

## Adoption of Information Communication Technology by New Zealand SMEs.

**Author: Stuart Locke**

Department of Finance  
University of Waikato Management School  
smlocke@waikato.ac.nz

### **Abstract**

The speed at which new information communication technology (ICT) is being adopted by small to medium size enterprises in New Zealand is discussed in this study. Against a background of recent government and private sector initiatives directed toward increasing SME utilisation of ICT the results of empirical work on SMEs' perception of barriers to more rapid adoption are presented.

Government has shown a concern to promote the use of ICT by New Zealand SMEs. There has been an enquiry into telecommunication regulation and an ongoing commitment to an E-summit programme. The latter involves both Government and enterprise in ongoing dialogue and public fora. The nature of these works is described as a significant part of the environment in which ICT is being promulgated to SMEs in New Zealand.

Telecommunication companies (Telcos), internet service providers (ISPs), application service providers (ASPs) and service related businesses are actively promoting to SMEs, business to business (B2B) and business to consumer (B2C) solutions to grow revenue, reduce costs and generally make the SME a better business to own. New business portals are coming online and the barriers to participation are central concerns for their future success.

The extent to which the various advertising promotions and information sharing campaigns are successful is investigated in this study. The chosen method is through a quarterly SME Benchmarking Survey including additional questions concerning the barriers, which proprietors and managers perceive on relation to adoption of further ICT in their SME. The SME Benchmarking survey is FRST funded as part of a larger research contract into ICT adoption by New Zealand Business.

The study concludes with highlighting potentially beneficial policy changes for Government.

## Adoption of Information Communication Technology by New Zealand SMEs.

**Author: Stuart Locke**

Department of Finance  
University of Waikato Management School  
smlocke@waikato.ac.nz

### **Introduction**

The perceptions of various groups integrally involved with the small medium enterprises (SMEs) sector, regarding information communication technology (ICT) are analysed in this paper. The Economist Intelligence Unit/Pyramid Research (EIU) study (2001) ([www.ebusinessforum.com](http://www.ebusinessforum.com)) into levels of E-preparedness ranked New Zealand 20<sup>th</sup> down from 16<sup>th</sup> the year before. While the impact of ICT across the whole business sector is important, it is essential that the SME sector, including the micro businesses, should capture some of the efficiency gains.

Trade NZ notes the importance of unleashing the potential gains from ICT for SMEs in underpinning their recent programme of assistance:

*New Zealand has no other option but to adopt e-business and increase participation of its SMEs in the global economy. E-Business has the potential to expand the country's current exports and grow the number of new exporters. Since uptake of true e-commerce is slow among exporters and other companies, the New Zealand Trade Development Board (Trade New Zealand) has taken on a leadership role through a NZ\$10 million project supported by additional funding from the Government. (Trade NZ 2001).*

Within the popular business magazine literature, it appears, the emphasis has moved from the rise and fall of dot-coms, and away from the heavy emphasis on Business to consumer (b2c) marketing to a business-to-business (b2b) emphasis. While supply chain management remains a hot topic there is an increasing move toward the general business opportunities that ICT may afford. There appears to be an increasing prevalence of smaller scale success stories with a distillation of some key learning as the core of these articles.

In the absence of a commercial imperative or a large stick/carrot regime it may be relatively easy to succumb to complacency in times of reasonable economic growth. Currently, agricultural exports are doing relatively well given the higher international prices for commodities and the low New Zealand dollar. Nevertheless, it is generally recognised that long-term sustainable competitive advantage needs to be built upon a strong foundation in the knowledge economy. With a small population, a relatively open economy, heavy compliance regimes relating to occupational-safety and health, resource management, employment relations, and the burden of social welfare vis ? vis other emerging knowledge economies there are multiple challenges to be faced. The SME sector, and in particular the micro business sector, is a very large component of the New Zealand economy. If ICT offers the opportunity of reducing

costs and enhancing supply chain efficiency, then it is important that these potential gains accrue to the SME sector.

The proportion of commerce that is undertaken by the smaller businesses in New Zealand is not completely clear. Dependent on the definition used and the data chosen SMEs represent something in excess of 90% of New Zealand business. The number of businesses as a proportion of all business is, according to Cameron and Tweed (1997) over 99.4% and the workforce engaged by SMEs relative to the total number employed is also large, at 60%.

A major issue facing the economy is the dead weight losses associated with business failure. If ICT were to impact to any significant extent upon business failure the gains will be considerable. Anecdotal evidence, in New Zealand, points to a significant number of business failures resulting in the personal bankruptcy of the owners (TV ONE (1999)). From a general perspective such failures in financial and social terms appear to be less than desirable. It is a concern in economic terms due to both the loss of productive efficiency and the extent to which there is transference onto the public purse through welfare payments.

Berryman (1983) surveyed the literature concerning failures and in 1993 updated the findings. In many respects the situation had not advanced much from what Cochran (1981) observed. If the high level of SME failure is the result of information asymmetry, poor signaling and classical market failure conditions, then there are potentially sound reasons for government to intervene in the market place. While the evidence of SME failure is problematic with official figures for two government agencies differing there does appear to be a sufficient reason for concern. Both the Department of Statistics and the Ministry of Commerce indicate that in excess of 60% of SMEs will fail in the first three years.

Government policy in a range of areas appears, among SMEs to have a low credibility. Changes by successive governments through the late 1980s up to the present time have resulted in low credibility for new policy initiatives. Scrimgeour and Locke (2001) review the decade from 1990 considering such events as the demise of Regional Development Councils, introduction and destruction of Business Development Boards, and the Biz Programmes mark 1 and 2. The issues combined with discriminatory personal taxation rates, slow progress in the reduction of compliance costs impacting upon SMEs, patchy regional development initiatives, and an inability to sort out the telecommunication and power switching arrangements have combined to create a low impression of Government policy.

Government policy, in New Zealand, relating to small to medium enterprises (SMEs) has altered significantly during the last decade (Nyamori and Lawrence, 1997). The changes have not followed a consistent pattern but rather have promoted considerable uncertainty in the environment. Commenting on the then most recently announced policy for SMEs Welham (2000, p41.) suggests, "they are 'reinventions of the wheel' for it has all been done before."

At the national level telcos (telecommunication companies) continue to dispute interconnection agreements. "After Telecom refused to switch WorldxChange's toll bypass phonecalls to Clear's network, WorldxChange complained to the Commerce

Commission on Friday June 1 accusing Telecom of abusing its market power” (New Zealand Herald 9 June, 2001). It is generally true that competition works to limit the extent to which there are dead weight losses in the system (Williamson 1996, p.197). However, the ICT environment reflects an ineffectual regulatory and compliance policy framework, which is a typical problem in a heavily bureaucratic structure where administrative process is the objective rather than tangible efficiency gains. The EIU makes this point forcefully commenting, “The importance of a regulatory regime geared to e-business is clear in our rankings; it is the main factor that puts Australia 18 places ahead of its neighbour New Zealand, which ranks only 20<sup>th</sup>.” This is despite the government’s involvement in a number of initiatives such as Esummit and ECAT (Electronic Commerce Action Team). The efficacy of these policies needs to be considered in the light of New Zealand deteriorating international ranking.

## **Method**

The SME survey has been conducted quarterly since 1999. Initially the project was managed through the Management Research Centre of the University of Waikato Management School ([www.mngt.waikato.ac.nz/mrc](http://www.mngt.waikato.ac.nz/mrc)). In 2001 the study has been run under the auspices of the Independent Business Foundation (IBF) [www.enterprise.org.nz](http://www.enterprise.org.nz). The survey is based on an Australian SME survey conducted by the CPA Australia. The 4-6 minute telephone interview consists of two parts. First, there are questions relating to the level of operating activity and these are asked each quarter. In addition several special interest questions are asked. These typically relate to the topical issues and the responses are prepared for business professional magazines. The minimum sample size of 400 provides a level of margin of error of less than 5%.

Sample selection is generated from ‘yellow pages’ telephone listings. The sample is programmed subject to constraints. Specifically two parameters are considered. First, the regions are balanced to ensure that more than 30 enterprises are selected in each chosen region. This biases the sample against the geographical concentration of Hamilton north. Similarly, the industry profiles are not representative of the proportions operating in the economy by rather ensure that minimum samples sizes are greater than 30. In order to get a response of at least 400 the number of calls made varies. Typically, 1,000 SMEs are contacted in order to get a response sample of 400 fulfilling the industry and regional diversity requirements. The questionnaire takes between 4 and 6 minutes to administer and approximately 85% of those taking part indicate a willingness to participate again in the future. These potential responders are cycled so they should be contacted in 2 or 3 quarters time.

Where surveys have been conducted of groups such as the Chamber of Commerce, Economic Development Association of New Zealand and local government the whole population is surveyed.

## **Results**

In March 2000 information was gathered concerning the extent to which activities, which broadly fall within the domain of e-commerce, were undertaken by SMEs. The survey, which was financially supported by a New Zealand telco, questioned the extent of computer ownership, computer usage, Internet connectedness, and type of Internet usage. Twelve months later, in March 2001, a survey containing questions pursuing a similar theme was conducted.

**March 2000**

Considerable variation is recorded in the usage of computers as shown in Table 1. It is noticeable that in the retail sector, with its predominance of small operations, computers are used by less than half of the establishments. This is contrasted with Wholesalers where there is over ninety percent usage and in financial services it is, not surprisingly, almost 100%. Internet access is relatively low ranging downwards from the financial services sector at 83% through transport and storage at 33% and construction at 29%. The relatively low linkage of the last two sectors suggests that few e-commercial transactions are being undertaken.

Table 1 March 2000 SMEs with Computers and Internet Connection

Industry	Have a computer %	Have a computer and are connected to internet %
Manufacturing	81	69
Construction	88	29
Wholesale Trade	92	79
Retail Trade	48	67
Transport and storage	75	33
Finance, property and business services	98	83
Community Services	80	0
Recreation, personal and other services	50	80
Other	92	83

From Table 2 it is apparent the predominant types of usage were at the low end of sophistication, reflecting that *www* has become a fax machine replacement for speedy mail and an on-line reference medium. Little use was being made of the Internet for business-to-business transactions.

Table 2 March 2000 Main uses of Internet connection

Industry	Information %	Advertising %	Buying %	Selling %	News Group %	E-mail %	Recreation %
Manufacturing	44	10	12	10	1	79	6
Construction	30	0	0	0	0	50	0
Wholesale Trade	47	5	11	16	5	79	16
Retail Trade	50	19	17	19	11	72	14
Transport and storage	100	12	100	0	0	100	0
Finance, property and business services	72	0	10	12	12	98	20
Community Services	0	0	0	0	0	0	0
Recreation, personal and other services	0	15	0	0	0	100	0
Other	31	14	4	6	6	94	10

The impact of business size on the use of the Internet was considered and results are shown in Table 3. E-mail usage differs very little with size whereas newsgroups decline and advertising is large at the big firm end of the spectrum with a slump in the midrange size and larger again with the micro businesses.

Table 3 March 2000 Employee numbers and internet usage

Staff	Informat ion %	Adver- tising %	Buying %	Selling %	News Groups %	E-mail %	Recrea- tion %
<5	51	16	9	10	8	83	18
5-9	45	7	10	10	7	90	5
10-14	36	7	14	21	7	86	7
15-19	30	10	20	30	0	80	0
20-50	43	26	13	9	0	83	4

Regional disparity was considered and the tabulated responses are presented as Table 4. There is a marked difference in usage between the various regions. The Waikato region's results seemed most striking. While the sample size was in excess of 80 for these results they continue to appear anomalous. The follow-up survey in March 2001 discussed next presented a different picture. Concerns had been expressed about line speed and the telephone infrastructure impacting adversely on rural areas. These issues continue to be of concern when considering the potential to drive efficiency gains from ICT. The EIU report, noted above, observed that agility is of importance rather than size. "The strategic embrace of high-tech industries and broadband Internet access is of importance." To create the sustainable advantage through a knowledge based platform suggests that regional centres and country hamlets need to get onto the wave as a means of stimulating growth and prosperity in those communities. Failure to keep up means that there will be a slide in productive potential and markets as others capture these local markets also.

Table 4 March 2000 Regional Internet Usage

Region	Infor- mation %	Adver- -tising %	Buy- ing %	Sell- ing %	News Group %	E- mail %	Recre- ation %
Northland	50	0	6	0	6	81	6
Auckland	60	22	9	7	4	87	18
Waikato	67	33	33	33	25	97	25
Bay of Plenty	26	6	0	6	0	71	6
Wellington	50	18	14	14	1	82	14
Canterbury	32	0	2	5	0	85	0

### **March 2001**

In March 2001 a similar set of issues were explored through the quarterly SME survey. The intention in this particular survey was to explore the intentions of SMEs. Questions asked were of the form shown in Figure 1. These provide an interesting picture of current usage as tabulated below. There is also a conservatism displayed, in terms of likelihood of embracing more e-commerce. Further questions were asked concerning barriers to more e-commerce and these are discussed in the next section.

Figure 1 March 2001 Question Format

Does your business have e-mail?	
Yes	71%
No	29%
For those responding No are they considering introducing E-mail into the business?	
No.....	16%
Yes, then when	
Within next 12 months .....	11%
2-3 years time.....	2%

The most surprising result was the relatively low level of businesses that thought e-commerce would impact upon their respective businesses. To ensure that respondents were aware that e-commerce, so far as the survey was concerned, included banking transactions, placing orders, selling promotion and more sophisticated supply chain matters this was made explicit in the conversation.

Table 5 March 2001 Industry Internet Usage

Industry/Issue	e-business Will Impact %	Have a Web Page %	Use E-mail %	Use E-banking %
Manufacturing	31	42	81	52
Construction	57	45	68	34
Wholesale trade	31	49	72	49
Retail trade	31	47	60	33
Transport and storage	38	43	76	43
Finance, property and business services	20	58	91	56
Community services	55	39	68	18
Recreation, personal and services	39	43	57	20

The larger urban and commercial centres are adopting the technology more so than the provincial and rural centres as is apparent from Table 6. In part this may be due to technology or just the perception of what ICT can do for the business. This is the issue that is explored in the next section.

Table 6 March 2001 Regional breakdown of E-usage

Industry/Issue	Believe E-business Will Impact %	Have a Web Page %	Use E-mail %	Use E-banking %
Auckland	33	64	83	49
Bay of Plenty	52	27	56	36
Canterbury	32	51	81	43
Otago	34	50	84	50
Waikato	43	22	32	32
Wellington	39	50	71	26

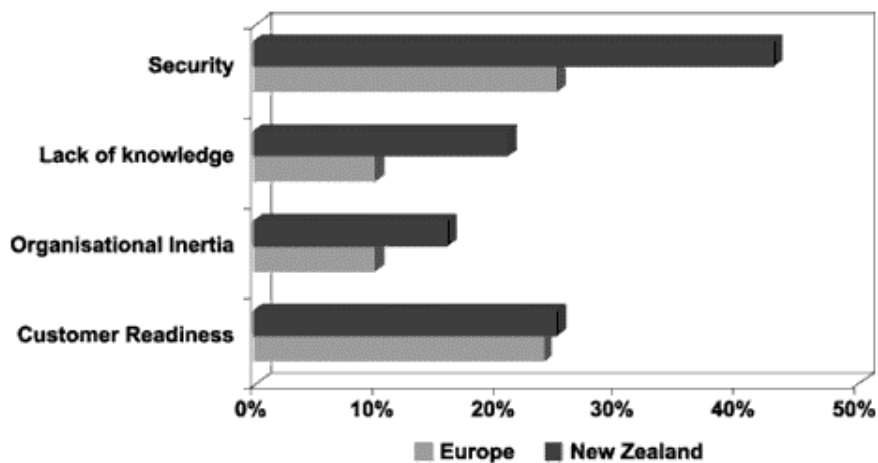
### Barrier to E-commerce

Wilde (2000) reporting the new Trade NZ funding initiative for exporters comments on barriers to e-commerce adoption by SMEs, listing:

- ?? Lack of knowledge
- ?? Concerns about security
- ?? Concerns about customer readiness
- ?? Confusion - there is no single voice or core of agreement
- ?? Lack of standard operating procedures
- ?? Fear of investing time and money in a rapidly changing environment
- ?? Fear of isolation, since there appears to be no critical mass of other users

These results were depicted graphically as shown in Figure 2

Figure 2 E-BUSINESS TODAY: PERCEIVED BARRIERS



***SME Perspective***

The March 2001 sought the views of SMEs as to the principal barriers, as they saw them, for more e-commerce. The most common reasons put forward are recorded in Table 7. These results differ from those suggested by Trade New Zealand.

Table 7 March 2001 SMEs' Perceived Barriers

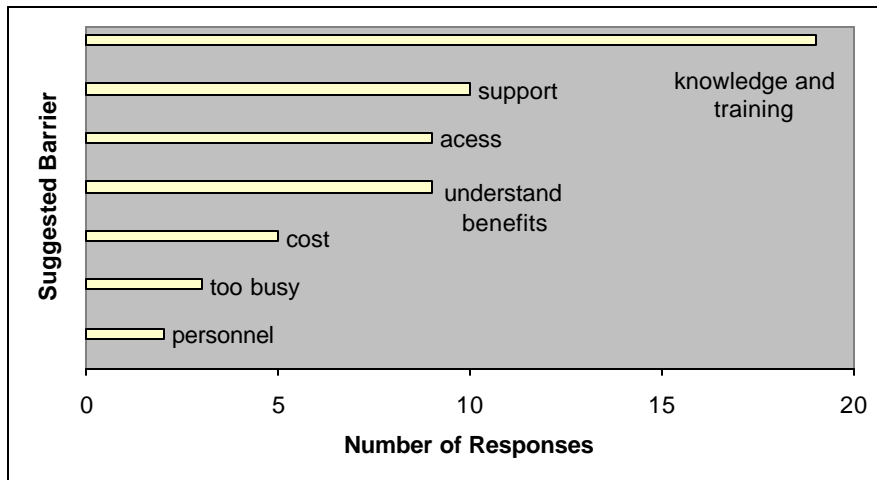
Barrier	Frequency
Not necessary for line of business	102
Cost	50
Time involved in investigating the issues and setting something up	50
Lack knowledge of issues involved	39
Clients lacking knowledge	6
Lack of apparent benefit	6
Lack of people resources	9
No computer	8
Not big enough	6
Not interested	8
People resistance	7
Security concerns	7
At full operational capacity	4
Speed of lines	4

***Economic Development Association of New Zealand Perspective***

A survey of all members of the Economic Development Associations of New Zealand was undertaken between May 21 and June 8, 2001. The response rate was 43% and 77 barriers for SMEs going further with E-commerce were provided. As these were open ended the analysis involved grouping them and forming like categories. The reduction process resulted in 7 barriers emerging as the principal hurdles that need to be overcome:

1. Lack of knowledge about e-commerce, what is involved and access to training to rectify this deficiency. It was noted that technophobia is a real issue to be confronted.
2. lack of support networks of mentors/experts, peers and understanding of how to form these.
3. access to the internet with reasonable telecommunication infrastructure
4. an appreciation of the benefits that an individual SME may enjoy from moving to adopt this new technology
5. the likely cost
6. SMEs are too busy
7. not sufficient trained personnel around.

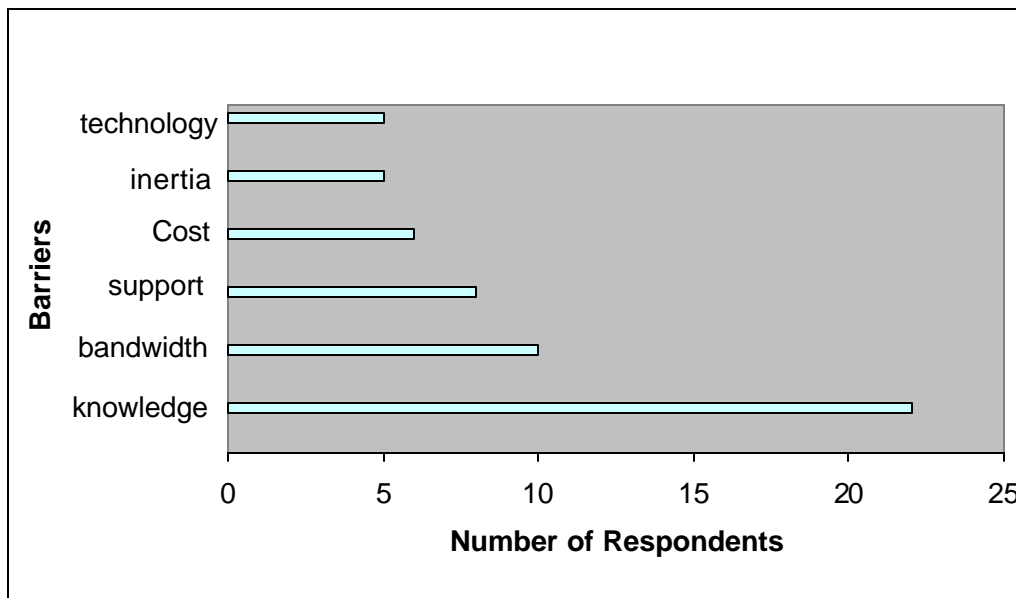
Figure 3 June 2001 EDANZ Perceptions of E-Barriers



***Territorial Local Government Perspective***

As part of a wider survey of local government e-preparedness views were sought from each territorial local authority's chief executive and mayor on what were, in their view, barriers to further e-commerce among business in their area. Additional feedback items coming through from local government related to the extent to which they should be in the vanguard. Resource constraints in terms of competing needs for expenditure and skilled personnel were suggested as the major inhibitors for local government doing more to lead the way.

Figure 4 June 2001 Local Government Perceptions of E-Barriers



***Consensus Issues***

The recurring themes in the three surveys are:

1. Knowledge of what e-commerce is about and how to use ICT to advantage.  
This includes the related issues of determining what the advantageous might

be, how to get started and lack of computer literacy. Personnel, with requisite skills, were noted as a barrier but for many SMEs the likelihood of having a dedicated staff member for e-matters is low. Accordingly, the development of support networks, potentially facilitated through EDANZ, BIZ or local government is essential.

2. Cost is presented as a problem. Certainly to obtain broadband access the charges are higher and remoteness from a telephone exchange makes this a non-option. Satellite and WAP services are developing and these may fill the gap but there are additional issues concerning reliability that need to be proven.
3. Access to adequate bandwidth, and in some areas, access to any width, is a problem that was raised repeatedly. It appears that infrastructural problems are a key issue. Where users cannot get a connection or the line speed is very slow this seems to be a major turn-off.
4. The not necessary for line of business argument may well be linked to lack of knowledge. The opportunity to drive efficiency gains for almost all businesses through greater adoption of ICT is present but not well recognised. The 'technophobia' issue and too busy doing what we do inhibitors may well be part of the same overall unwillingness to test something new.

## **Implications**

There is a widespread consensus in the literature that there are advantages for SMEs in embracing new ICT. The empirical evidence for New Zealand indicates that:

1. as a nation we are slipping further down the e-preparedness.
2. the level of e-commerce adoption is variable between industries and regions.
3. a quarter of SMEs don't see it as necessary for their line of business.
4. the level of knowledge among SMEs is low.

Government has a role to play in all the key areas of ICT adoption by SMEs. First, there are the infrastructural issues. Policy in relation to connectivity is lacking and the problem is not going away of its own accord. The EIU study points directly to the regulatory framework as being a key issue in New Zealand's non-improving international rating.

Government has a role to play in awareness building for SMEs of the advantages of E-commerce. To this end the government has co-sponsored E-summits and formed an E-commerce Action Team. While the level of awareness for the original E-Summit was low in the first few weeks after it was announced it was well attended. ECAT on the other hand seems to be making little impression in the months after its inception. The EDANZ survey of June 2001 asked:

Is the work of the E-commerce Action Team (ECAT) having any impact on SMEs in your area? Provide a number in range 1-7, with 1 as low and 7 as very high) [If ECAT is unknown use 1]

The mean score was 1.7, which included a 7 from one respondent.

In at least two important dimensions Government policy is not contributing to further adoption of ICT by SMEs.



## References

- Barton, C. (2001), "Bid to switch networks seems headed for court", New Zealand Herald, 9 June.
- Berryman, J. E. (1983), "Small Business Failure and Bankruptcy: A Survey of the Literature. International Small Business Journal, Summer, pp.47-59.
- Berryman, J. E. (1993), "Small Business Failure and Bankruptcy: What Progress Has Been Made in a Decade?", Small Enterprise Research, 2(1-2), pp.5-27.
- Cameron, A., Massey, C. and Tweed, D. (1997), "New Zealand Small Business: A Review" Accountants Journal of New Zealand, October, pp.4, 12.
- Cochran, A. B. (1981), "Small Business Mortality Rates: A Review of the Literature". Journal of Small Business Management, 19(4), pp.50-59.
- Economist Intelligence Unit/Pyramid Research study (2001) ([www.ebusinessforum.com](http://www.ebusinessforum.com))
- Nyamori, R and S Lawrence (1997), "Small Business Policy in New Zealand", New Zealand Journal of Business, 19 (1 and 2) pp. 73-93.
- Scrimgeour F and S Locke (2001) Small to Medium Enterprises and Government Policy: A decade of instability in New Zealand. In The Development and Supporting Systems for SMEs in Asia-Pacific countries in the 21<sup>st</sup> Century, Jinan University, pp 81-104.
- Trade NZ (2001) Trade NZ's E-Business Strategy, [www.tradenz.govt.nz/ebusiness](http://www.tradenz.govt.nz/ebusiness)
- TV One (1999), Bankruptcy in New Zealand, Inside New Zealand, Television Documentary, March.
- Welham, P. (2000), Reinventing the Regional and Business Development Wheel, Chartered Accountants Journal, 79(7), pp.41-42.
- Wilde, F. (2000) "E-nabling Exporters", New Zealand Business, December, pp.10-14.
- Williamson O.E. (1966), The Mechanisms of Governance, Oxford University Press.