

**CENTRE FOR
COMPUTING AND BIOMETRICS**

Business Use of the Internet in New Zealand: An Exploratory Study

Walter Abell and Leon Lim

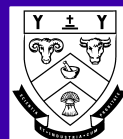
Research Report No:96/03
September 1996

RESEARCH

ISSN 1173-8405

REPORT

LINCOLN
UNIVERSITY
Te Whare Wānaka O Aoraki



Centre for Computing and Biometrics

The Centre for Computing and Biometrics (CCB) has both an academic (teaching and research) role and a computer services role. The academic section teaches subjects leading to a Bachelor of Applied Computing degree and a computing major in the BCM degree. In addition it contributes computing, statistics and mathematics subjects to a wide range of other Lincoln University degrees. The CCB is also strongly involved in postgraduate teaching leading to honours, masters and PhD degrees. The department has active research interests in modelling and simulation, applied statistics and statistical consulting, end user computing, computer assisted learning, networking, geometric modelling, visualisation, databases and information sharing.

The Computer Services section provides and supports the computer facilities used throughout Lincoln University for teaching, research and administration. It is also responsible for the telecommunications services of the University.

Research Report Editors

Every paper appearing in this series has undergone editorial review within the Centre for Computing and Biometrics. Current members of the editorial panel are

Dr Alan McKinnon	Dr Keith Unsworth
Dr Bill Rosenberg	Dr Don Kulasiri
Dr Clare Churcher	Mr Kenneth Choo
Dr Jim Young	

The views expressed in this paper are not necessarily the same as those held by members of the editorial panel. The accuracy of the information presented in this paper is the sole responsibility of the authors.

Copyright

Copyright remains with the authors. Unless otherwise stated, permission to copy for research or teaching purposes is granted on the condition that the authors and the series are given due acknowledgement. Reproduction in any form for purposes other than research or teaching is forbidden unless prior written permission has been obtained from the authors.

Correspondence

This paper represents work to date and may not necessarily form the basis for the authors' final conclusions relating to this topic. It is likely, however, that the paper will appear in some form in a journal or in conference proceedings in the near future. The authors would be pleased to receive correspondence in connection with any of the issues raised in this paper. Please contact the authors either by email or by writing to the address below.

Any correspondence concerning the series should be sent to:

The Editor
Centre for Computing and Biometrics
PO Box 84
Lincoln University
Canterbury, NEW ZEALAND
Email: computing@lincoln.ac.nz

Business Use of the Internet in New Zealand: An Exploratory Study

Walter Abell and Leon Lim
Centre for Computing and Biometrics, Lincoln University,
Canterbury, New Zealand.
Enquiries to: abell@lincoln.ac.nz

Abstract

Information Technology industry and media commentators claim that businesses stand to gain many benefits from use of the Internet. While successful examples of companies using the net have been widely reported, few studies have seriously examined the issues involved.

A survey of New Zealand businesses using the Internet was undertaken, looking at current and expected uses, perceived benefits and problems areas. Interesting results included: small companies making more use of the Internet and experiencing more benefits; only a quarter of the businesses using the net for marketing; and some indications of dissatisfaction with Internet Service Providers. The results suggest several directions for future research..

Keywords: internet commerce, internet surveys, small business, New Zealand

Introduction

The Internet is portrayed by the media and the Information Technology industry as revolutionising business activities. Trade publications and popular books promote what companies can or will be able to achieve on the Internet. Indeed, many companies already use the net (or plan do so in the near future) and a new industry has sprung up to advise and support them. Clearly there is a great deal of interest and enthusiasm in the Internet's potential for commerce. However, there are currently only a few studies of business use the Internet and most of these are from private market research companies (eg Activ Media, href 2; O'Reilly & Associates, href 3).

The first objective of this study was to investigate the current and future use of the Internet by New Zealand businesses. Secondly, it looked at the benefits companies perceived from net use, both for general business activities and specifically for marketing and advertising. The ultimate goal was to promote a better understanding of the Internet's potential for commerce.

Many reasons for using the Internet in business have been suggested. In fact the growth of the Internet (and the World-Wide Web in particular) has been given as a reason itself for being connected. Cronin (1995) categorised business use of the net into three main areas:

<u>Area of Use</u>	<u>Sample Uses</u>	<u>Potential Benefits</u>
<i>customer relations</i>	sales marketing, advertising market research customer support	increased market share reach a wider market greater customer satisfaction
<i>dealing with suppliers</i>	product information product support on-line ordering	lower operational costs greater flexibility of supply
<i>internal company operations</i>	communications information gathering resource sharing job recruitment	access to expertise regardless of location more awareness of business environment increased productivity

Marketing on the Internet has received substantial attention. Businesses are not only able to reach a wider audience but also reduce marketing costs (Ellsworth & Ellsworth, 1995). Indeed, creating a "business presence" is a common reason given for being on the net. Regardless of size, a business can have the same on-line profile as much larger companies (Cronin, 1995).

While the Internet offers many potential benefits, there are a number of unresolved issues in conducting business on it. Despite recent advances, security remains the most fundamental concern and the main reason why companies hold back from full use of the net (van Kirk, 1994; Baron, 1995).

Other important issues include:

- authenticity and legality of electronic messages
- reliability of Internet connections and services
- difficulty of locating required (and relevant) information
- frivolous use of the Internet by employees
- effectiveness of marketing on-line

New Zealand Context

It appears that a number of New Zealand companies are trialing use of the Internet, to see where it fits into their business (Collins, 1995; King, 1995). Electronic mail is the predominant use and there is growth in the area of product support (Hosking, 1995; King, 1995). Recent articles give little indication as to the level of business use but two surveys in the last year provide some data on general usage patterns in New Zealand. The first was a local market research survey undertaken by Go Global Interactive and AGB McNair which looked at the profiles of individuals using the web only (href 4). The second was the New Zealand and Australian results from the 4th Georgia Institute of Technology WWW User Survey which again looked at user profiles (Recker et al, href 5). However, neither of these surveys addressed business use of the Internet.

Reports of New Zealand companies suggest that they are facing the same issues and problems described in overseas literature. The slow speed of some Internet connections and relatively high traffic charges are of special concern in New Zealand (Watt & Stewart, 1995). There have been a number of recent changes (and controversies) involving New Zealand Internet Service Providers (ISPs) and their charging, access and service policies. With the entry of Telecom New Zealand and other large companies into the ISP market, further shake-ups are likely (Brown, href 6).

The Study

To investigate some of the issues mentioned above, a questionnaire was developed and sent to New Zealand companies already using the Internet. The areas covered were:

- current and future usage of the Internet
- reasons for and perceived benefits of Internet use
- use of the Internet for marketing and advertising
- problems and issues associated with Internet use

Population And Sample

As the study was aimed at businesses already using the net, the "New Zealand Internet Connected Organisations" web page (Davies, href 7) was used as the starting point. This page contains the Internet addresses for New Zealand organisations with registered domain names. This list is automatically updated each month and includes all addresses with ".NZ" as part of the name. For this study, the list as at August 1995 was obtained and manually edited to remove duplications (eg different branches of the same company) and non-profit organisations such as universities and schools (ie those without ".CO" in the address). The edited list contained 754 companies and was used as the sample for the study.

Methodology

An email message requesting participation was sent to each of the companies on the edited domain name list. The message did not contain the survey itself, due to the difficulties of designing a legible email form and of respondents filling it in on-line. As the addresses on the list did not contain any user identification, the messages were sent to the "postmaster" alias, on the assumption that every correctly set up email system would have a postmaster.

The questionnaire was targeted at individuals responsible for decisions regarding Internet usage by their companies (eg IT manager). The email message contained a request to forward it to the appropriate individual in the company.

Of the 754 email requests, 139 replies agreeing to participate were received and questionnaires were mailed, faxed or emailed according to respondents' wishes. In total, 116 completed questionnaires were returned (15% of the companies on the list). It should be noted that about 200 of the email requests were rejected by the computer systems of the recipient companies. This was primarily due to incorrect set up of either the email systems or the postmaster aliases.

As this was an exploratory study, descriptive statistics were considered appropriate for presenting the survey results.

Limitations

As is common with many Internet surveys, a self-selected sample was used. This means the results obtained cannot be generalised to all New Zealand companies using the Internet. The problems and validity of Internet surveys are topics of ongoing debate (eg see discussion in Georgia Institute of Technology WWW User Survey reports (Pitkow, href 8). In our case, random sampling was not deemed appropriate because the study was attempting to determine the range of Internet use rather than the absolute number of businesses connected. In addition, little was known about the types of companies involved and the likely response rate.

Summary of Results

A summary of the results from the survey in each of the areas addressed follows. A complete list of results and the original questionnaire can be found at on the Lincoln University web site (Abell, href 1).

Demographic Information

This section looked at the range of companies and individuals answering the survey. Respondents were asked their job title and how they learned about the Internet as well as their company's area of business, size (in staff and turnover), and the year net access was established.

As mentioned previously, 116 completed surveys were returned. Two-thirds of the respondents were in management positions (including business owners) while about a quarter were technical staff (eg system administrator, engineer, programmer). 42% learned about the Internet through print and other media. This was not surprising given the extensive publicity and exposure that the net has received. Other sources included staff or business contacts (28%), general knowledge or "folklore" (22%) and university contacts (11%).

Three quarters of the companies gained net access within the previous two years with only a small number using it for more than four years. 64% of the companies were in the business/financial services industry while just over half had an "Information Technology focus".

72% of the companies employed fewer than 50 employees. As can be seen in Table 1, the largest proportion of responses were from small companies with a technology focus. Analysis of the results show that these companies used the Internet in more ways, gained more benefits from its use, and were more likely to use it for advertising or marketing; these points are discussed later. Over half the companies had an annual turnover in excess of \$1,000,000.

Table 1 : Company Size by Company Focus

Number of Employees	Non-IT Focus	IT Focus	Total
0-49	32 (28%)	52 (45%)	84 (72%)
50	22 (19%)	8 (7%)	30 (27%)
Total	54 (47%)	60 (52%)	114

Internet Resources

These were defined as the methods used to access the Internet and included email, World-Wide Web, FTP, etc. Respondents were asked about which resources they were aware of, which were currently used by their company, and which were expected to be used within the next 12 months.

There was high awareness (over 70%) of all the resources listed. Not surprisingly, almost every company used email and 80% used the web. Newsgroups and FTP were also used by more than 70%. With such high current usage, the expected increase in use over the next 12 months was small, with only FTP and WWW showing much increase (13% and 10% respectively).

The figures for FTP were a little puzzling and it is not clear if some respondents considered that this covered file transfers over email, etc. The figures for current and future use of Gopher, Telnet and Listservers were comparatively low. In the case of Gopher, this probably indicates that it has been superseded while the others are only used in special situations.

Internet Uses

This section looked at the ways in which the companies used the Internet. Uses included dealing with customers and suppliers, internal company use (eg communications, voice/video conferencing) and "to be seen at the forefront of technology". Respondents were asked about their awareness of these uses as well as current and future uses.

Once again, awareness was high with over 70% for each use listed. The top current uses were:

- communication within or outside the company (90%)
- getting information from suppliers (66%)
- providing customer information (52%)
- R&D and sharing of software and information (52%)
- to be seen at the forefront of technology (47%)
- market and product research (41%)
- sending orders to suppliers (35%)
- receiving orders from customers (29%)

Providing customer information and accepting customer orders were the major areas for growth over the next year (34% and 27% respectively). Other uses expected to increase were advertising job vacancies, voice/video conferencing, market research, and ordering from suppliers (about 20% for each).

Internet Benefits

This section asked about the perceived benefits of Internet use, both current and expected in the next 12 months. Benefits listed were in the areas of supplier and customer relations, increased market share and improved productivity. Respondents were asked for an overall effectiveness rating as well as for any reasons why their company had not fully benefited from use of the net.

All the benefits listed were selected by at least 20% of the respondents. Those with the highest ratings were:

- improved information gathering (75%)
- availability of expertise regardless of location (58%)
- better service and support from suppliers (49%)
- increased productivity (43%)
- better awareness of business environment (38%)
- ability to reach international markets (35%)
- faster, more flexible delivery from suppliers (32%)

Growth over the next year was expected in the areas of increased market share, reaching international markets and increased customer satisfaction (about 25% each).

Over 90% of respondents felt that the Internet had been "effective" or "very effective" in meeting their company's needs. The most common reason given for *not* getting full benefit from the net was that suppliers and customers were not yet on-line (70%). Locating information on the net was listed as a problem by 32%. This is important as it contrasts with the high value placed on information gathering. Technical limitations of the hardware or software was selected by 30% and network charges by 16%. Of special note was that, when asked for written comments, 10% of the respondents said they had experienced problems with ISPs.

Internet issues

This section asked about the importance of a number of current issues surrounding Internet use. All the issues listed were selected as "important" or "very important" by more than half of the companies. Combining the important and very important responses, the issues in rank order were:

- guarantee of message delivery (96%)
- tampering with network messages (90%)
- unauthorised access to internal networks (89%)
- interception of network messages (79%)
- verification of authorship of messages (65%)

- decreased productivity through frivolous use (59%)
- enforceability of contracts negotiated over the network (58%)

Interestingly, only 19% of respondents said that frivolous use of the net was a very important issue.

Internet Marketing

Respondents were asked if their companies used the Internet for marketing or advertising. Those that did were asked which methods were used (eg bulletin boards, mailing lists, WWW), whether they collected statistics, and how effective the marketing effort had been. Those that did not market on the net were asked for reasons why.

Only a quarter of the companies engaged in marketing on the net and 83% of those did so via a web home page. Also used were mailing lists (37%), newgroups (33%), electronic publications (23%) and virtual shopping malls (20%). About half of those marketing said that statistics were collected on customers perusing their Internet information. In most cases, this was simply a count of web page accesses. Half of those using the net for marketing felt that it had been "effective" or "very effective" while a third felt it was "neutral" and 13% indicated it was "too early to tell".

The main reasons for not using the Internet for marketing were:

- target customers not connected (47%)
- lack of expertise or personnel (29%)
- did not believe on-line marketing would be effective (20%)
- connection or usage charges too high (14%)
- technical limitations of hardware or software (12%)

14% of respondents also indicated that a marketing use was contemplated or under development.

Discussion

This was an exploratory study and no specific hypothesis or theory was being tested. It is important to remember that since a self-selected sample was used, the results are not necessarily representative of all New Zealand businesses using the Internet. Nonetheless, some of results are very interesting and provide ideas for further research.

Size of Companies

As mentioned previously, a large proportion of responses came from companies with less than 50 employees. In one way, this result is not surprising as almost all New Zealand businesses fall into this category. But it contrasts sharply with a recent survey of Internet use by North American businesses (O'Reilly and Associates, href 3). In that study, the proportion of large businesses (more than 100 employees) connected to the net was several times greater than that of small companies. The difference may be partially explained by the purported enthusiasm of New Zealanders for adopting new technology. In addition, New Zealand companies may believe that the Internet helps reduce the effects of New Zealand's geographical isolation.

It is also interesting our results show that both small and IT-focussed companies used the Internet for more business activities and reported more benefits. While this result might be expected for the IT companies (owing to the nature of their business and their existing expertise), the difference between smaller and larger companies is again surprising.

For example, Table 2 shows a breakdown of uses for the Internet by company size. Small companies had higher levels for almost all the activities listed, especially for accepting customer orders and being seen at the forefront of technology. Possible explanations for this are that small companies may be more flexible and willing to experiment with new technology and that handling customer orders over the net may be a cost-effective way of reaching a wider market.

Table 2: Current Usage by Company Size

Internet Uses	Percentage of Companies	
	0-49 employees	50 employees
To get information from suppliers	71	55
Provide information to customers	51	24
Send orders to suppliers	37	24
Receive orders from customers	34	7
Market and product research	49	24
Communication with other branches, companies	90	86
R&D/Sharing of software, data or information	52	48
Advertising job vacancies or recruiting	9	14
To be seen as being in the forefront of technology	60	10
Voice or video conferencing via the Internet	4	3

Similarly, Table 3 shows that small companies claimed more benefits from their use of the net than larger ones. This is probably due in part to the greater use of the net by small companies as mentioned above. However, there is a substantially higher number of small companies using the net to both increase market share and lower costs. The market share issue is reinforced by the higher level of net use for marketing by small companies (33% versus 7%). Again, it may be speculated that small companies in New Zealand find the Internet a cost-effective way to increase their profile and put them on a more even footing with their larger competitors.

Table 3: Perceived Benefits by Company Size

Internet Benefits	Percentages of Companies	
	0-49 employees	50 employees
Lower cost of obtaining supplies	21	17
Faster, more flexible delivery from supplier	38	17
Better service and support from suppliers	51	48
Increase in market share of products/services	24	3
Lower cost margins for products/services	26	3
Greater customer satisfaction	45	17
Ability to reach out to international markets	44	14
Effectiveness in information gathering	75	66
Increased productivity	46	38
Availability of expertise regardless of locality	63	48
Better awareness of the business environment	42	28

It should be noted that there is a substantial overlap between companies in the small and IT focused categories (refer Table 1). But even when the results are broken down by both categories, the differences between small and large companies is still apparent, with the most uses and benefits claimed by companies that are both small and IT focused.

Putting aside the question of response bias, these results could imply that companies which are small or IT focused stand to gain the most (or the most initially) from using the Internet. As most New Zealand companies are small by international standards, this could be a significant factor in planning for Internet development in New Zealand. Further research is needed to test if this is a general trend and to investigate the factors leading to successful use of the Internet in business.

Problems and Issues

As could be expected, security of both messages and internal networks were the main concerns of the companies surveyed. However, it would appear there are more fundamental issues of concern. A majority of the businesses felt that they had not received full benefit from the Internet because either their suppliers or their customers were not yet on-line. This seems to imply that the level of Internet usage in New Zealand at the time of the survey was not sufficient to sustain effective commercial activities. However the continued growth in sites and users (both in New Zealand and overseas) suggests that this concern will diminish over time.

Some of the companies indicated that they were dissatisfied with their Internet access. Unreliable connections, poor service and high charges were the main reasons given. That about a quarter of the original email requests for participation in this study failed to reach their destinations is further evidence of problems. It would appear that the relatively young Internet service industry is facing a number of teething problems. The situation is likely to improve with time, especially given the increasing competition in the industry.

It is unclear if the above problems are unique to New Zealand, although some of the access and charging issues seem to be. It may be that, in New Zealand, the Internet has yet to reach a point of maturity or to fulfil its potential for electronic commerce. Further research is needed to determine what types and levels of services are required by companies. Initially, it would be useful to document the problems occurring and to formulate objective measures for rating ISPs. This would not only aid companies in selecting a supplier but also help the budding ISP industry identify problem areas.

Marketing And Advertising

Use of the Internet for marketing purposes by the responding companies was fairly low. Many of those using the net for marketing were unsure of its effectiveness and the only evaluation method used was keeping track of costs. This is not surprising as methods for measuring the effectiveness of the Internet are only starting to appear (Metcalf, 1996).

Further research is needed to develop effective cost-benefit techniques to apply to Internet use. For example, a checklist of criteria for success would help companies evaluate if their needs warrant the use of the net. Such techniques are essential for companies making decisions about Internet use and trying to monitor its effectiveness.

Summary

This study looked at the ways that some New Zealand businesses are using and benefiting from the Internet. The response from small companies is especially interesting and important. This, coupled with New Zealand's relative geographical isolation, makes the net an extremely attractive method for New Zealand companies to expand their markets and perhaps even gain a competitive advantage. However, fruitful use is being hampered by concerns over security, whether target markets can be reached, and problems with ISPs. Further research in this area is crucial if New Zealand is to capitalise on the full potential of the Internet for commerce.

References

T Baron (1995) "Can the Net handle more than E-mail?" *CommunicationsWeek*, No. 563, pp. 5(2).

M Collins (1995) "NZ companies dip a tentative toe into Internet waters..." *The National Business Review*, Jul 21, pp. 24-25.

M J Cronin (1995) "Doing More Business on the Internet" New York: Van Nostrand Reinhold.

J H Ellsworth and M V Ellsworth (1994) "The Internet Business Book" New York: John Wiley & Sons, Inc..

R Hosking (1995) "Businesses take first steps online" *ComputerWorld (NZ)*, No. 396, pp. 1(2).

D King (1995) "Net Profit: A big boost for business" InfoTech Weekly, No. 185, Mar, p. 6.

R M Metcalfe (1996) "Do the numbers add up to an intoxicated Internet facing a hangover?" InfoWorld, Vol. 18, No. 11, p. 55.

L Watt and P Stewart (1995) "Cashing in on the information superhighway" Management, Vol. 42, No. 1, pp. 58-65.

D van Kirk (1994) "Unraveling the Internet hype" InfoWorld, Vol. 16, No. 52, pp. 52(2).

Hypertext References

href 1 <http://www.lincoln.ac.nz/ccb/staff/abell.htm> - Walt Abell's home page.

href 2 <http://www.activmedia.com/Trends.html> - Trends in the World Wide Web Marketplace, 1996, Activ Media, Inc.

href 3 <http://www.ora.com/survey/business> - Conducting Business on the Internet, 1996, O'Reilly & Associates.

href 4 <http://surfcheck.co.nz/> - Surfcheck World-wide Web Survey Results, 1995, Go Global Interactive and AGB McNair.

href 5 <http://www.vuw.ac.nz/~mimi/survey> - GVU World-wide Web Survey Results for Oceania, 1995, Mimi Recker, John Greenwood and James Pitkow.

href 6 <http://www.computerbuyer.co.nz/wwwfeat/21be.html> - Shaping up for ISP shakeout, 1996, Russell Brown, Computerworld (NZ).

href 7 <http://www.comp.vuw.ac.nz/~mark/netsites.html> - New Zealand Internet Connected Organisations, Mark Davies.

href 8 http://www.cc.gatech.edu/gvu/user_surveys - Georgia Institute of Technology WWW User Surveys, James Pitkow.