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Perceived barriers to Internet adoption: a study of Victorian regional wineries

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Abstract

This paper reports on a study that determined some of the barriers that wineries perceived as inhibiting them from going online. The Rogers' framework is used to classify and discuss some of the characteristics of the non-adopter that are identified in the study, whilst the Yellow Pages® Business Index (IT) is used to compare wineries to a national study. An important finding of the study is the high degree of non-computerisation amongst wineries, which is an inhibitor not only to Internet access, but also possibly to the efficient management of running a winery. The study also provides some evidence indicating that wineries may not have the same business objectives and characteristics as other manufacturing businesses, hence, the development of an Internet model may need to be tailored specifically around winery business management processes.

Keywords

Wineries, Internet technologies, Rogers' paradigm, non-computerisation, diffusion

INTRODUCTION

The advent of Internet technologies has allowed some organisations and companies to automate business processes, facilitate communication, globally disseminate information, and engage in electronic transactions between partners. Porter (2001) suggests the Internet has become an extremely important technology for business and proposes that the important question for many businesses is not whether to deploy Internet technology, but how to use the Internet as a competitive part of business strategy.

The Australian wine industry has undergone a renaissance over the last twenty years. Australian winegrowers and the wine industry can be regarded as having global best practice in wine making and viticulture. However, the industry appears to have been slow to adopt the Internet and e-commerce for competitive advantage, when compared to other Australian sectors (Major, 2000). Australian wineries and wine distributors have also been found to lag behind counterparts in the Californian wine industry (Stricker *et al.,* 2001). The pressures for the adoption of e-commerce by agribusiness – a category in which wineries can be placed – will increase worldwide (Gregor and Jones, 1999; Badger, 2000), and the wine industry will not be isolated from this trend. Industry leaders such as Southcorp, Miranda and Tyrrells have planned, or are anticipating, the move to electronic business by utilising the Internet as the central technology with new supply chain management and enterprise resource planning systems. These large businesses have concluded that earnings growth in the future will not be tied to the revenue from the phenomenal export growth to date, but in efficiency and cost management gains – these gains are inextricably tied to the electronic streamlining of supply chains and customising business processes (Braue, 2001). Wine industry adoption of Internet technologies will benefit areas such as grape-growing, winemaking, administration and marketing, warehousing and distribution (Horlin-Smith, 2000).

Thus, use of the Internet by wineries has the potential to streamline information flows and transactions between constituent entities within the supply chain, resulting in cost savings, shorter delivery times and efficiencies. For the very small wineries a direct interaction with customers may allow for the by-passing of certain elements in the supply chain – for example, wine distributors, agents and retailers – potentially leading to cost reductions and increased market penetration. Moreover, Internet sales direct to customers has the

advantage of allowing wineries – especially the smaller ones – the ability to claim significant wine equalisation tax (WET) rebates on those sales.

Barriers to Internet adoption can be either technical or social. The technical barriers include poor or inadequate telecommunications infrastructure and lack of secure transactions (Badger, 2000; Lawson *et al.,* 2001). Social barriers can include lacking technical expertise, the general reluctance of individuals to break with traditional business methods, age, employment categories and different income levels (Badger, 2000; Rolfe, 2001). At the Federal level, the Australian National Office for the Information Economy (NOIE, 2001) has identified a number of key impediments that a business may encounter in the adoption of key e-Commerce enabling technologies. These impediments include factors such as cost of Internet access, the Internet not being a suitable tool for the business, electronic transaction security and low levels of Internet related skills.

A BRIEF PRIMER ON ROGERS' INNOVATION THEORY

The diffusion-innovation model is a well documented and consistently researched paradigm which has been applied to Internet and Information Technology adoption (Kwon and Zmud, 1987; Brancheau and Wetherbe, 1990; Gurbaxani, 1990; Gregor and Jones, 1999). For the purpose of this study the Rogers' paradigm is used to discuss non-adopters of the Internet, however it is acknowledged that various studies based on organisational psychology or social science paradigms have had some success in explaining IT adoption. For example, the Technology Acceptance Model (TAM) proposed by Davis (1989) utilises two constructs – the perceived ease of use and perceived usefulness of the new technology – as predictive conditions that shape a users attitude to IT adoption. The TAM constructs appear to be drawn from Rogers' paradigm and arguably perceived usefulness and ease of use are akin to perceived relative advantage and complexity factors (Davis *et al.*, 1989).

Rogers (1995) asserts that an individual's decision to adopt an innovation is not an instantaneous act, but a process that occurs over time, consisting of a series of actions and decisions. Rogers' model of the innovation-decision process consists of five stages as depicted in Figure 1. The innovation-decision process thus allows an individual to transgress from first knowledge of an innovation, to forming an attitude toward the innovation, then to deciding whether to adopt or reject, implementation of the new idea, and finally confirmation of this decision (Rogers 1995).

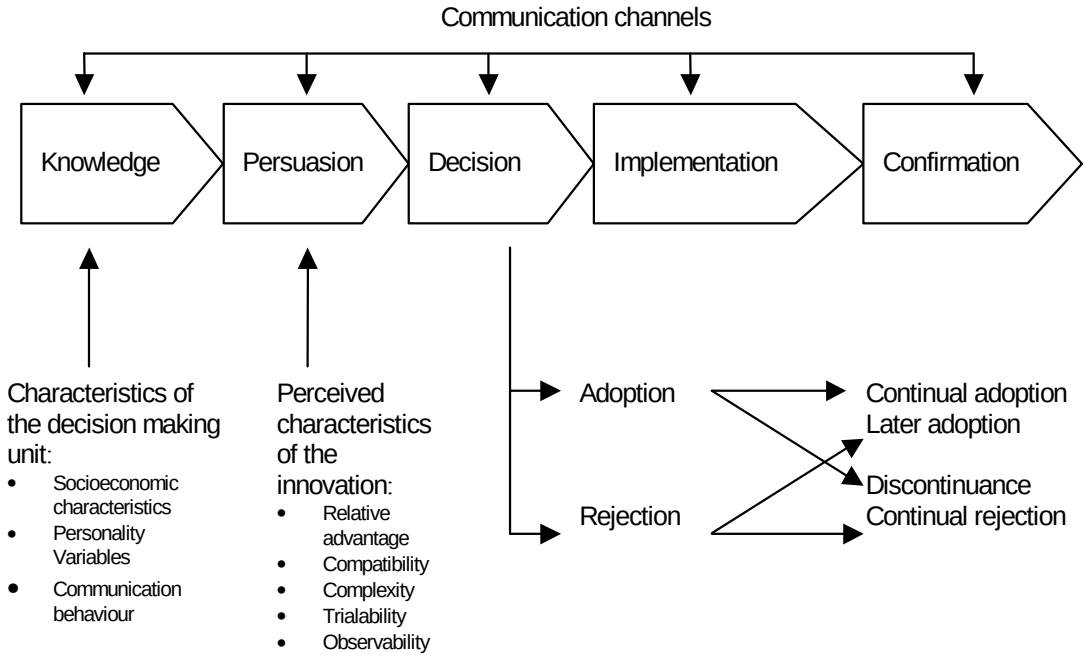

Figure 1: The five stages of the innovation- decision process (Rogers, 1995:163)

In brief, the Knowledge stage reflects the process of an individual being exposed to an innovation and gaining an understanding of how it functions. Persuasion occurs when the individual forms a favourable or unfavourable attitude toward, or an opinion of the innovation based upon perceived characteristics of the innovation – characteristics such as relative advantage, complexity, comparability, trialability and observability. The Decision stage is characterised by an individual engaging in activities that lead to a choice to adopt or reject the innovation, whilst Implementation occurs when an individual puts the innovation into use. The final stage of this process is Confirmation that occurs when an individual seeks reinforcement of an innovation-decision already made, or reverses a previous decision to adopt or reject the innovation if exposed to conflicting messages about it.

Drawing on work from the Saucio Study (Deutchman and Fals Borda, 1962), Rogers proposed that the adoption continuum recognise five categories of participants that can be classified by their degree of 'innovativeness' –

- The innovators who tend to be first users of a new idea and play an important promotional role in the diffusion process – they constitute the first 2.5% of adopting individuals in a system.
- The early adopters (2.5%-16%) of an innovation are generally interested in the innovation for solving business problems and gaining advantage.
- The early majority (16%-50%) are the pragmatists and constitutes the first part of the mainstream when it comes to the adoption of the innovation.
- The late majority (50%-84%) who are less comfortable with technology and are the sceptical second half of the mainstream. Because this group has relatively scarce resources, new ideas and innovations are considered cautiously and with scepticism, and as such are generally adopted only after most of the uncertainty about a new idea has been removed.
- The laggards (last 16%) or 'resistors' who may never adopt the innovation. Laggards tend to be suspicious of new innovations and the change agents who promote them. Resistance to innovations on the part of this group may be entirely rational from the laggards' viewpoint and they must be sure that a new idea will not fail before they adopt.

Within the realms of this study the Internet was considered to meet this definition of being a new idea or practice, and considered in the context of being adopted by wineries. Wineries in Victoria have been selected as the study group because Victoria has the greatest number of wineries in the country, with a substantial proportion of these wineries being small to medium size businesses (SMEs). The study effectively researches the way a section of the small rural business community has adopted the Internet. Internet technologies in this study encompass electronic mail (email) and/ or World Wide Web adoption, technologies which allow wineries to engage in electronic business activities directly with customers and/ or suppliers.

RESEARCH METHOD

The study was conducted with assistance from the Victorian Wine Industry Association (VWIA) in association with RMIT University. The VWIA is an organisation that has close links with the Federal and Victorian Governments and the Australian Wine and Brandy Corporation. A survey was posted to 380 non-subsidiary wineries with completed questionnaires returned from 112 wineries (30% response rate). The responses were representative of the study group on the basis of size and location.

Classification of wineries into business size categories is based on their annual grape crush, a method that the Australian wine industry uses; a large winery is one crushing more than 1000 tonnes per annum, a medium size winery between 250-999 tonnes, and a small or boutique winery less than 249 tonnes a year (Goodman, 1999; ANZWD, 2001). Micro wineries, which are very small businesses, and are based on a 'lifestyle' philosophy, crush less than 20 tonnes of grapes per annum (Sellitto and Martin, 2001) and will be used in this study as well as large, medium and small business sizes.

The Yellow Pages® Business Index for small and medium enterprises – is an ongoing series of surveys designed to track confidence and behaviour in the Australian small and medium business sector. Since 1995, the Index has examined the experiences of SMEs with electronic technology and reported benefits and inhibitors associated with Internet based electronic commerce (Telstra, 2001). Using the results of the July 2001 Index – which is the Internet study undertaken closest to the time to the winery survey – a comparison between national business Internet adoption and winery adoption is examined.

RESULTS

Annual grape crush was used to classify wineries into the traditional categories of large, medium, small and micro businesses. The resultant size categories are shown in Table 1.

Classification	Responses (Observed N)	Percentage of Businesses
Micro (<20 tonnes)	47	42.0%
Small (20-249 tonnes)	56	50.0%
Medium (250-999 tonnes)	4	3.5%
Large (1000+ tonnes)	5	4.5%
Total	112	100%

Table 1: Winery Business Size Classification

The majority (95.5%) of wineries in this survey are primarily small or medium sized enterprises (SMEs). Generally, the wineries are relatively young, with over 50% having been established in the last ten years, and the annual turnover from wine sales for 48.2% of wineries is less that $100,000. A substantial number (47%) of wineries in the State have diversified into wine-tourism enterprises, which may be an adjunct to achieving increased income flow. Some 38% are engaged in regularly exporting wine.

PERCEIVED BARRIERS TO ADOPTING THE INTERNET

An analysis of the wineries that have not adopted the Internet indicates that they are all SMEs (<1000 tonnes crushed per annum) with micro wineries being the predominate sub-group. Table 2 summarises the non-Internet adopting wineries on the basis of size.

Winery Class	Size (tonnes crushed)	Frequency (N)	Percentage of ALL Non Adopting Businesses
Micro	<20	15	65.2%
Small	20-49	4	17.4%
	50-99	3	13.0%
	100-249	1	4.3%
Total		23	100.0%

Table 2: Non-Internet adopting wineries by size (tonnes)

Wineries that were yet to go online were asked to indicate some of the perceived barriers they had experienced in gaining Internet access. These wineries were asked to select from a list of 14 barriers (NOIE, 2000; Papandrea and Wade, 2000; Telstra, 2001; NOIE, 2001) that may have been a reason for them not having adopted Internet technologies. A summary of responses is depicted in Figure 2.

From the survey eleven barriers have been identified as hindering wineries from going online. The barriers that have been identified and appear to be significant for more than 25% of the non-adopting wineries are:

- Not being aware of any of the benefits (30.4%).
- Being too busy and not having the time to explore the online option (30.4%).

- Lacking technical skills and training in use of the Internet (30.4%).
- Not having a computer (26.1%), the fundamental tool for gaining Internet access.

The perceived barriers that relate to time (too busy, and no time) and technical skills appear to be widely reported obstacles that small businesses have to the adoption of the Internet and information technology (Igbaria *et al.,* 1997; Pollard and Hayne, 1998; McDonagh and Prothero, 2000; NOIE, 2000). All these relate to the business being resource poor and hence not having time, money or expertise to investigate the Internet option.

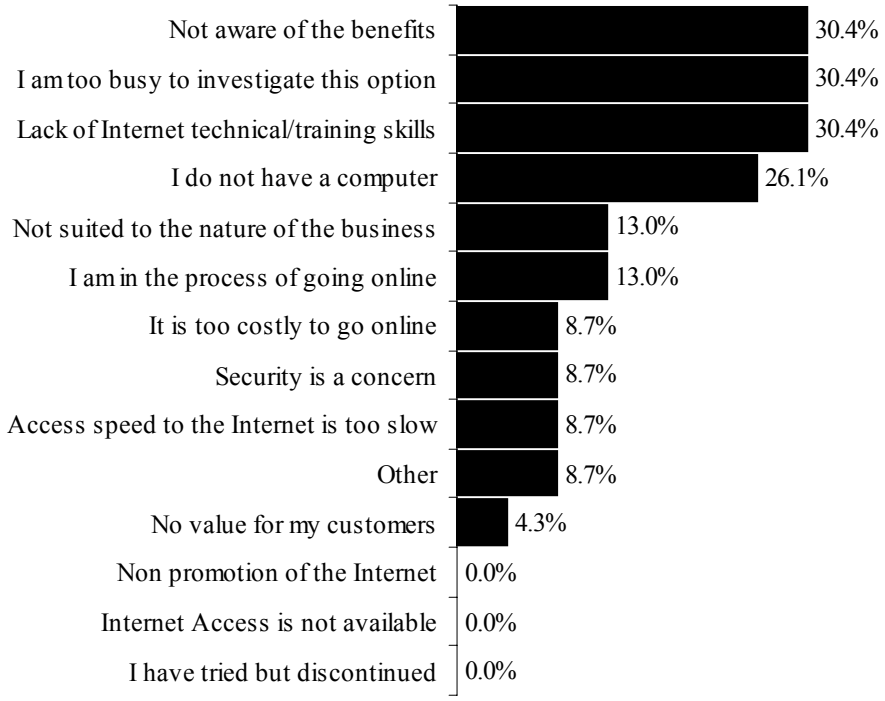

Figure 2: Identified barriers to Internet adoption by wineries as a percentage of non-adopting businesses

Wineries that indicated they were not aware of the benefits of using the Internet are possibly at the initial stage of Rogers' innovation-decision process. This conceptual process involves a unit (or an individual) firstly gaining knowledge about the innovation, which is followed by a decision to either adopt or reject this new technology (Rogers, 1995). Arguably, these businesses will have heard about and seen the Internet being used, especially considering that in traditional advertising the listing of a web sites URL has become the norm in product promotion. However, they may not have made a connection with using Internet technologies in their own industry. One respondent's cynical response regarding Internet benefits was, '*This assumes there are benefits!'* (Winery profile – Size: micro; Age: 0-5years; Sales: <$100,000; Location: Central Victoria). Interpretation of comments from other non-adopters suggests that they are also in the initial stages of the Rogers' innovation-decision process, "*I am interested but I am not sure of the suitability or advantages to a vineyard such as mine. I have no information on cost-benefits.*" (Winery profile – Size: micro; Age: 6-10years; Sales: <$100,000; Location: Port Phillip).

This respondent has become informed about the new idea (Internet), however has not been able to be convinced of its usefulness – and at least seeks more appropriate information. Investment in new forms of technology has traditionally used tangible measures, such as the cost-benefit analysis in order to gauge the viability of implementing such technologies in business (Haag *et al.,* 2000; O'Brien, 2001). This winery owner appears to seek information in the form of cost-benefits analysis so as to facilitate the decision making process. The requirement of this specific and traditional measure may suggest that the winery owner is not aware of some of the indirect or intangible benefits of the Internet, such as efficiencies in communications, improved information and a modern up-to-date image (Poon and

Swatman, 1997; 1999). The requirement for this traditional type of cost benefit information may suggest that winery business practices may themselves be also based on traditional processes – where a new idea such as the Internet is not viewed as being useful and there is an attitude of skepticism to the new technology.

Hence, the winery owner although interested in going online is cautious and the uncertainty of this new technology must firstly be removed before they can be comfortable with the new innovation. Rogers (1995) generalises that such characteristic is typical of the late majority group. This appears to conform to the research results indicating that 79% of wineries indicated they had adopted the Internet – placing the remaining units that are yet to adopt the Internet in the late adopter and laggard groups.

Being in the process of adopting the Internet can also be a good indicator of e-Commerce readiness. The survey revealed 13% of wineries had examined the Internet option and were proceeding down the adoption path. No respondent had used the Internet and had consciously stopped using the technology. Rogers (1995:22; 1995:163) refers to this phenomenon as innovation *discontinuity*.

The non-ownership of computers in this study suggests that it is a major barrier to Internet adoption in the wine industry. The first step of any e-commerce adoption is ownership and use of a computer, an activity that leads on to a more sophisticated adoption of information technology innovations and eventually the Internet (NOIE, 2000). Alberici (2001) indicates that computer ownership for the average small business can achieve up to an 80% improvement of its time on record keeping – as well as streamlining account-keeping, correspondence and customer information management. English (2002) further suggests that small and micro businesses can use a computer to increased sales, allow cost reductions and improved operations efficiency. Consider the unprompted suggestions from two of the non-computer owning respondents: *'I am too old for these gadgets and cannot be bothered at my age. I have a telephone, a docket book and a Cannon small calculator – that's all. I do not see any use for a computer let alone email.'* (Winery profile – Size: Micro; Age: 16-20years; Sales: <$100,000; Location: NE Victoria).

The traditional methods of doing business (telephone, docket book and calculator) are an acceptable way of doing business for this winery owner. Lack of awareness of the Internet appears to be preceded by lack of awareness of the usefulness of owning a computer. The owners' reference to *new gadgets* tends to suggest a general aversion to new ideas and technology, which appears to be typical of the laggard (Rogers, 1995:265).

The other non-computer owning respondent is an interesting one, when you consider the reason for the lack of technology acquisition by the owner: *'I sell all my wine immediately after release. I only really need a telephone, there is no need for me to have a computer or to be online.'* (Winery profile – Size: Small; Age: 21-25years; Sales: $500,000-$1,000,000; Location: Port Phillip).

Like the previous wine owner the lack of awareness of the Internet appears to only be preceded by lack of awareness of computer technology. This winery is the only respondent in the annual 100-249 tonne crush size that does not have a computer. The business practice of being able to sell all wine immediately after release is the main reason offered for not having a computer and not being online. Part of the process of innovation adoption is that the new idea or technology is perceived as being advantageous to a business – a construct that is described by the Innovation-Diffusion process (Rogers, 1995). Rogers indicates that part of the persuasion stage of the innovation-decision process involves the examination of perceived characteristics of an innovation, such as how useful or compatible it may be, allowing a favourable or unfavourable attitude about the innovation to be formed. Consequently, in the eyes of this owner, there is no obvious advantage – perceived or otherwise – for a computer or the Internet in the running of the winery.

This business also offers some insight into the way that a typical winery may function and alerts us to the notion that wineries cannot be considered as typical small manufacturing business. The wine vintage is a seasonal occurrence, and once wine is made and sold the business must wait for the following year to make a new product. Hence, unlike a typical manufacturing company that can accept orders any time, and crank up production to meet these orders, wine makers cannot. Consequently, the use of a broadly developed Internet or

e-Business integration model based on the research that has examined a cohort or sample of small businesses may be totally inappropriate for wineries that appear to have unique characteristics and behaviour. Another non-adopter raises the issue of the undesirable consequences of adopting the Internet that is viewed as a perceived obstacle, and relates to potential detrimental effects on the business: *'I believe we will be inundated by junk email as we are currently with paper mail which for us is very time consuming to deal with.'* (Winery profile – Size: Micro; Age: 0-5years; Sales: <$100,000; Location: Central Victoria).

Rogers (1995:410) indicates that the undesirable consequences of adopting an innovation have been understudied. There has been a bias in the study of the desirable and beneficial outcomes of the adoption of new technologies, however Rogers also indicates that sometimes the diffusion of new technologies into a system can result in unplanned, indirect and latent consequences for the members of the system. The winery described above has not adopted the Internet, however there is an awareness of some of the associated problems of going online. In the context of innovation-decision process the owners have certainly gained knowledge about the innovation, which has been followed by a decision to reject this new technology. The business may at some point gain further knowledge that removes some of the existing doubts about the Internet's usefulness, and moderation of undesirable consequences (for example *junk email*) which results in adoption.

Consider also another winery owner who indicates that: *'…fax and mail are my preferred communication modes due to the nature of the business and structure of our administration…'* (Winery profile – Size: Small; Age: 11-15years; Sales: <$100,000; Location: Central Victoria).

Traditional methods, such as using the fax and postal system, appear again to be used successfully for running this business. Clearly, the use of the more traditional communications channels over the ubiquitous Internet suggests that the business has examined adoption of the Internet and decided not to pursue the online pathway for fear of disrupting what are obviously tried and proven business practices.

AUSTRALIAN COMPANIES AND WINERIES

Results from the winery survey were compared to national business figures on Internet adoption published in the Yellow Pages® Business Index Report (Telstra, 2001). These comparisons are summarised in Table 3.

Victorian Wineries Internet Survey (October 2001)	**Percentages (Based on non-adopters)**		**Yellow Pages® Business Index Internet Survey (July 2001)**
Not suited to the nature of the business	30.4%	32%	No need for it
I am too busy to investigate this option	30.4%	7%	Not got around to it
Lack of Internet technical/training skills	30.4%	28%	Lack of expertise and knowledge
I do not have a computer	26.1%	10%	No Computer
Not suited to the nature of the business	13.0%	14%	Not helpful for us
I am in the process of going online	13.0%	10%	Now setting up
It is too costly to go online	8.7%	9%	Costs
Security is a concern	8.7%	5%	Lack of security
Access speed is too slow	8.7%	—	No comparable measures available
No value for my customers	4.3%	—	

Table 3: Comparison of Non-Internet Adopting Wineries with Yellow Pages® Pages 2001 Survey

A comparison of the winery responses with the Yellow Pages® Business Index national figures reveals that many of the Internet adoption barriers for wineries are similar to those of national businesses. However, there appear to be several significant differences in this

study's findings and the research findings of the Yellow Pages® study. The Yellow Pages® study reveals that 30.4% of wineries were too busy to investigate the Internet option compared to the their national business counterparts, who indicated that only 7% of businesses had not got around to examining the use of the Internet in their business. Implied in the Yellow Pages® question category is a time variable which allows this comparison. The perceived barriers that relate to time – for example, 'I'm too busy', or 'I have no time' – appear to be general and widely reported obstacles in the adoption of technology by small business (see previous reference to this issue). In this study it appears that wineries are significantly *time-poor* when compared to the Yellow Pages® national business survey results.

The Yellow Pages® report uncovered that some 10% of Australian businesses did not have a computer and this was the main reason for them not being online. Wineries have a higher non-computer ownership of 26.1%, which appears to be significant when compared to this national value. On the basis of this result, getting the remaining group of wineries online requires the computer technology resistance issue to be firstly addressed and overcome. Mark McKenzie, the Chief Executive Officer of the VWIA comments on this:

> '*This is not unexpected and confirms some of my suspicions that I have had from first hand experience with some of the wineries. Not only do they not have computers, but also lack fax and mobile phones. These are basic business tools that became available in the 1980s.'*

He further adds:

> '*The dot-com crash has given some people in the industry real comfort in avoiding information technology and my fear is that they will use this excuse to avoid considering some of the obvious benefits that the Internet can offer to wineries.'*
>
> (Personal communication with Mark McKenzie, 22/3/2002)

NOIE (2001) has noted that the majority of businesses in Australia not using a computer were micro businesses – something that is surprising post the Year 2000 (Y2K) era and Goods and Services Tax (GST) implementation when computer and software upgrades became mandatory. Clearly, the non-Internet adopting wineries without computers have survived these two software and hardware implementation milestones and indeed are still engaged in their prime business objective of producing quality wine.

CONCLUSION

The study has determined some of the perceived barriers of Internet adoption by wineries. An important discovery in this study is that a substantial proportion of wineries are unable to adopt Internet technologies because they do not own a basic business tool – the computer. By comparing the study to the national results of the Yellow Pages® Business Internet Survey (July, 2001) wineries were found to have encountered similar barriers, although time resources and non-computerisation appear to be more significant for wineries than their national counterparts.

The study provides some evidence indicating that wineries may not have the same business objectives and characteristics as other manufacturing businesses – the winery environment appears to be a little more complex – hence, the development of an e-Business or Internet model may need to be tailored around the structure of existing business processes. Moreover, some winery owners appear to be aware of some of the Internet technologies such as email, however they are not prepared to disrupt their traditional business communication processes, whilst others view the negative consequences of Internet adoption as a reason for not going online.

The next phase of the research involves the examination of the perceived benefits of Internet adoption by wineries, and will target the early adopters to draw from their experiences and practices which will be detailed in a set of case studies.

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