scope for New Zealand organisations to develop their E-Business activities

further and to move beyond the introductory electronic activities such as listing their products and company data on websites.

In terms of E-Business implementation, the results confirm the need for both technological and managerial knowledge and systems. Although E-Business activities are based upon technological transactions and communications, an integrated business solution, coupled with extensive managerial acumen, is required to maximise the return from electronic modes of business. Accordingly, key resources and types of advice needed for implementation of E-Business initiatives reflect the full spectrum of management and technological expertise. Many different types of advisors, including web-page developers, software vendors, other technical support providers and business contacts, were consulted for assistance with E-Business implementation. In 2002, the proportions of companies consulting the IT companies increased (by an average of 4%). Customers emerged as a very important source of assistance for 40% of the website companies. However, only a small number of respondents reported utilising government sources for advice on E-Business implementation.

Inhibitors to E-Business implementation also extended beyond technological resources to incorporate a broad range of organisational and external factors. For the website companies, the top inhibitors in 2001 and 2002 were 'low customer use of E-Commerce' and the 'high costs of computing and network technology'. However, companies without websites were more concerned with feasibility issues linked to financial returns, market size and resources (specifically time and costs). Furthermore, the lack of readiness for E-Business by other key players, including partners, customers and suppliers, were perceived as major difficulties by the non-website businesses.

To improve the uptake and effectiveness of E-Business in New Zealand, many structural, socio-economic, and educational issues need to be addressed at national, regional and industry levels. For the New Zealand website companies surveyed, the three most important factors in 2002 were improvements to the 'telecommunications infrastructure', 'consumer access to the Internet' and 'improved security'. The top three factors for the companies without websites in 2002 were 'improved security', 'telecommunications infrastructure' and the provision of 'training for E-Business'.

Further analysis of this extensive research database will examine the impacts of scale and scope on E-Business activities, identify trends in each industry, and explore adoption enablers

and inhibitors. The business strategies and competitive positioning of E-Business initiatives will be further evaluated. As this large sample represents such a wide range of New Zealand organisations, the results will provide an invaluable independent source of information for the emerging E-Commerce strategy. In addition, key findings will be summarised for policy developers and to provide guidelines on E-Business for managers.

Acknowledgements

This research project was funded by the University of Waikato Vice-Chancellor's E-Commerce Fund (2000) and the Foundation for Research, Science and Technology grant, UOWX0016.

References

- Berryman, E. 2000. *Getting on with the Business of E-Business*. PriceWaterhouseCoopers www.pwcglobal.com/ retrieved 17/06/00.
- Cameron, A. & Massey, C. (1999). *Small and Medium Sized Enterprises: A New Zealand Perspective*. Auckland: Longman.
- Clark, D. N., Bowden, S., Corner, P., Gibb, J., Kearins, K., and Pavlovich, K. 2001. Adoption and Implementation of E-Business in New Zealand: Empirical Results, 2001. *University of Waikato Management School Research Report, 2001-1*, 21p.
- Deloitte Touche Tohmatsu. 2000. *Deloitte E-Business Survey: Insights and Issues facing New Zealand Business*. 20 pp.
- Dillman, D.A. 1978. *Mail and Telephone Surveys: The Total Design Method*. Wiley: New York.
- Finkelstein, S. and Hambrick, D. (1996). *Strategic Leadership: Top Executives and Their Effects on Organizations*. Minneapolis, MN., USA: West Publishing Company.
- Ministry of Economic Development (MED). 2000. *Electronic Commerce in New Zealand: A Survey of Business on the Internet*, Information Technology Policy Group, Competition and Enterprise Branch. 13 pp.
- Ministry of Economic Development (MED). 2001. *Electronic Commerce in New Zealand: A Survey of Electronic Traders*, July 2001. AC Nielson/Inland Revenue Department.
- National Office for the Information Economy (NOIE). 2000. *Taking the Plunge 2000: Sink or Swim*. Commonwealth of Australia.
- New Zealand Institute for the Study of Competition and Regulation Inc. (ISCR). 2001. *Scoping Study: E-Commerce Performance Measurement Research in New Zealand*, September 2001.

PriceWaterhouseCoopers. 1999. *SME Electronic Commerce Study (TEL05/97T)*. Asia Pacific Economic Cooperation (APEC) Telecommunications Working Group, 37 pp.

PriceWaterhouseCoopers. 2000. *Electronic Business Outlook for the New Millennium*. 40 pp.

Wetenhall, P., Sutherland, G. and Boven, R. 2000. *After the Land Grab: B2B E-Commerce in Australia and New Zealand*. Boston Consulting Group, 30 pp.

Appendix

Industry Distribution of Population and Sample (%)

Industry	Population	2002
Agriculture, forestry and fishing	2.3	7.6
Manufacturing	16.7	32.3
Mining	0.2	0.4
Electricity, gas and water supply	0.4	1.3
Construction	7.6	6.4
Wholesale trade	6.9	11.9
Retail trade	12.8	5.2
Accommodation, cafes and restaurants	4.8	2.4
Transport and storage	4.7	5.8
Communication services	2.0	4.2
Finance and insurance	3.0	4.6
Property and business services	12.9	5.5
Government administration and defence	4.0	2.6
Education	7.1	2.6
Health and community services	8.8	1.4
Cultural and recreational services	2.5	0.8
Personal and other services	3.5	5.1

Source: New Zealand Business Demographic Statistics 2001, Statistics New Zealand.

University of Waikato Management School
Research Report Series
ISSN 1175-5571

The purpose of this Research Report Series is to stimulate discussion and comment. Papers in the series should not be cited or quoted in any publication without the written permission of the author(s).

Comment on papers should be addressed to the author(s) concerned.

Further copies may be obtained from the Research Administrator as follows:

Research Administrator
University of Waikato Management School
Private Bag 3105
Hamilton
NEW ZEALAND

Telephone: 0064-7-838-4376
Facsimile: 0064-7-838-4063
Email: amandas@mngt.waikato.ac.nz
Web Site: <http://www.mngt.waikato.ac.nz/research>