SMALL BUSINESS COMPUTER SOFTWARE ACQUISITION OPTIONS AND RISK ASSESSMENT

William Larry Gordon, University of Alaska, Anchorage Henry Wichmann, Jr., University of Alaska, Anchorage

ABSTRACT

The purpose of this paper is to identify the information needs of the small business and then to examine the various computer software acquisition options available that may be used to obtain the software necessary to help satisfy these information needs. The relationships between the acquisition options and their relative acquisition costs and associated risk levels of computer assisted crime are discussed.

INTRODUCTION

The dramatic decline in computer hardware costs caused by rapid technological improvements in the computer industry has resulted in the widespread adoption of computers by many organizations and individuals. In particular, small business purchases of micro-computers (micros) has occurred at a phenomenal rate. According to statistics recently released by the U.S. Bureau of Census, nearly eighty-eight per cent of the 4.16 million digital computers shipped in 1984 were priced at less than $2,500 while sales of large computers--retailing for $1 million or more--represented less than one percent of the total shipped (1).

Besides the factors of availability and low cost, a major factor contributing to the increased usage of computers is the awareness by the small businessman that small business survival depends as much on management ability as it does on the quality and desirability of the goods and services offered. The Small Business Administration (SBA) estimates that 9 out of 10 businesses fail due to the lack of management ability which the SBA broadly defines as skills in accounting problem- solving, marketing problem-solving, and other problem-solving, areas (2).

One recent survey of micro users indicated that sixty-eight percent utilized their micros daily, twenty-four percent frequently (but, not daily), and eight percent occasionally (3). The study also indicated that micro use was more common at the lower levels of the organization with word processing being the most commonly used application. These data are substantiated by numerous other studies and are consistent with the authors' own experiences with small businesses where we have observed that very little, if any, of the computers' potential for improving management ability is utilized. This characteristic of small business computer usage is partially explainable by a general organizational fear of computers (cyberphobia) and partially by an unwillingness on the part of the small business entrepreneur to invest time and effort into acquiring a minimally sufficient education in each of the major problem-solving areas so that full utilization of the computers' capabilities can be obtained.

Regardless of the problems of small business adaptation to this new technology, computerization represents an affordable opportunity to increase management ability by providing assistance to management in its problem solving tasks. Unfortunately, by providing efficient data processing and rapid satisfaction of information needs to the

users, computerization may also increase the opportunities for criminal activity by providing "user friendly" support for information destruction, unauthorized data entry and modification, and the fraudulent or unauthorized use of data. Computer assisted crime is one of the fastest growing national "hobbies." Not only can it be fun from a backer's point of view, but it also is one of the most lucrative. Crime data published by the Bureau of justice Statistics indicates that for the period 1958-1979, a total of 669 computer assisted crime cases were reported with an average known loss of $1.7 million (4).

Such criminal activity is not made possible solely by the existence of the computer hardware but by the unauthorized use or modification of the computer software. The "user friendly software" that has resulted in the more rapid acceptance of computerization within the small business has also created a more "criminal friendly" environment. Because of this relationship between software and the potential for computer assisted crime, the decision to acquire software in support of small business information needs should include an examination of the relative risk levels associated with the major software acquisition options. The acquisition option decision should then be selected on the basis of the best acquisition cost-risk level combination. The following section will explore these tradeoffs.

APPLICATIONS SOFTWARE ACQUISITION OPTIONS

The three major alternatives for acquisition of applications software are purchase, in-house custom development, and contracted custom development. Individual firms may elect to use a combination of these options. (A recent survey by the authors in Alaska of 347 accounting firms revealed that the percentage use of each of these alternatives was 70 percent, 15 percent, and 15 percent, respectively (5)).

PURCHASE OPTION

The most common source of software is vendor supplied standardized software packages. Two categories of software are available: specialized pre-written application (SPA) software packages and generalized pre-written application (GPA) software packages. SPA software packages perform application specific tasks such as general ledger accounting. GPA software packages perform specific. tasks but can be used for many different applications. Relative to accounting applications, the most important example is electronic spreadsheet software. This is a software development tool which allows the user to develop an electronic spreadsheet that constructs both data and formulas. Another important example of GPA software packages is file management application development software (6). The use of GPA software packages within the small business may imply that some in-house (or contracted) software development is occurring. While the use of these packages requires different skill levels than the use of programming languages such as COBOL or BASIC, the employment of either to develop computer software solutions to the problems of small businesses will be considered as programming in this paper.

Although GPA packages have the capability to support applications development, they may be used with other purchased software to solve application specific tasks. An example of this is the purchase of a popular spreadsheet package and additional

purchases of software (template programs) that are designed to generate (with the spreadsheet package) the templates needed in order to perform application specific tasks. The template program converts the spreadsheet program into application specific programs (7).
The purchase of SPA software packages represents the least expensive software acquisition solution. Because the software is developed for mass marketing, the development costs can be spread over a large number of units which allows the product to be marketed at a very reasonable price relative to the value provided to the small business user. The small per unit cost, also, reduces the potential impact of copyright infringement by making vendor guaranteed software with users' manuals available at a cost that decreases the potential "savings" that would accrue from copying both the software and the manuals.

A large number of different vendors and different products are available for the support of the different problem-solving functions. Many of these will have established reputations so that the purchaser can be confident that the product will perform as advertised. If the application is relatively new, the small business-owner-manager can look for software products that provide a solution and that have been or can be certified (8). With a reasonable level of thoughtful examination and selection, good software solutions can be purchased at low cost that will fully satisfy the needs of small business, will be easily implemented, and will be easily maintained with the aid of good documentation and good vendor support (9).
One additional benefit from the purchase and use of standardized software is that a greater supply of experienced personnel will exist in the labor force than would be associated with the use of custom developed software. This will reduce the problems associated with recruitment and training.

CUSTOM DEVELOPMENT OPTIONS

The use of vendor supplied standardized software packages provides the small business with readily available software solutions at low cost and that typically have proven records of performance and for which a large base of experienced users is available to recruit from. The primary motivation for electing to develop customized software solutions is that the available standardized software solutions are not compatible with the existing accounting methods and/or other procedures of the small business (and management refuses to make the necessary changes that would provide compatibility with one of the available packages) or because little or no packaged software exists. For these situations, in-house or contracted custom development are the only alternatives. Custom software development requires an understanding of the business needs to be satisfied; an understanding of how to design and to implement a software solution compatible with the selected hardware; and an understanding of how to program. If the development team consists of more than one person, then the tasks can be assigned on the basis of individual expertise. If the development responsibility is assigned to one person, then that person must be competent in all tasks or negative consequences will result. Custom development has some major disadvantages relative to the purchase option. The development period may be lengthy and the quality and cost of the delivered product may be uncertain. Turnover within the development group, changes in technology or business

conditions, user dissatisfaction, inadequate management controls, inaccurate or insufficient analysis and design, and poor planning can all contribute to an inferior and costly product. The likelihood of these types of problems occurring is directly related to the experience and skill levels of members of the development team and the cooperation and support of management.

In-House Custom Development

The in-house development "team" for a small business will typically consist of from one to three people. The actual number will vary with the complexity of the application and the firms resources. The level of computer expertise assumed in this discussion is that the typical small business does not have experienced, technically qualified staff relative to the requirements of software development. This assumption is consistent with the authors' own surveys in Alaska (10). If accounting functions are to be computerized, the responsibility will likely fall on the comptroller/ accountant/bookkeeper. While this individual will generally have a good understanding of the problems to be solved and the needs to-be satisfied, inexperience in software development will generally result in a costly, if not unsatisfactory, software solution. (Experts estimate that in-house development costs are likely to average or exceed ten dollars per program line or instruction (11). The result will be a costly, poorly designed, poorly documented, and difficult to maintain software package. Additionally, the small business owner-manager will be heavily dependent on the services of the in-house developers of the custom software when the package is fully implemented.

An unexpected advantage to in-house custom development is the increased morale of personnel assigned to the project who view the effort as an opportunity for obtaining or improving skills that will provide upward mobility within the firm or will increase their marketability (12).

Contracted Custom Development

Contracted custom development is generally characterized by the employment of experienced, technically competent development teams that will generally deliver good software solutions to the problems as they understand them (assuming; that small business management has required evidence of ability to satisfy contract requirements!). The major problems that car arise will be generally due to one or more of the following reasons:

1. Inadequate evaluation of contractee's capabilities. 2. Inadequate problem definition due to poor participation by management. 3. Inadequate solutions developed due to poor participation by management and their employees. 4. Continued dependence on the developers for software maintenance.

SMALL BUSINESS COMPUTER FRAUD

As applied to accounting, fraud is any act or omission to act of a deceitful and, therefore, dishonest nature or negligence so gross that property is taken from its lawful owner without his knowledge or consent. Fraud may constitute larceny, embezzlement, or both (13). Computer fraud is fraud in which a computer is used. Legislation in one state

defines first-degree computer fraud as accessing any computer system to obtain goods or services illegally or to execute a scheme to defraud. Altering, destroying, or preventing access to a computer system is included, also. Second-degree computer fraud is defined to be the accessing of a computer system or data base without authorization and is principally aimed at discouraging "hackers"(14). Since "hackers" utilize remote terminals and communication lines to gain unauthorized access to computers and since the typical small business does not utilize computers that support communications, this paper is concerned only with first-degree computer fraud and its relationship with the software acquisition option selected by the small business.

A variety of techniques are employed in the commission of first-degree computer fraud (13) (15). Because of the nature of the typical small business computer environment, only those methods that involve unauthorized data entry or modification of applications software are considered and, of these two, the most active category of computer related crimes is unauthorized data entry (16). This method of theft is popular because it requires minimal computer skills due to the use of user friendly applications software. The level of risk exposure to this activity is directly related to management policies on computer use and to the degree that the software is user friendly. The National Association of Accountants sponsored a study by Price Waterhouse of the existence of micro policies within businesses. Of the 100 companies examined, 52 percent claimed to have policies but only 22 percent had written policies. This study indicated a need to implement micro policies in order to effect better data- security (17).

Unauthorized modifications (mods) to applications software is the other major category of computer crime methods that should be considered major relative to a typical small business. In order for this type of activity to occur, the individuals) will need a background in programming and will need access to the "source" programs as contrasted with the "object" or "machine language" programs.

The relative risk levels associated with these two major categories of crime methods will be examined in the next section.

RELATIONSHIP OF ACQUISITION OPTION WITH RISK LEVEL

Unauthorized Data Entry

The use of standardized software increases the risk exposure fraudulent transactions by providing well documented, user friendly software solutions whose operating characteristics are known to a large number of users. This risk level is greatest for the purchase option and least for the contracted custom development option based on arguments of accessibility and general knowledge of the packages.

Unauthorized Software Modifications

The use of standardized software minimizes the risk exposure to fraudulent transactions due to program modifications because the product is generally sold only in object (machine language) form and modification would be extremely difficult even for a computer expert. The use of contracted custom developed software provides low risk exposure to mods because the only opportunities for "fraud thru mods" would be via

collusion between the contractors and small business employees or by the existence of skilled programmers within the small business. If skilled programmers were available, software modification would easily occur since the source code would be available along with good documentation. In-house custom development within the small business provides maximum risk exposure to mods because the user and developer groups overlap which would be in clear violation of the separation of duties rule. Detailed knowledge of the software and of management controls and policies would provide maximum possible protection from detection.

SUMMARY AND CONCLUSION'S

Small business success land survival is related to management ability. One way to increase this ability is to obtain a computerized information system. This requires that the small business owner-manager identify the information needs of the firm and then select the appropriate hardware and software solutions. With today's technology, the software acquisition decisions are probably the more difficult and the more critical. Associated with each acquisition option is a cost and a risk level of fraudulent transactions due to unauthorized data entry or software modifications. The greatest risk exposure is associated with the in-house custom development option while the least risk exposure is associated with contracted custom development.

The decision to purchase software, represents a good combination of acquisition cost and risk exposure and is recommended as a first choice option for the typical small business.

REFERENCES

(1) Betts, Mitch, "Census Bureau Counts 1984 Hardware Shipments," ComputerWorld", September 9, 1985, p. 15.

(2) Pratt, Charles M, "Small Business: Washington Begins to Take It More Seriously," U.S. News & World Report, August 8, 1977, p. 78.

(3) Minicucci, Rick, "Survey: Users, Show Us Your PCs," Today's Office, October, 1984, pp. 35-42.

(4) Bureau of Justice Statistics, Computer Crime: Criminal Justice Resource Manual. Washington, D.C., 1979.

(5) A questionnaire was sent to 347 Alaska licensed accounting firms, 85 usable questionnaires were returned, representing a 25 percent response.

(6) Some authors define GPA packaged software so that application software development tools such as electronic spreadsheets and data base management systems are not included. These are included in a separate category called "fourth generation software development tools."

(7) In electronic spreadsheet processing, a template is a formatted worksheet that contains no data but does contain the labels and formulas associated with a particular application.

This template can be generated by using the spreadsheet package, only, or can be generated by other programs linked with the spreadsheet package.

(8) Software certification is the process of carefully examining the documentation for a software package and then testing the software against the documentation claims. The certification may be supplied by the developer, but a more satisfactory source is an unbiased third party such as an accounting firm. Certification of packaged accounting software will be increasingly important as more businesses adopt these systems. The American Institute of Certified Public Accountants has issued an official statement (SAS-3), directing CPA's (and warning auditors, in particular) to increase monitoring (and skills) related to business computer systems.

(9) Rosenthal, Morton, "Careful Software Evaluation Increases End User Acceptance," Data Management, September, 1985, pp. 30-32.

(10) A questionnaire was sent to all 1,000 members of the Chamber of Commerce in Anchorage, Alaska who were considered to be small businesses. Thirty percent (300 responses) were returned and usable.

(11) Stair, Ralph M., Jr., "Acquiring Computer Programs Software for the Small Business," Journal of Small Business Management, October, 1979, pp. 37-42.

(12) Murray, John P., "Maintaining Morale When the Contractors Enter," ComputerWorld, September 9, 1985.

(13) Freedman, Martin S., "A Primer on Fraud and Embezzlement," Management Accounting, October, 1973, p. 36.

(14) Shelly, Gary; and Thomas Cashman, Computer Fundamentals for an Information Age, (Anaheim) Publishing Co., Inc., 1984), p. 18-10

(15) Allen, Brandt, "Embezzler's Guide to the Computer," Harvard Business Review, July- August, 1975, pp. 79- 89.

(16) Allen, Brandt, "The Biggest Computer Frauds: Lessons for CPAs,"The Journal of Accounting, May 1977, pp. 52-62.

(17) "Security", PC Accounting, April, 1984.