

# Software Upgrade: Will They Buy It?

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## Abstract

*Most Australian businesses now own computers and consequently possess computer experience. The know-how acquired in the purchase of their first computer system combined with the experience gained using it since then will influence the decision for their next purchase, an upgrade to their existing hardware or software. How do small businesses decide whether they want to purchase an upgrade to their software? To answer this question, a model of the purchase decision for small businesses was developed from the literature and some exploratory interviews were conducted. The preliminary findings from the interviews are reported.*

## Keywords

Adoption categories, Investment in IS, Software upgrades, Software selection

## INTRODUCTION

The majority of Australian businesses now own computers. In Australian businesses employing less than 20 people 75% own a computer and the figure jumps to 99% for business with 20 or more employees. (Yellow Pages Australia, 1998) The amount of use varies but the majority (54%) claim they use computers as much as possible. Predictably ownership of computers also varies across industry sectors from 61% for the building-construction sector to 88% for the business services sector. The average across all business sectors is 74%. Most use a word processor (85%), accounting or bookkeeping software (75%), spreadsheet software (65%) and an industry specialist package (51%). (Yellow Pages Australia, 1998)

The widespread adoption of computers in business is a consequence of the improvements in both hardware and software. The advances in hardware are readily observable and are well explained by Moore's Law (Alter 1999). But these advances have been paralleled by improvements in software making it easier for millions of workers to use desktop computers, even though they know little about computer technology. As the speed and capacity of computers has improved with each new release, the software running on the machines has changed to take advantage of the faster processing and larger storage. So, while chips are constantly getting faster and are having more features added to them, software vendors are adding new features to their software to exploit the improved chips. This has created the "upgrade escalator" (Scott 1998) whereby organizations tend to keep spending money on desktop hardware and software even though it fails to yield additional business benefit.

Cynicism about the benefits from investment in Information Systems (IS) is not new (Remenyi, Money & Twite 1997). Consequently, it is natural to wonder whether

businesses will continue to invest in IS. Specifically, this paper explores the question:  
- *How does a small business decide to upgrade its software?*

In this exploratory research, the literature on diffusion of innovations, organizational buyer behaviour and adoption of information technology in small businesses was examined to find factors that influence the adoption of software upgrades in small Australian businesses. Five factors, adopter type, IS investment, external influences, decision type, and business characteristics were identified. The proposed model for the adoption of software upgrades with the five factors is shown below in Figure 1. Each of these factors will be discussed in turn.

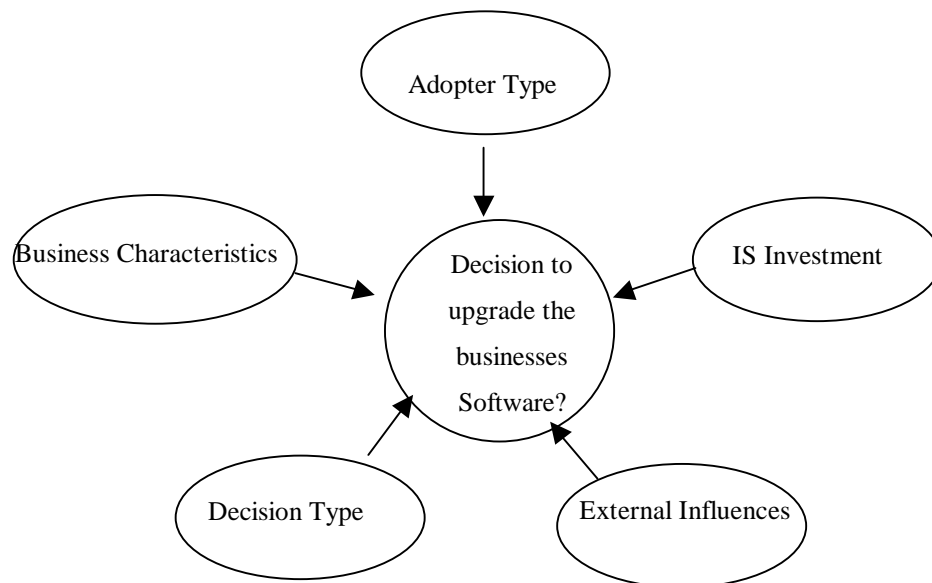


Figure 1: Proposed Model for the Adoption of Software Upgrades

### **Adopter Type**

In his comprehensive work on diffusion of innovations Rogers (1995) identifies five adopter types and has shown the distribution of these types closely approach normality. The first 2.5 percent to adopt the innovation are classified as the innovators, the next 13.5 percent are the early adopters, the following 34 percent are the early majority, the next 34 percent are the late majority and the last 16 percent are the laggards. The psychographic characteristics of these adopter types differ according to Rogers (1985) and Moore (1999).

The innovators appreciate technology for its own sake, which distinguishes them from the early adopters who use informed intuition to match new technology to a strategic opportunity for their business. The early majority prefers evolution to revolution and focuses on standardization rather than specialization. The late majority is not comfortable with their ability to handle high tech products but will buy just to get on par with rest of the world. This is very different from the laggards who only purchase new technology if it is buried in something else.

## **IS Investment**

Business buying is different from household buying because businesses need to be accountable, mainly because the buyer need not be the user. Despite this, formal appraisal techniques do not appear to be used in many IS investments. (Ward 1996)

The reason for so little use of these techniques may be because considerable problems exist with evaluating business investments in IS. Banker, Kauffman, and Mahmood (1993) argue that evaluating investments in information technologies poses a number of problems that investing in traditional assets does not present. The focus shifts from measuring the tangible benefits to the intangible benefits.

Ballantine and Stray (1999) confirmed this with their study which showed formal evaluations are more prevalent with other capital investments than IS projects. However, when financial criteria are used to make investment decisions, then payback, cost benefit analysis, and return on investment are the techniques most used.

Businesses have diverse needs for computers and use them at different degrees. As Kegan and Lau (1990) found, information systems used in small business varies by sector and size and that as a small firm develops in size, its information needs will increase.

Research conducted by the Yellow Pages Australia (1998) corroborates this showing not only that a wide range of software in Australian small businesses is used but also the use made of the software varies considerably.

“There is widespread concern in organizations that investment in IS does not deliver” (Jones & Hughes, 2000). Effective use of software packages would help address this concern. Studies have shown that perceived ease of use and perceived usefulness of software are good predictors of usage (Davis 1989; Davis, Bagozzi, & Warshaw 1989; Adams, Nelson & Todd 1992; Montazemi & Cameron 1996) and as such should be considered when evaluating any investment in software.

## **External Influences**

The Y2K bug and the impending of the GST in Australia have had a very noticeable impact on businesses. Those businesses with computers were faced with decisions concerning both these issues. Clearly, agencies outside a business can generate a state of affairs necessitating a decision concerning whether or not to upgrade software. (Shelly, Cashman, Adamski & Adamski 1995)

## **Decision type**

Purchases are made to satisfy a need or goal, whether it is an individual or an organization making the purchase. Just as individuals differ in the way they make purchases, so do organizations. Personal characteristics influence personal consumer behaviour, and likewise organizational values (Hawkins, Neal & Quester 1994).

The purchasing process can vary according to the complexity and difficulty of the decision task. The new task buying decisions that have major organizational implications are at one end of a continuum while the straight re-buy situations that are less complex and routine are at the other end of the continuum. Between them is the modified re-buy class. New task buying decisions could adversely impact an

organization's financial position, product quality, and corporate morale. However, the straight re-buy decisions are low-involvement and routine. (Sheth, Mittal & Newman 1999)

A purchase of a software upgrade would be considered a modified re-buy. The more the purchase task is like a new buying task, the greater the need for information, more time is spent on the decision, a greater emphasis is placed on finding a good solution, advice is sought from technical persons, price is considered less important, evaluation criteria are more important and alternatives will be considered. (Anderson, Chu & Weitz 1987)

Innovations can be continuous or discontinuous. Continuous innovations require little or no behavioural change by the adopter. An example of a continuous innovation would be the change from the 5¼" to the 3½" floppy disk. Discontinuous innovations necessitate changes by the adopter. The change from DOS to Windows is an example of this. Adopters had to learn to point and click instead of typing commands.

Those software upgrades that are considered discontinuous innovations would be closer to a new buying task, while those that are considered more continuous innovations would be closer to a straight re-buy.

### **Business characteristics**

Numerous studies have considered business size and sector (Malone 1985, Kagan & Lau 1990, Julien & Raymond 1994) influence computer usage while studies in marketing research have shown organisational demographics such as size, location, industry category, type of ownership, number of employees, characteristics and composition of employees, and the sphere of operations have an impact on the decision-making behaviour of the business. (Sheth et al.1999)

## **METHODOLOGY**

Because the number of small businesses in Australia is approximately 1 million a mail survey would seem to be the most appropriate means of collecting representative sample data. No survey instrument pertaining to the decision to upgrade software could be located, thus one has to be developed. To facilitate this some preliminary in-depth unstructured interviews were conducted with small businesses. In-depth interviews are especially helpful for developing survey instruments and eight to ten interviews are considered appropriate to identify topical areas and appropriate language. (Crabtree 1993)

The people involved in making the decision on software purchases from ten businesses were interviewed. A profile of the ten businesses interviewed is shown in table 1.

	Business									
	1	2	3	4	5	6	7	8	9	10
Type of industry	F	F	M	RE	RE	R	R	S	S	S
Sector	SW	L	N	L	L	L	L	L	L	L
Staff numbers.	350	16	300	10	17	40	7	18	12	300
Number of IT staff.	23	0	0	0	0	0	0	0	0	1
Approximate annual profit.	na	\$1.5M	na	\$.750	\$.7	\$2.1M	\$.4M	\$.6	\$.5	na
Age of business (yrs)	>100	11	35	4	8	>100	2	7	8	35
Business computer experience (yrs)	30	11	20	4	8	20	1	7	8	15
Software used	All have a Word Processor, Spreadsheet, Database, WEB browser and an Accounting software. Most have e-mail capability but only a few are using it. Other packages used include Publisher, POS, Payroll, electronic banking, and Camera software. All had Industry Specific software that they consider to be their key software. In two cases this software had been written specifically for that business, while the business with 23 IT staff writes some of their own software.									

Legend: F=Finance, M= Manufacturer, RE= Real estate, R= Retail, S= Service, W=State-wide, N=National, L=Local, na=not available

Table 1: Profile of Businesses Interviewed

All the businesses were local businesses varying in size, type and industry sector. While the final research will concentrate on small business, some large businesses were included at this preliminary stage, to highlight any differences that exist between the small and larger business. Also, the findings from these interviews are not considered to represent the views of all Australian businesses, they are appropriate for the purposes of identifying key issues from which the survey instrument could be developed.

The remainder of this paper discusses the findings of the interviews.

## FINDINGS AND DISCUSSION

### Adopter type

It was evident from the interviews to which category the businesses belonged. One business from the service sector considered itself to be very innovative and said it is a “test-bed” for software. It is also considered a leader within its industry in business practices and has had the state branch for their industry looking to them for advice. Hence the conclusion they would fit into the innovator or early adopter category. So it was somewhat surprising when it came to actually purchasing software that they

expressed caution and confessed to never buying the first version. Another business, also from the service sector behaved in a similar fashion. That business kept up to date with hardware but was willing wait when it came to purchasing software. When this anomaly was pointed out to him he found it interesting, and responded, “the second mouse gets the cheese”. So while these businesses would be classified as innovative in some ways they were cautious later adopters with software upgrades. Further probing revealed some reasons for this reluctance to upgrade of some software. For example, this business owner would not upgrade the word processor because “you can only type a letter so many ways and don’t need a powerful word processor to do it” and for the industry specific software the preference was to skip a version. “When they came out with a new version for Windows, but I suspected it would have bugs so I kept using my DOS version. When it was upgraded for the Y2K issue – as I knew it would have to be- I checked it out again and decided to upgrade then”. This owner is very passionate about computers, but cautious with software upgrades.

For the most part the businesses seemed to belong to early majority or late majority categories, and as such were somewhat cautious when it came to upgrading software.

### **IS investment**

One of the larger businesses made an interesting comparison. To upgrade their industry specific software a formal cost benefit analysis was required because it was going to cost many tens of thousands of dollars and yet to upgrade the software for the office, verbal approval was given without any analysis being required. The total amount spent on the office software was considerably less, but exceeded ten thousand dollars for the organization.

Only two of the ten businesses conducted a formal cost benefit analysis of any type. In both cases it was a larger business, one of which was a large financial business where formal procedures exist for all purchases, including software upgrades. These were also the only two businesses that employed dedicated IT staff. Cost benefit analysis and payback analysis were the techniques used.

With all the smaller businesses no formal cost benefit analysis is conducted for software upgrades. Some owners claimed they do a quick ‘mental’ calculation, but conducting a full analysis was “not worth the effort”.

Despite saying any purchase “must be needs driven” there was no indication how the needs were determined or how they would know if they had been satisfied by purchasing the software.

An alternative view expressed by one of the more cautious owners was, “Will it inhibit us if we don’t upgrade our software?” Thus rather than determining whether the business needed to purchase the upgrade the feeling was that they did not know enough about it and that they thought it was less expensive just to simply upgrade every time. There is an element of loyalty to the software provider.

Some businesses consider alternative software when faced with an upgrade but feel “swapping software is too much of a hassle”. Two businesses had bad experiences with their software provider. In one case the business changed their industry specific

software because of a bad experience with the provider. The other case, the business was a large one and their software have been written specifically for them. However, a programmer in the company developing the software for them “did not listen to us and did what he thought best, which proved to be a mistake,” and we demanded he be replaced. We had to continue with the company because they had nearly finished writing the software.

All of the businesses were asked how much they actually needed their computers. With the larger businesses the computers are critical, they would not be able to operate for even a short period without them. All the other businesses use them as much as possible. Typical comments were “we couldn’t do it without them” or “I would hate to do it manually” or “we’re totally dependent on them” were common. Given this dependence on computers the owners were asked what they looked for in upgrades. Everyone felt the software must be easy to use and must be cost effective.

Clearly, if the software has to be checked for ease of use it must be evaluated. The larger organizations look towards information from computer journals or the Internet, while the smaller organizations tend to seek advice from ‘gurus’. These can be my accountant (“he is a switched on guy”), the people who sold me my hardware (“but I don’t understand them”), or they wait until they can check it out with other users either at a conference or trade seminar or they had people (“the good guys – the ones who know what they are doing”) working in the same industry from whom they seek advice.

How cost effectiveness was determined was not clear, but was presumably part of the “mental” calculation. All the businesses appreciated the “the cost of the time devoted to getting up to speed with the new software” but this is just something that has to be done and no allowances were made for it. So while business agreed there was a “learning curve and the associated higher workload” with software upgrades no effort was made to include this cost in the calculations. Indeed, the process was very simple for one business where “I look at the price and if it I find it will work I’ll buy it”. Given the success of the businesses included in the study one assumes the “a quick mental calculation” and “gut instincts” seem to be working, for these businesses at least.

The range of software used by the businesses was diverse which is consistent with the findings of the Yellow Pages Australia research. The businesses were most interested in discussing their industry specific software. Two businesses that seemed to be the most reliant on computers had their software written specifically for them. Both of these businesses could not function without their software and one stated that “everything was time critical in their organization and they could not afford for things not to work on time”. When asked what the value of their computers were to their organizations both businesses could not provide an answer except to say they were essential. The other businesses responded to this in an equally vague manner with the exception of one who said the computer was worth \$30000 to the business, because that would be the cost of employing someone to do the work it does.

While discussing the use of the software in the businesses the functionality of the software was raised. The more technically informed interviewees suggested that the latest packages are ‘overkill’ offering features that you really don’t need. The less

informed held an opposing view that “everyone tends to buy more than they need at the moment just in case they need it later”. These latest packages are simply a “sign of the times, you cannot have just the basic functions”.

### **External influences**

Some owners felt they were “forced to upgrade” against their wishes. The large financial business that made extensive use of e-mail found that ‘compatibility’ problems were forcing the issue. Their current operating system is OS/2 and is a 16-bit system. They are extremely happy with it as it is, it does everything that they want and they find it very stable. However, because the Windows operating system is more popular and is 32-bit, they now find that third party vendors are not writing software for the 16-bit systems. Thus, if they want to use some of the new applications they must upgrade their current software and operating system from one they are happy with.

The more technically informed interviewees were the only ones to raise the compatibility issue. These people objected to having to upgrade their software, and shared a dislike of Microsoft, but none would be willing to purchase alternative software.

Most of the businesses are connected to the Internet, and some businesses found their ISP had forced them to upgrade (“more than once”) their web browser or some other software they used. Others mentioned the banks now required them to do their banking electronically, and some had experienced forced upgrades because of this.

Every business has made changes because of Y2K and GST. Most acted on the advice of their accountants or software providers to do this. Only the more technically informed were able to make decisions concerning this by themselves.

### **Decision type**

Just where on the new-buy to straight re-buy continuum the decision to upgrade software lies is difficult to determine. Caution, cynicism and confusion about software upgrades are widespread. The risk involved in the decision seemed to vary not only by business, but also by software type. General software such as word processors were either upgraded without question or not upgraded because there was no need, while the industry specific software required more consideration with some businesses taking over a year to decide. Another said, “We cannot afford to experiment with software. It has to be right”.

Businesses consider the upgrade question quite technical seeking advice mainly from ‘gurus’, friends, accountants, and suppliers.

## **CONCLUSIONS AND IMPLICATIONS**

The findings discussed above support the factors identified in the proposed model. The investment in IS by the businesses is highly valued but impossible for almost all to quantify. When a change to this investment, by means of a software upgrade is considered, the business make informal judgments concerning the needs and benefits.



The research literature on adoption of innovations combines software and hardware together whereas the findings here suggest businesses may have different adoption categories for hardware and software upgrades.

The decision to purchase a software upgrade varies in complexity, risk, the time it takes to make, technicality and uncertainty thus justifying further investigation on these factors.

The interviews also confirmed the influence external agencies have on the business often forcing them to upgrade their software against their wishes.

Demographic differences were detected, mainly between the larger and smaller businesses, but also between categories. More data is needed to support the other differences influencing the decision to upgrade software.

This research examines the adoption of software upgrades in Australian business. It has practical implications for business managers and software providers. This paper has relevance for business managers, since it provides an understanding of the factors that influence the decision to upgrade software. Software providers should note that businesses are needs driven and software upgrades must satisfy those needs if they are going to be adopted. Businesses are concerned about software upgrades and the computing industry must address these concerns.

The research described here forms the initial part of a larger project investigating the decision to upgrade software. The majority of software purchases in the future will be upgrades, rather than new purchases, making this a growing area of importance.

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