

ADOPTION OF INFORMATION TECHNOLOGY IN A SMALL BUSINESS SETTING

by

RICHARD S. LAKTIN

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Department of Commerce and Business Administration
The University of British Columbia
1956 Main Mall
Vancouver, British Columbia
Canada
V6T 1Y3

Date: 30 April, 1992

ABSTRACT

Many small businesses are turning to Information Technology as a means of competitive advantage and survival in today's tougher business climate. The *Public Accounting* profession portrays itself in the role of *Information Consultant* to small business when it comes to *information technology*. The role that Public Accountants play in the information technology adoption process is poorly understood. The purpose of this research was to examine more closely the role that information consultants play in the adoption process, with particular emphasis on the public accountant.

The *Diffusion of Information Technology* model (Moore, 1989) was used as the theoretical foundation for this study. The Diffusion of Information Technology model is well grounded in theory and is supported by Moore's research results.

The major research questions answered are:

1. What role do independent information consultants such as accounting firms play in the *Diffusion of Information Technology* process?
2. Is the *Diffusion of Information Technology* model a general model?

A cross-sectional survey using a questionnaire was issued to small business clients of public accounting firms. Profiles of information technology users and non-users were generated from questionnaire data. These profiles were subject to regression analysis and structural equation modelling using *PLS* (Partial Least Squares). The analysis provided some answers to the role accountants play in the information technology adoption process as well as supporting the Diffusion of Information Technology model in a small business domain.

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CHAPTER 1: INTRODUCTION AND OVERVIEW OF RESEARCH

1.1 RESEARCH STUDY RATIONALE

Most small firms have limited access to information sources on *information technology (IT)*. As a result, information is often sought from an external information consultant (Goodson, 1990). The role of the external information consultant as an information source to small firms is an important research area. In the role of *information consultants* professional accountants have been involved with many computer systems that have been considered successful by their users, and several that have been considered failures. To the accountant as well as the small business client they serve, the success or failure of the introduction of an information technology may seem to be not only a product of planning but a product of fortune as well. To an accountant, working in a profession that sells information and methods of generating information as products, unsuccessful implementation of computerized accounting systems is to be avoided. Maintaining good client relations is the bottom line to professional accounting organizations and failures (perceived or otherwise) are unacceptable, as small businesses cannot afford the emotional and monetary costs of an unsuccessfully implemented computerized accounting system. Research that can illuminate the interaction between small firms and their public accountant may provide the accounting profession with an understanding of how to better deliver the current information technology services it already provides to small business clients.

Equally as important to small businesses are suggestions for coping with information technology and finding ways to increase productivity given the scarcity of trained and skilled specialists. There is a growing belief that information technology will be the most important technology to change business and society in the 1990's as Canada moves from an economy that is resource based to one that is service based (Gunning, 1992). Small businesses may end up in the unenviable position of relying on information technology much more than they currently are, and unable to find ready assistance (in the form of skilled labour) to implement and manage the information technology they require.

For the public accountant, this research should help reinforce the need to be adequately trained in areas that will be called upon increasingly more often by current and future clients, such as information technology. Public accountants are finding themselves more and more in the position of being Information Consultants to their small business clients. The respective institutes (CICA and CGA) are portraying their members as computer (IT) professionals in national ads. This research should provide results that show if the message is getting through to the public as well as to the professional accountant.

For the purposes of this paper, the term information consultants is broadly defined as "professionals who use their knowledge of *information technology* to help individuals (i.e. clients/customers) obtain sufficient knowledge/skill level in the use of an *information technology* to become independent of further *extensive* professional aid in using the *information technology*". This definition includes information centers, DP departments, computer consultants, and public accountants.

The public accountant is often relied upon by the small business manager for help in installing computerized accounting services to ensure that the system will meet the accountant's requirements as well as the manager's. This expectation arises from the public perception of the accountant's expertise with information technology. Public accountants now find that some 95% of their audit clients have information technology installed (Walker, 1991). Often, however, accountants are not familiar enough with automated systems and treat them as automated manual systems (which they are not), resulting in potential disservice to the client (Overbey et al, 1987). To avoid the public and private humiliation that adverse headlines tend to bring, as well as the subsequent lawsuits and loss of business, research is required that will aid the professional accountant in helping his client successfully adopt any new information technology.

Despite the good reputation of information consultants, failures still occur. Practical advice based on solid research, designed to minimize the risk of failure, would be very welcome. Also, new types of information technologies are continually being developed. Inevitably, the new information technology will find its way into business. The skills to cope

with the introduction of the information technology need to be defined in an attempt to avoid any trepidation on the part of the client, based on past experience, that may otherwise occur.

There is a general reluctance to adopt new information technology in the public accounting profession (Batch et al, 1989) as well as in other professions (Newman, 1990). If these information technology specialists are resistant to learning and adopting newer information technology, it should be no wonder that the information technology specialists experience user resistance to the introduction of even basic information technology. This research should provide motivation for the information consultant to continue on the arduous task of bringing his clients into the 1990's by introducing a theory backed approach on how to successfully introduce new information technology into an organization.

1.2 RESEARCH DIRECTION

A review of any major MIS publication will show that the majority of research in MIS is carried out on large organizations (Attewell, 1989). The result is similar for studies on how information technology affects organizations as well. It can be easy to fall into the trap of thinking that results from these studies apply equally well to small organizations. However, it has been shown that small firms differ from large firms in many areas, including job creation and growth which in turn affect many other organizational characteristics (Attewell, 1989). For example, research on the role of information consultants, such as the Information Center (IC), is generally carried out on large firms (for a typical large firm study see Brancheau & Wetherbe, 1990). However, there are few (if any) IC's or similar entities in small firms. There has been little empirical research that has looked at the role of information consultants in the adoption of information technology in a small business setting.

The role of the information consultant in the diffusion of innovations process will be examined. For small business managers this is an important issue as small firms usually lack the resources to develop necessary expertise in-house. These businesses often look to their professional accountant for advice on their information requirements. For professional accountants this is also an important issue as their associations are attempting to transform

their members into information specialists to meet the needs of their clients. For example, the Canadian Institute of Chartered Accountants (CICA) is currently considering recognition of areas of specialization (if not accreditation) amongst CA's, one such area being information technology (Brown, 1992; Goodson, 1990; Luscombe, 1990).

1.3 THE COMPUTERIZED ACCOUNTING SYSTEM

The *Computerized Accounting System* is the specific *information technology* of interest to the accounting profession and small business in general. The *Computerized Accounting System* is a special subset of the *Personal Work Station* which Moore studied.

The *Personal Work Station* as defined by Moore consists of a set of computerized tools designed for an individual; is used on a microcomputer or terminal connected to a minicomputer or mainframe; is accompanied by appropriate software; and is used directly (hands on) (Moore & Benbasat, 1991). The *Personal Work Station* is general and not function dependent. A *Personal Work Station* can be used in *marketing, finance, production* or any other area of an organization. The choice of tools (hardware/software) comprising the *Personal Work Station* is usually up to the individual.

A *Computerized Accounting System* for the purposes of this research is defined as a set of computerized tools for an individual, and usually consists of a personal or microcomputer with one or more software packages, including an accounting program and/or other software such as a spreadsheet, database, word-processing, etc. in support of the accounting function. A *Computerized Accounting System* is similar to the *Personal Work Station* defined by Moore. The major differences between a *Computerized Accounting System* and *Personal Work Station* are that the use of a *Computerized Accounting System* (hardware/software) is usually an organizational decision and a *Computerized Accounting System* supports the accounting function primarily.

1.4 TOWARDS A SMALL BUSINESS ORIENTATION

Research into information technology, now entering its third decade, has primarily focused on large organizations. Although there are several issues regarding whether or not it is necessary to study small businesses separately from other businesses, the main issue is whether the organizational factors found in small firms are sufficiently similar to those of larger firms. If the main factors of interest are common across firms then it is appropriate and economically prudent to limit research studies to large firms and extrapolate the results to all other firms, given the difficulty in obtaining results from small firms. If these factors are dissimilar, then we as researchers have been omitting a significant group of organizations from our studies and we cannot claim with confidence that our results are generalizable across all firms.

This orientation towards big business is natural, as larger firms tend to operate in complex conditions. Understanding the environmental and internal factors that influence how a firm will behave is important to the enterprise and to society. This understanding is necessary because large firms have high public profiles, are large employers, and make large contributions to local economies, research institutes, and governments in the form of taxes or donations. Large firms are properly viewed as being very important to our economy.

Small businesses are also important to the economy. A study on small businesses in Canada, commissioned by the Federal Business Development Bank (FBDB) in 1986 and released in 1987, found some unexpected results. Small businesses (defined as firms with sales under \$2 million and typically with less than 20 employees) accounted for 25% of our GNP, 96% of all business organizations (over 700,000), created the greatest employment opportunities for women and young people (under 25 years old), had less of a wage gap between men and women, employed 32% of all workers (excluding farm, professionals, fishing and commission sales people) and over the period 1978-1982 created over 52% of all new jobs (FBDB, 1987). More recent data confirms the impact of small firms on job creation, as a study commissioned by the Canadian Organization of Small Business found small businesses created over 98% of the new jobs in the period 1984-1987 (Small Business

Magazine, October 1989). The increasing importance of small businesses can be shown in B.C., where small businesses employed almost 60% of B.C. workers by the end of 1988 compared to under 45% in 1986 (Smith, 1989), represented 92% of all businesses (Richmond Business, 1990) and created 96% of net new jobs (Richmond Business, 1990). Similar growth has occurred all across Canada during this time. In the USA, small businesses in the late 1970's and early 1980's accounted for 98% of all non-farm business organizations; 39% of the GNP; and 48% of non-farm, non-government employment (DeLone, 1988). In the U.K., small firms were found to contribute 35% of all technological innovations during the period 1970-1979 (Pavitt et al, 1989) and the portion of innovating small firms (under 200 employees) has been increasing significantly over the period 1945-1983 (Pavitt et al, 1989). The importance of small firms to the economies of Western countries is obvious.

The above statistics hide the sensitivity of small firms to economic fluctuations. Even in boom times many small firms experience a rocky road. The Canadian experience in the period 1978-82, for firms employing 5 or less full time employees, indicated that for every 100 *net new jobs created*: 52 were in currently existing firms; 106 were for newly created firms which survived; and 58 were lost for new firms that didn't survive (FBDB, 1987). Due to this sensitivity to the economic environment, smaller firms are often perceived to be more risky, subject to higher failure rates, have more problems collecting receivables, have more difficulty keeping adequate records (DeLone, 1988).¹

It is also evident that small firms are very important to public accountants, and vice versa. There is a special, symbiotic relationship between these two groups. This relationship, while acknowledged, is not well understood and varies from country to country. It appears that many small businesses in Canada rely on their public accountants for more than their accounting and tax knowledge (Goodson, 1990; Delente et al, 1990; Hamilton, 1989), while most small firms in Australia still seek mainly year end accounting and tax services from their accountants (Holmes & Nicholls, 1989). A recent Canadian study on small firm's relationship with their accountants found that one of the reasons small firms *initially* engaged their

¹The researcher has encountered several small firms that have experienced most, if not all, of the above problems through his own involvement in accounting public practice.

accountant was to install a computer system (ranked 8th on the top 10 list), a response provided by 21% of the survey firms. However, when asked about *ongoing* work performed by their accountants, "advice on computers" did not make the top 10 list. A significant portion of firms requested that more services, including computer systems advice, be provided by their accountant (Hamilton, 1989).

1.5 THE ROLE OF INFORMATION TECHNOLOGY IN ORGANIZATIONS

Unplanned and uncontrolled adoption of information technology are major problems for any firm (Miller, 1988). These problems could include loss of data and programs (Stulberg, 1991) and poor decisions based on unreliable information systems (CICA, 1986; Alavi & Weiss, 1986; Gremillion & Pyburn, 1983; and Davis, 1981). Any or all of these problems could lead to possible cessation of operations (Rosen et al, 1986; Allen, 1982). More recently, sabotage via *computer viruses* has become a real concern (Jenish, 1992; BYTE, August 1991; Rockburn, 1990; Kunz & Maingot, 1989). While most larger firms have internal resources to help overcome these problems (in-house expertise, financial resources to acquire adequate information technology) most small firms remain at risk due to their lack of resources.

Factors contributing to the problem of unmanaged information technology include ignorance of the full potential of the information technology by the information consultant (Cox, 1990; Batch et al, 1989) or the user (Benson, 1983) with the user often being more concerned about the information technology's impact on himself (Baronas & Louis, 1988); management ignorance of the skills the organization has available for using the information technology (Benson, 1983); and management reluctance or inability to provide adequate user training (Buckler, 1990 and others). For large and small firms the information technology user is often unsophisticated because the technology is new to the firm and personnel familiar with it would be relatively few (Lees & Lees, 1987). To learn to use the information technology the user has the options of relying on information consultants (Melone & Bayer, 1990; Stieren, 1990), other staff (Melon & Bayer, 1990; Nilakanta & Scamell, 1990; McFarlan &

McKenney, 1983), or on the user's own abilities. The extent of reliance on other skill sources depends on the individuals own skills and the organizations resources.

The ability of large firms to cope with the above problems of information technology are generally better than for small firms. A problem faced by many small business managers is that they attempt to manage information technology based on practices that they are familiar with, strategies aimed at obtaining or maintaining stability. Such practices are not conducive to coping with the major change information technology tends to impose on an organization (Miller, 1988) as is the case with the initial introduction of an information technology. Most large firms have experienced these major changes several years (or decades) ago and will be more familiar in dealing with change than their smaller counterparts. In large firms users often have skilled resources to fall back on such as an EDP department or personnel who had recently come from a firm with the information technology. With the increasing complexity of computer technology even these traditional sources are finding it increasingly difficult to keep up (Gellman, 1991; Gotleib, 1990) with the result that large firms will turn to specialists (consultants) if necessary (Gotleib, 1990; Boynton & Zmud, 1987). Users in small businesses on the other hand have much fewer resources to fall back on (Willits, 1990; Delone, 1988; Lees & Lees, 1987). Often they must rely on external skilled specialists, helpful friends, or themselves (Lefebvre & Lefebvre, 1990; Gable, 1989; Delone, 1988; Lees, 1987). In many cases hiring the external information specialist is much cheaper than hiring full time EDP staff (Arter, 1988) with the result that external information consultants are commonly used by small firms (Bracker & Pearson, 1985). For the small business the specialist is often their professional advisor - their public accountant (Delente et. al, 1990; Peat et al, 1984). Recent studies show that in Canada there is a growing shortage of skilled information technology specialists (Buechert, 1992). While this shortage poses problems from businesses in general, it provides an opportunity for public accountants to fill this void. Partly in response to this trend, organizations such as the CICA have exhibited plans to expand their involvement in information technology on a large scale (Brown, 1992).

It has been suggested that the reasons a small firm seeks outside help for managing information technology are similar to those used for seeking outside help in business planning (Gable, 1989). If this is true, then the professional accountant is the person to whom the business manager will turn as the accountant often has provided the business planning advice initially. However, success in providing a business plan doesn't ensure success regarding the adoption of information technology. The failures of information systems installed with the help of information consultants have been well documented in the media. This is particularly true for accountants (e.g. see Babcock, 1986) and the fear of lawsuits over malpractice for providing information systems or advice is a real and growing threat (Dragich, 1989; Walton & Durham, 1988). While there is research to support the claim that external accounting services help small firms to be successful (Bracker & Pearson, 1985), there are also research results that claim using external information consultants, including accountants, provide less than satisfactory results for a small business (Hamilton, 1989; Baker, 1987; Lees, 1987; Lees & Lees, 1987; Bracker & Pearson, 1985). Some of these studies indicated that higher satisfaction could be achieved if the consultant provided a full range of support and services.

CHAPTER 2: LITERATURE REVIEW

ACCOUNTANTS:

THEN

"Observe that much of the difficulty in the conception of profit, taxes, costs, and so on, can be seen to come from the professionalization of the accountants as a group. They are the ones who force upon the industrial situation the concern with numbers, with exchangeable money, with tangibles rather than intangibles, with exactness, with predictability, with control, with law and order generally, etc. ... Andy Kay [then president of the company] pointed out that the accountants have the lowest vocabulary scores of any of the professional groups. I added that the psychiatrists think of them as being the most obsessional of any group. From what I know of them, they also attract to the schools of accounting those who are number bound, those who are interested in small details, those who are tradition bound, and the like." [Maslow, 1965 quoted by Davidson, 1991].

AND NOW

"My own research ... found that members of professional accounting firms are *very* bright, with an average intelligence level at the 84th percentile of the general population.... For starters, accountants tend to be more assertive, independent-minded, unconventional, cheerful, enthusiastic, rebellious, experimenting, liberal, self-sufficient, careless of social rules and standards, nonconforming, anxious, independent and impulsive." [Davidson & Dalby, 1991].

From an organizational perspective, there is a growing realization that information can be considered as an asset (Framel, 1990; Ahituv, 1989), albeit an intangible asset. Many firms (large and small) are turning to information technology due to the increasingly complex and competitive business environment and the recent technological and software trends making it feasible and less costly to acquire an information technology, allowing firms to better manage and protect their information (Huber, 1990; McGill, 1990). The concept of *information as an asset* is not new to large firms or to public accountants, but to many small businesses it is a novel idea with the result (as many public accountants can attest) that little is done to protect (Bradbard et al, 1990; Alavi & Weiss, 1986) or exploit their data. A recent BYTE survey of its readers (including large and small firms) found that 53% of respondents had suffered loss of critical data costing an average of \$14,000 (BYTE, August 1991).

The wide spread diffusion of information technology has left many firms open to the issue of security. Many small firms appear to be ignorant of the necessity of information

technology security (Pendegraft et al, 1987). For the small business it has been suggested that security is even more important than for large firms due to the high degree of reliance on information technology (Pendegraft et al, 1987) and to the high degree of [unrelated] third party knowledge about the use of the information technology, particularly microcomputer software (Bradbard et al, 1990; Overbey et al, 1987). Large firms tend to experience less security problems as they tend to use large computers and more restricted software. Prior experience with larger computer systems also provides large firms with an advantage in safeguarding their data and micro computer systems.

There are often several reasons that firms acquire information technology. Initiative to introduce information technology is either due to a *PUSH* (organizational) environment or a *PULL* (individual) environment.

A *PUSH* environment exists when events external to the user (or the firm) force information technology on the user. Firms acquire information technology due to competitive pressures such as improved business value indicators like return on investment (ROI) figures or net income (Alavi et al, 1988; Kauffman & Weill, 1989) and competitive advantage (Framel, 1990; Clemons & Row, 1989; Alavi et al, 1988; Reich & Benbasat, 1988; Boynton & Zmud, 1987).

A *PULL* environment exists when the user finds it necessary to acquire information technology due to his own work environment. Employees may acquire information technology for higher job satisfaction (Kraut et al, 1989; Pentland, 1989; Millman & Hartwick, 1987). Additionally, non-IS employees may acquire information technology due to frustration with the IS department for delays in developing user required systems (Gremillion & Pyburn, 1983; Rockart & Flannery, 1983; Davis, 1981; McLean, 1979) or due to the inability of specialists to understand user requirements (Gremillion & Pyburn, 1983; Rockart & Flannery, 1983; Davis, 1981). The user is not only more likely to be satisfied with a system that he developed himself (Gremillion & Pyburn, 1983); but he is also responsible for the implementation (Davis, 1981).

Research of successful adoption of information technology has focused on measurable attributes associated with *success*. Over the past decade or so, the definition of *success* has evolved from a one dimensional point of view (i.e. see studies by DeLone, 1988; Sein et al, 1987; Raymond, 1985; McKeen, 1983; Ein-Dor & Segev, 1982; Lucas, 1978 and others) to a perspective with complex multi-dimensional features (i.e. see studies by Melone & Bayer, 1990; Rivard & Huff, 1988; Sanders & Courtney, 1985; Barki & Huff, 1984; Bailey & Pearson, 1983; Ives et al, 1983; McKeen, 1983; Zmud, 1979 and others). As a result of the increasing knowledge on information technology adoption processes, currently *success* is viewed as a relative term (Gallupe, 1989). In other words, *success* is dependent on how well there is a match between the user's expectation of what the information technology is supposed to accomplish, and what the information technology actually does.

User attitudes have increasingly been seen as an important indicator of the success of information technology adoption (Lin & Ashcraft, 1990; Melone, 1990; Thompson, 1989; Goodhue, 1986). The research focus on user attitudes and behaviour is due to the increased emphasis on theory based constructs such as *attitudes* (from the social and cognitive psychology domain - for an overview of current thought on attitudes, see Pratkanis et al, 1989), where in the IS domain the concept of user attitude encompasses the success attribute of user satisfaction (Melone, 1990) as well as several other of the single dimensional attributes (Goodhue, 1986).

Recent research has begun to look more closely at the *process* of adoption of information technology, also called *technology transfer* (Bouldin, 1989). The study of information technology using an *adoption of innovations* approach has been pursued in the MIS field (Cooper & Zmud 1990; Alexander 1989; Moore 1989; Brancheau 1987; and others) and in the psychology domain (Hill et al., 1987). Much of this work has drawn from the literature on diffusion of innovations which was pioneered by Rogers (1983), and from the work on *attitudes and beliefs* by Ajzen and Fishbein (1980) as well as other psychologists.

CHAPTER 3: ADOPTION OF INFORMATION TECHNOLOGY

It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the older order, and only lukewarm defenders in all those who could profit by the new order. This lukewarmness arises partly from fear of their adversaries, who have the laws in their favor, and partly from the incredulity of mankind, who do not truly believe in anything new until they have had an actual experience of it. (Machiavelli, Niccolo [1500's], *The Prince*, Translated by Luigi Rice, Rev. E. R. P. Vincent, New York: New American Library, 1952; cited in *Foundations of Business Systems* (Flaaten et al, 1989, pg. 37)).

A general criticism about information systems research has been the lack of an adequate theory of *IS* (Goodhue, 1986). There is considerable confusion on the issue of what a *successful information system* is (Goodhue, 1986). The recent research on *information system attitudes* and *adoption of innovations* has begun to clear up this confusion. The current view of *information system* which incorporates these concepts have been described by Boon & Pienaar (1989, pp. 122):

"Technology is not an end in itself but merely a means to an end, the end being to help knowledge workers to do their jobs effectively and efficiently. *Knowing these knowledge workers and what they are doing, as well as the information technology*, would result in appropriate and successful application of the technology" (emphasis added).

The issue of knowing what *the knowledge workers are doing* is addressed by Moore in his study. Moore (1989) has developed a general model, the Diffusion of Information Technology model (see Figure 1 - Diffusion of Information Technology), that explains the adoption and use of information technologies by individuals.

This model was integrated from concepts contained in the *Diffusion of Innovations* model by Rogers (1983) (see Figure 2) and the *Theory of Reasoned Action* by Ajzen and Fishbein (1980) (see Figure 3), to explain the adoption of information technology by individuals. In developing this model, Moore has attempted to overcome the previously noted weaknesses (ie. lack of theory, measuring *information system* success) in research in this area. The Moore model is the most comprehensive and theory backed work to date on information technology diffusion and adoption.

3.1 DIFFUSION OF INNOVATIONS

The Diffusion of Innovations work by Rogers is well supported by research. Rogers' *Diffusion of Innovations* model is used to explain the rate of *adoption* of innovations (Rogers, 1983), which included five perceived attributes of innovations; type of innovation-decision (individual or collective decision); communication channels (media or interpersonal contact); nature of the social system (social norms, interconnectedness of the communication network); and extent of change agent's (product champion or opinion leader) promotion efforts - see Figure 2.

Based on a synthesis of the literature and research on innovations Rogers (1983) has determined that there were five attributes of innovation that are all conceptually distinct from each other (*Relative Advantage* - the degree to which an innovation is perceived as being better than its precursor; *Compatibility* - the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters; *Complexity* - the degree to which an innovation is perceived as being difficult to use; *Trialability* - the degree to which an innovation may be experimented with before adoption; and *Observability* - the degree to which the results of an innovation are observable to others). Moore added an additional two attributes (*Image* - the degree to which use of an innovation is perceived to enhance one's image or status in one's social system; and *Visibility* - the degree to which the innovation is apparent to the sense of sight) and called the resulting seven attributes *Perceived Characteristics of Innovation*. An additional related variable, *Voluntariness of use* (the degree to which use of the innovation is perceived as being voluntary, or of free will), was also added by Moore and the variable *Complexity* was renamed *Ease of Use*. Finally, Moore added some scales to measure Computer Avoidance (a term which he did not define). Appendix I-A contains a summary of a complete list of *Perceived Characteristics of Innovativeness* variables and *Voluntariness* definitions.

3.2 THE THEORY OF REASONED ACTION

In the *Theory of Reasoned Action*, which is well supported by research studies, Ajzen & Fishbein identified the relationship between intentions, beliefs, attitudes, and behaviours (Ajzen & Fishbein, 1980). The basic premise is that an individual's behaviour is determined by his decision or intention (which is reasoned) to perform that behaviour. The *attitude* toward the specific behaviour (an individual's personal attitude towards the behaviour) and his *Subjective Norms* (the individual's perception of what other people think about the behaviour) determine the individual's behavioural intention. These attitudes and subjective norms are a function of the individual's *beliefs*. The basic premises of the *Theory of Reasoned Action* are illustrated in Figure 3.

3.3 DIFFUSION OF INFORMATION TECHNOLOGY

The link between the *Diffusion of Innovations* model and the *Theory of Reasoned Action* can be seen in Figure 1. The synthesized *Diffusion of Information Technology* model developed by Moore can be described as follows (Moore & Benbasat, 1990, pp. 3):

"Innovations diffuse because of the cumulative decisions of individuals to adopt them. Thus, it is not the potential adopters' perceptions of the innovation itself, but rather their perceptions of **using** the innovation that are key to whether an innovation diffuses."

To test the Diffusion of Information Technology model, a questionnaire was developed and administered in a cross sectional study involving individuals in six Canadian organizations. The questionnaire results supported all eight Perceived Characteristics of Innovation variables as being factors in explaining the diffusion of *Personal Work Stations*, which was the particular innovation being investigated (Moore & Benbasat, 1990).

3.4 SIGNIFICANCE OF THE DIFFUSION OF INFORMATION TECHNOLOGY MODEL

The *Diffusion of Information Technology* model attempts to *predict, explain and influence individual behaviour* towards the *adoption of information technology*. The Diffusion of Information Technology model is also designed to be a general model (Moore, 1989). As a general model, the Diffusion of Information Technology model should apply to a

specific information technology other than the *Personal Work Station*, such as *Computerized Accounting Systems*. The Diffusion of Information Technology model should also apply equally well to small businesses and large businesses.

These observations about the Diffusion of Information Technology model arise from an inspection of the theory on which the model is based. Because the Diffusion of Information Technology model is based on theoretical models, it will contain the characteristics of the underlying models. An important characteristic of the *Theory of Reasoned Action* is the ability to *predict, explain and influence individual behaviour* (Ajzen & Fishbein, 1980). The Theory of Reasoned Action is generalizable and is applicable to all people. The Diffusion of Innovations model focuses on the *adoption* of innovations. The Diffusion of Innovations model should be generalizable across all innovations, including information technology.

It is important to examine whether the Diffusion of Information Technology model is sufficiently robust to include small businesses as part of the population it encompasses. Research models that are of help to small firms are few and far between. This model could provide a means for explaining why a particular innovation, such as installation of a computerized accounting system, succeeds in one firm and not another. It could also be used for *predicting* if the innovation is likely to succeed, before significant time and resources are committed to a project, by determining if the firm has an adequate mix of similar attitudes and beliefs as those found for the successful adopters.

CHAPTER 4: TECHNOLOGY TRANSFER - RESEARCH QUESTIONS

"We have lived through a bewildering array of new hardware and software technologies, most of which are supposed to increase the productivity of the average programmer and systems analyst by a factor of ten or more; yet these technologies are not even being used in many DP organizations and have achieved only modest results in many others.... It took the military 75 years to go from the technology of muskets to the technology of rifles, so we should not be too discouraged to learn that it takes 14-15 years ... for new software technologies to be accepted" (Yourdon, found in Bouldin, 1989, pg. xiii).

As discussed in the previous section, the *Diffusion of Information Technology* model has the ability to *predict* and *explain* individual behaviour towards the *adoption* of *information technology*. An underlying reason for this current study was to verify the robustness of Moore's results for the Diffusion of Information Technology model. Equally important was to determine the potential usefulness of this model to the public accountant (information consultant) as well as to their small business clients. For the small business manager or information technology specialist, it is expected that by understanding the factors that lead to successful adoption of information technology a systematic approach can be developed to *influence* individual behaviour to adopt new information technology in the future.

Besides attempting to extend the Diffusion of Information Technology model to the small business domain, this study attempted to obtain new knowledge regarding the appropriateness of using the theory based work of *Rogers* and *Fishbein & Ajzen* in the MIS domain. The *Communication Channels* section of Roger's model, coupled with the *Extent of Change Agent's Promotion Efforts* section (Figure 2) and the *Communications Network* section of Fishbein & Ajzen's model (Figure 3) essentially represent the same concept - information gathering/exchange (for convenience the term *Communication Channels* will be used in the remainder of this thesis). Moore's research did not investigate this area. However, the importance of communications channels in the adoption process should not be underestimated, as it has been pointed out that ...

"before a business unit can adopt and use a technology, members of the business unit must become knowledgeable of the technology and be able to propose ideas for its use. This awareness results from communication behaviors ... whereby a 'technology provider' familiar with the technology interacts with a potential 'technology user' not familiar with the technology" (Lind & Zmud, 1990, pg. 4).

For a small business, the *technology provider*, likely an external consultant (Gable, 1989), is often the accountant (Goodson, 1990; Hamilton, 1989). The role of external consultants as information sources on information technology has not been well established in the Diffusion of Information Technology literature (Gable, 1989). Unlike most external consultants, accountants are often considered to be an integral part of their client's management team (Delente et al., 1990; Goodson, 1990). For many small business managers, the opinion of their accountants are highly regarded and persuasive (Goodson, 1990).

4.1 RESEARCH HYPOTHESES

The Diffusion of Information Technology model provides a means to determine just what the characteristics of a *successful* interaction between the user and a specific information technology are. Interactions between users and an information technology are registered by means of a questionnaire that Moore has developed and validated. Moore's questionnaire did not focus on the role of external information consultants, probably as a result of his focus on large business adoption of information technology where the necessary expertise would be available in-house through the Information Centre or similar department. As small firms do not have a similar body of in-house information expertise, the role of external information consultant becomes more important. This specific item may provide an important research area for small firms.

As validating Moore's results regarding the Diffusion of Information Technology model is one goal of this study, a summary of the Moore hypotheses (modified to reflect the Computerized Accounting System) is provided below.

H₁: One's attitude towards using a Computerized Accounting System will influence one's innovativeness with respect to Computerized Accounting System usage.

H₂: Relative Advantage will have a contribution more than any other Perceived Characteristics of Innovation on one's attitude towards adopting Computerized Accounting Systems.

H₃: Computer Avoidance will have a contribution less than any other Perceived Characteristics of Innovation on one's attitude towards adopting Computerized Accounting Systems.

H₄: The Subjective Norm will influence one's innovativeness with respect to Computerized Accounting System usage.

H₅: The Subjective Norm will influence one's attitude toward adopting the Computerized Accounting System.

H₆: Voluntariness is negatively related to one's innovativeness with respect to Computerized Accounting System usage.

H₇: Voluntariness will be negatively related to one's attitude towards using Computerized Accounting System.

An important research question for small business managers arises concerning the role that Support groups, especially external information consultants such as accounting professionals, play in the process of information technology diffusion. The research hypotheses related to this question are developed in the following paragraphs.

It has been shown, in Chapter 1, that small and medium firms rely on external consultants more than large firms. Because small firms have little in-house expertise in information technology, especially for an important information technology such as a Computerized Accounting System, the involvement of an external source of information and guidance should contribute to the success of the introduction and adoption of the Computerized Accounting System.

H₈: The involvement of a Support Group will contribute to a successful adoption of Computerized Accounting Systems.

As a Support Group is made up of different components, it follows that each of these components should contribute to a successful Computerized Accounting System. For the purposes of this study, the Support Group is comprised of Friends, other Employees, external Accountant, and external Consultant. This group generate the following hypotheses:

H₉. The involvement of a Friend will contribute to a successful Computerized Accounting System.

H₁₀. The involvement of other Employees will contribute to a successful Computerized Accounting System.

H₁₁. The involvement of an external Accountant will contribute to a successful Computerized Accounting System.

H₁₂. The involvement of an external Consultant will contribute to a successful Computerized Accounting System.

An investigation of the Moore, Fishbein & Ajzen, and Rogers models indicate that the presence of a communications channel will influence other areas of the Diffusion of Information Technology model as well as *Innovativeness*. In this study, communications channels is represented by the *Support Group*. The Fishbein & Azjen model (Figure 3) shows direct links from *Communications Network* to *Subjective Norm* and *Attitude*. These links suggest the following two hypotheses:

H₁₃. The involvement of a Support Group will have a positive influence on Subjective Norm.

H₁₄. The involvement of a Support Group will have a positive influence on Attitude.

Also, while not explicit in the Fishbein & Ajzen model, it is possible that the Perceived Characteristics of Innovation variables may also be influenced by the communications channels. This link is suggested from a review of the adoption process indicated in Roger's *Stages of the Innovation Decision Process* model (Figure 4), where the *Knowledge/Persuasion* cycle (incorporating the communications channels) impacts the

Decision cycle (which incorporates the behavioural intention, which are shaped by Perceived Characteristics of Innovation variables). Finally, the perceptions of several Perceived Characteristics of Innovation variables in Figure 1 (ie. Trialability, Visibility, Relative Advantage and Image) can be influenced by how other people (eg. *Support Group*) perceive or present information technology. From these observations an additional hypothesis can be generated.

H₁₅. The involvement of a Support Group will have a positive influence on Perceived Characteristics of Innovation variables.

CHAPTER 5: INSTRUMENT DEVELOPMENT

SECTION A - INTRODUCTION

5.1 GENERAL

In this section the development of the two questionnaires used in the study will be discussed. Reliability results for both the pilot study and the final study will be presented.

The use of questionnaires as a method of gathering research data is both *common* and *controversial*. It is *common* because it is convenient and often the only feasible way a researcher can obtain sufficient volume of data in an economical manner. It is *controversial* as the method is susceptible to a number of sources of error that could render any results suspect. A good questionnaire must therefore strike a balance between its length and complexity, presenting to respondents a form that isn't intimidating, while obtaining data that is reliable and valid.

Moore spent a considerable amount of time establishing the reliability and validity of his questionnaire. The changes to the Diffusion of Information Technology questionnaire discussed in the next section were of a type to potentially call into question its reliability but not its validity. The changes made were generally cosmetic, substituting *Computerized Accounting System* for *Personal Work Station* and cleaning up terminology to be more consistent with a small business environment. These changes were not expected to affect the focus of the questionnaire from the underlying theoretical foundations, therefore the validity of the questionnaire should not have been affected. Changing the wording of individual questions may have affected how they were interpreted, which is a reliability issue. As a result reliability issues will be dealt with in more detail than validity issues.

5.1.1 RELIABILITY

Reliability is defined as "the degree to which the results of measurement are free of error" (Stone, 1978). Generally, there are two components to any measurement, a "true" component and an "error" component. A reliable measurement instrument is one that has a

low error component. In other words, repeated use of the instrument gives consistent results. Also, a measure is considered to be reliable when independent but comparable measures for the item of interest provide similar results (Churchill, 1979).

The appropriate level of reliability is a factor of the goals of the researcher and published criteria for the type of research being done. Reliability numbers range from 0 to 1 and are usually presented as decimal fractions, where the higher the fraction the better the reliability. The general *rule of thumb* for a reliability outcome is .80 (Bryman & Cramer, 1990). For the purposes of this study, a reliability figure of .70 will be used as this level of reliability is appropriate for a study that is in the early stage of theory testing (Nunnally, 1978) and is also an acceptable *rule of thumb* level for *PLS* analysis (Barclay et. al., 1991). It should be stressed that .70 is the lower bound for an acceptable reliability level.

5.1.2 VALIDITY

Validity is defined as "the degree to which a measure actually measures what it purports to" (Nunnally, 1967, pp. 75). In other words, the differences observed are true differences for the characteristics being investigated and not a result of some other source (Churchill, 1979). There are several items comprising validity which are summarized in Appendix I-C. It should be noted that not all of these factors may be an important issue with any given questionnaire, but they should at least be considered upon preparation.

Validity is not considered to be a problem in this research as the questionnaire used was previously validated by Moore. Changes made to the questionnaire for this study did not fundamentally alter what the questions were meant to measure. For example, questions meant to measure *Image* still measured *Image*, only the *Image* being measured was for a Computerized Accounting System (Modified question U-6: Using a CAS improves my image within the organization) and not a Personal Work Station (Original question U-6: Using a PWS improves my image within the organization). This substitution of CAS for PWS occurred for all 39 questions.

5.1.3 QUESTIONNAIRE SELECTION

The research issues being investigated indicated that two separate questionnaires were required. One questionnaire to test the Diffusion of Information Technology model and simultaneously gather data on users (clients) information technology information sources, the second questionnaire to elicit data from accountants.

The development of each of these questionnaires is discussed in the following sections.

SECTION B: QUESTIONNAIRE DESIGN - PILOT STUDY

All references to questions in this section refer to the Pilot Study questionnaire.

5.2 CLIENT/DIFFUSION OF INFORMATION TECHNOLOGY QUESTIONNAIRE

5.2.1 PERCEIVED CHARACTERISTICS OF INNOVATIONS

One goal of this research study is to replicate the results Gary Moore obtained validating his *Diffusion of Information Technology* model. Moore spent considerable time and effort in developing a questionnaire that met suitable reliability and validity criteria (see Moore & Benbasat, 1991). It was determined that redeveloping an alternate questionnaire would be redundant, futile, and not contribute to a cumulative discipline. Therefore, Moore's questionnaire was adopted with some minor modifications which are discussed below.

In Moore's study, the measurement of *Perceived Characteristics of Innovations* was obtained through the use of an interval scale (ranging from 1 to 7) consisting of 50 questions. These 50 questions were used to measure the 9 *Perceived Characteristics of Innovation* variables that Moore considered integral to the Diffusion of Information Technology model. Based on subsequent analysis of the Diffusion of Information Technology model using *LISREL* (Linear Structural Relations Model), Moore was able to determine that only 8 Perceived Characteristics of Innovation variables were significant factors. Moore also was able to determine that the *Perceived Characteristics of Innovation* questions could be trimmed down to 38 from 50 without significantly affecting the results (Moore & Benbasat, 1991). In this paper, references to Moore's questionnaire will refer to the 38 item instrument

unless otherwise noted.

In this current study, Moore's questionnaire was modified by changing all Personal Work Station references to Computerized Accounting System to focus the study on the information technology Computerized Accounting System. Altering the questionnaire introduced the risk that the instrument no longer measured what it was supposed to measure. The modified questionnaire was tested by a pilot study on a sample of small businesses and compared to Moore's results to establish that the modifications did not fundamentally alter the reliability of the questionnaire in relation to Moore's Diffusion of Information Technology model. The major risk inherent in this approach is if the pilot study does not produce statistically similar results, it will be difficult to determine if the results are from the changes to the instrument or from difference between large and small firms. Due to this potential problem, an additional pilot study was contemplated to be carried out on a relatively unmodified version of Moore's questionnaire. The only modification to this questionnaire would be the substitution of Computerized Accounting System for Personal Work Station. The results from these two pilot studies would be compared to each other and to Moore's results to ensure that the overall integrity of the questionnaire was not damaged. Any differences between the two pilot studies could be attributed to changes in the questionnaire, while differences between the pilot studies and Moore's study could be attributed to differences between large and small firms.

As it turned out the results for the pilot study were statistically similar enough to Moore's findings to dispense with the second pilot study. The pilot study results were compared using the reported reliability figures (Cronbach's alpha) for each Perceived Characteristics of Innovation variable to Moore's results. Pilot scores of .60 and higher were considered as acceptable as reliability scores tend to increase with larger sample sizes (Nunnally, 1978). This pilot study had all Perceived Characteristics of Innovation variables except *Visibility* (.28) and *Image* (.59) reporting scores above .60 (see Table 1). The Perceived Characteristics of Innovation variable *Visibility* had a reliability score much lower than the minimum acceptable and was examined more closely. Upon reviewing Moore's

rationale for using a subset of his original questionnaire it was decided that *Visibility* could be improved by adding an additional question to the questionnaire, bringing the Diffusion of Information Technology subset of the questionnaire up to 39 questions. This additional question had originally been dropped, by Moore, from the 50 item questionnaire in developing the 38 item questionnaire. On the whole, the reliability results were encouraging. It was decided that the modified pilot study questionnaire would be used in the actual study. The Perceived Characteristics of Innovation questions were labeled U-1 to U-39 for Computerized Accounting System users and N-1 to N-39 for non-Computerized Accounting System users (for Pilot Study questionnaire see Appendix II-A, for final questionnaire see Appendix II-B).

5.2.2 SYSTEM USAGE

The *adoption* of a Computerized Accounting System is the dependent variable of interest in this study. Like other *success* measures, measurement of adoption is difficult and surrogate items are often used, such as system usage. After reviewing the literature it became evident that usage was commonly measured by using one or two items. This is disturbing as reliability is impossible to establish based on a measure of one and difficult for two items. Even in Moore's study this practice was followed (Moore, 1989). However, as Moore argues in his thesis, with dependent variables this is not as major a drawback as it is for independent variables. As validating Moore's model is an important part of this study, it was determined to use similar usage measures as those used by Moore.

Adoption is measured by determining the usage of the information technology (the Personal Work Station). The usage measures are called *Innovativeness*. There are three aspects of innovative behaviour that were measured in his study, these are Adoptive Innovativeness - degree to which an individual is relatively early in adopting an innovation, Use Innovativeness - degree to which an individual puts an innovation to use within a given use domain, and Implementation Innovativeness - degree to which an individual who has adopted the innovation uses it to solve novel problems, or in a new use domain (Moore, 1989). The Innovativeness measures and definitions are summarized in Appendix I-B.

Adoptive Innovativeness

Adoptive Innovativeness was considered to be *the time of first use* of the Computerized Accounting System. Two questions were included in the pilot questionnaire to measure this item. These questions were *day and month the CAS was first used* (B-3) and *the number of months the CAS was regularly used* (B-8b). A reliability scale was developed by converting both questions to an interval scale from 1 to 7 (1=less than one month; 2=between 1 and 3 months; 3=between 3 and 6 months; 4=between 6 and 12 months; 5=between 12 and 18 months; 6=between 18 and 24 months; 7=more than 24 months). A reliability score of .97 was calculated (see Table 1). The results were encouraging enough to leave these questions unmodified. While it is preferable to use more than two items for reliability testing, the resulting reliability score was high enough to indicate that a third question would not be required.

Implementation Innovativeness

Implementation Innovativeness was measured by asking questions on hours of use and frequency of use. The idea behind these questions was to determine the degree of use the Computerized Accounting System was currently receiving.

There were two questions for hours of use in the Pilot study, *overall weekly use of a CAS in hours* (B-4) and *weekly use, in hours, broken down by function* (B-8a). Before a reliability score could be determined for these two scales, the question on *hourly use broken down by function* (B-8a) was converted to a single number by summing the hours of each function used, in order to make the two measures similar in nature. A reliability score of .80 (see Table 1) was achieved. While the reliability score was acceptable, a review of the questionnaires indicated that there were problems that some respondents had in answering these questions consistently. The basic problem was that the process of summing hours of Computerized Accounting System usage for functions in B-8a resulted in a single total that seldom equaled the hours reported in the overall weekly usage scale (B-4). Often the totals resulting from adding hours reported in question B-8a were considerably higher than the

overall number reported in question B-4. It was reasoned that individuals are probably more likely to accurately remember how much they use individual Computerized Accounting System functions than to quickly provide an overall estimate of their time using all Computerized Accounting System functions, therefore it was decided to drop the overall *CAS usage* measure (B-4: Overall, how many hours per week do you use a CAS?) from the questionnaire and to rely on the question measuring *CAS usage by function* (B-8a: On average how many hours per week do you spend using the CAS on the following functions? ...). It was also decided not to develop a replacement question for the item dropped as the best alternative would have been to obtain actual usage figures. This alternative was not feasible as the researcher had no access to the respondents' place of work to measure usage due to confidentiality. Judging from the researcher's own experience working with small businesses, it was also unlikely such records existed in small firms either.

Frequency of Use in the Pilot study was measured by three questions. Two of the scales asked the same question, using slightly different wording. Both scales (B-5: How regularly do you now use a CAS?, B-11: I have been using a CAS for ...) measured *Computerized Accounting System usage in an overall manner*. The third question measured *frequency of use of individual CAS functions* (B-7: On average, how frequently do you currently use the following functions? ...). All three questions used a seven point ranking scale (1= Not at all, 2=Less than once per month, 3=About 1-3 times per month, 4=About once per week, 5=About 2 to 4 times per week, 6=About once per day, 7=More than once per day). After reviewing the responses to these questions it was decided not to use the question measuring use by individual Computerized Accounting System functions (B-7) in determining a reliability score due to problems in interpreting these responses. For example, a person could use several functions *about once a week* (indicated by a "4" on the scale for B-7) yet report using a CAS *more than once per day* (indicated by a "7" on the scale for B-5 or B-11). These different responses could arise due to the timing of use of each function. This same problem was noted by Moore.

The two scales (B-5, B-11) were thought to ask the same question, *measuring Computerized Accounting System usage in an overall manner*, and were included to determine if respondents were answering consistently. A reliability score of .22 (see Table 1) was obtained for these two measures which was very surprising, given the similarity of these two questions. The responses were reviewed as were these two questions. A possible explanation is that respondents interpreted B-5 (How regularly do you now use a CAS?) in the present tense and B-11 (I have been using a CAS for ...) in the past tense. The inclusion of the same 7 point ranking scale (discussed above) should have caused respondents to answer the questions similarly. Dropping one of these questions (B-11) was considered; however it was decided to retain this question to see if similar results would occur in the full study.

Use Innovativeness

The Pilot study included four questions designed to measure system usage, called *Use Innovativeness* by Moore. These four questions were: *did the firm use a mainframe or micro* (B-6), *how frequently the functions were used each day* (B-7), *how many hours per week each function was used* (B-8a), and *how long the user had been using the function, in months* (B-8b). An overall Use Innovativeness reliability score was calculated by taking the average number of functions used for each question. The reliability score was found to be low, .45 (see Table 1). Further reliability calculations were performed on a reduced subset of questions and it was found that by dropping the question *did the firm use a mainframe or micro* (B-6) the score improved to .77. The Pilot study indicated that all respondents only used microcomputers, which made sense for a small business environment. It was decided to drop B-6 from the final questionnaire for the above reasons.

5.2.3 CLIENT COMPUTERIZED ACCOUNTING SYSTEM SUPPORT

General

An important part of this study was to examine the role of the support group in Computerized Accounting System adoption. A series of questions were asked regarding the makeup of the support group and the role they play in helping the client with the use of the client's Computerized Accounting System.

Current Support

For *Computerized Accounting System* users, there were five questions designed to measure the composition of the support group. These questions were *...currently receive continuing support* (B-13), *...last 10 source(s) of CAS support* (B-14), *...where to go if need Computerized Accounting System help* (B-15), *...rating of satisfaction with support group* (B-17), and *...rating of effectiveness of support group* (B-19). Because each question measured different aspects of support, the results were transformed to a binary measure for each support group (1=support, 0=no support). This treatment resulted in a reliability score of .94.

Based on follow up conversations with some respondents it appeared that B-14 was confusing. A reliability measure of .93 was obtained on the other four questions. As there were several comments about the length of the questionnaire, it was decided to drop B-14 from the final questionnaire, resulting in a shorter questionnaire and only a minor reduction on reliability.

SECTION C: FINAL SURVEYS - SCALE RELIABILITIES

5.4 GENERAL

Although full details of the full study are provided in the next chapter, the reliability scores for the various measures are summarized in Table 2 found at the end of this chapter. For the Perceived Characteristics of Innovation variables, all 75 respondents are included. For the scales measuring Innovativeness and client Computerized Accounting System support,

only the 53 Computerized Accounting System user questionnaires were included, as the 22 non-Computerized Accounting System user questionnaires did not capture any of this information.

5.5 RESULTS

As shown in Table 2, all of the results are above the minimum .70 except for *Result Demonstrability* (.43), and *Voluntariness* (.69). The reliability scores generally indicate that the modifications made in the Pilot study achieved their intended purpose, to produce a questionnaire with acceptable reliability scores. The implications of these results, including *Result Demonstrability*, will be looked at in more detail in the next chapter. It can be concluded that the scales can be used with confidence across different domains (firm size) and different information technology. It was very encouraging to see that the *use frequency* was .97 (Table 2) compared to the pilot study results of .22 (Table 1). This improvement in reliability appears to be a result of the respondents in the final sample interpreting the two questions similarly (pilot study B-5, final study B-4: *How regularly do you now use a CAS?*; pilot study B-11, final study B-9: *I have been using a CAS for ...*), as they were intended to be, while the pilot study group generally interpreted the questions differently. The final reliability results include respondents from both the pilot study and final study.

SECTION D: QUESTIONNAIRE DESIGN

5.6 GENERAL

The original intention was to follow closely the design and layout used by Moore. This approach was considered the most appropriate as Moore's questionnaire design was based on the *Total Design Method* which had been designed and tested by Dillman (1978). This method was reported to have resulted in very high response rates. There were some variations from Moore's approach that were adopted due to a variety of reasons. These are discussed later in this section.

5.7 FORMAT

5.7.1 PAMPHLET

The questionnaire was set up in booklet format, with coloured pages separating the major sections of the questionnaire. A covering letter from UBC was also attached to the front of the questionnaire. Moore had chosen this format in order to improve the overall appearance of the questionnaire in an attempt to make it appear more professional and worthy of a good response (Moore, 1989).

After presenting a copy of the questionnaire to the Partners in one of the accounting firms participating in the study, and discussing the possible distribution of a similar questionnaire to their client base, it was determined that some changes would have to be made. The Partners considered the questionnaire too long in appearance and that many of their clients would simply not fill it out, even though the covering letter stated that not all of the questionnaire was to be filled out. It was decided to split the questionnaire into two parts, one part for Computerized Accounting System users and one for non-Computerized Accounting System users. This approach was used for a number of reasons. First, it was expected that there would be differences between Computerized Accounting System users and non-Computerized Accounting System users. Separating the questionnaire based on this consideration was consistent with the objectives of the research. Secondly, the researcher would not have direct access to the client base of participating Accounting firms. Because the Partners or someone knowledgeable in each Accounting firm were to do the distribution to their clients, they would know if the intended recipient was a user or non-user and distribute the appropriate questionnaire. Finally, the questionnaire each potential respondent was to receive would be approximately half the size as originally designed which should enhance willingness to participate. These factors made the splitting of the questionnaire practical and desirable.

5.7.2 QUESTION LAYOUT

The questionnaire layout was organized in a manner that emphasized reduction in the number of pages. This was done by rearranging the appearance of several of the questions so that they were *horizontally oriented* and not *vertically oriented*. This approach was taken because of early feedback received on the apparent length of the questionnaire, even after splitting it into two parts. The Partners used to review the questionnaire were very cognizant of how their clients would respond to lengthy questionnaires.

Instructions on how to answer questions were placed at the start of each section. Additionally, embedded in each question were instructions on how to answer that specific question. At the end of each section encouragement was provided to complete the remaining part(s) of the questionnaire.

5.7.3 COVERING LETTER

Two covering letters were prepared for distribution with each questionnaire. One was printed on UBC letterhead and explained the purpose of the research as well as the confidentiality of the replies received. The second letter was prepared on the letterhead of the participating accounting firm and explained that the firm was not sponsoring the study but believed the results would be useful. Encouragement to participate and confidentiality were stressed in this letter also.

Both of these covering letters (see Appendix II-B) were designed after extensive consultation with Partners from different accounting firms and with the thesis supervisor. It was emphasized to the Partners that the wording of the second covering letter (the accounting firm letter) was a suggestion only and that they were free to make changes as they chose. The rationale behind this approach was to win Partner support for helping out in the survey by allowing them to participate in the design of a part of the questionnaire (the covering letter) and to present to the client a package that would encourage them to participate in the study.

CHAPTER 6: DATA COLLECTION AND ANALYSIS

SECTION A: DATA COLLECTION AND CONDITIONING

6.1 INTRODUCTION

This chapter will present the data collection and analysis on the final versions of the questionnaires used in this study. The reasoning behind the sample selection, the data integrity checks performed, the statistical analysis and results will be discussed in some detail. Before proceeding with this discussion a brief summary of the goals for this study are presented.

The prime objective of this study is to establish the role that public accountants play in the introduction and adoption of information technology in small businesses. This type of information is vital, as several research studies have shown that public accountants are not getting the message out, to their members and to the small business community, that accountants are skilled information technology specialists (see Hamilton, 1989; Batch, 1989). As part of this analysis, the Diffusion of Information Technology model developed by Moore will be examined in a Small Business setting, using Computerized Accounting System as the information technology of interest. This will be done in order to evaluate whether (i) the *Diffusion of Information Technology* model is generalizable across firm size and (ii) different information technologies than those examined by Moore when developing this model. Recall that the major differences between a Computerized Accounting System and Personal Work Station are that the use of a Computerized Accounting System is usually an organizational decision, and a Computerized Accounting System supports the accounting function primarily, whereas the use of a Personal Work Station is often a personal decision and a Personal Work Station may encompass any functional area in an organization.

6.2 SURVEY SAMPLE

6.2.1 TARGET POPULATION SELECTION

The target population is the client base of public practice accounting firms. Most small businesses use a public accountant for tax purposes or for preparation of financial statements.

However, not all firms decide to use a public accountant. There may be differences between firms who use public accountants and those who don't.²

The sample is drawn from the client lists of public accounting firms (CA and CGA). A convenience sample of small to medium size accounting firms in southwestern B.C. were contacted to elicit interest in the study as these accounting firms were the most likely to have large numbers of small business clients. Due to the method of selecting the sample certain biases may have been introduced that may affect the generalizability of the results.

A potential regional bias may restrict the generalizability of the results to the rest of the province or outside of B.C. A regional bias may exist due to possible differences in individuals' attitudes towards adoption of information technology, in southwestern B.C., relative to the rest of Canada. Because the Diffusion of Information Technology model measures individuals' attitudes, any bias would affect the results. Other regional biases may exist at the firm level as southwestern B.C. may have a larger than average number of small businesses concentrated in specific industries. These industries could have their own peculiar rate of adoption, independent of an individual's propensity to adopt. Also, there could be a bias between small businesses in large cities and small cities. Additional regional bias could be introduced at the public accounting firm level. B.C. public accounting firms could have different levels of knowledge or initiative towards introducing information technology to their clients.

These potential biases inherent in this study should not greatly affect the objectives of this study (i.e. generalizability). One objective of this study is to provide a predictive instrument that can be used to help small firms successfully introduce an information technology such as a Computerized Accounting System. This objective would be met by successfully replicating Moore's results. The Diffusion of Information Technology model should work as successfully in B.C. as any other province; therefore regional biases should not

²Although there is no reliable information on the number of firms that don't use public accounting firms, this number is generally accepted to be small. Firms that fall into this category include inactive or nearly inactive companies. The inclusion of these firms in the study would cause misleading results as IT is not likely to be a priority with low activity firms. Public accounting firms are not likely to be interested in inactive businesses either, as these firms are not likely to become clients nor pay their accounting fees.

be an issue. Also, members of public accounting firms (CA and CGA) must all take Canada wide exams as well as continuing Professional Development courses. All of these professionals will have a similar educational exposure to information technology which should help reduce regional differences amongst public accounting firms level of knowledge about Computerized Accounting System.

Data collection involved the use of survey instruments, with data analysis performed on self-reported data. Directed interviews were considered as a multi-method approach is considered appropriate for generating more assurance on the validity of the findings. However, the multi-method approach proved to not be feasible and the directed interview approach was abandoned.

6.2.2 PROBLEMS ENCOUNTERED

No different than any other research project, this one had its share of problems from the onset. Due to the volume and variety of problems encountered it was considered justifiable to devote a separate section discussing these problems and their impact on the study.

The sample size of directed interviews could not be increased beyond five or six due to the promise of confidentiality made to all participants, especially clients. At one point, arrangements were made with selected accounting firm personnel for follow up interviews, but conditions in the working world interfered with the follow up process to a point where the whole process was abandoned. Initially, a couple of key people went on two to three week holidays shortly after agreeing to be interviewed. When they returned it was considered that too long a time period had elapsed to put confidence in their responses. Additionally, some participating accounting firms (along with participating personnel) decided to back out of their commitments. It was too late to recruit new participants as the remaining accounting firms had already distributed questionnaires to their personnel and clients.

Coupled with the problems of holidays and attrition of participating accounting firms, an untimely mail strike hampered data collection efforts severely. It appears that many questionnaires that were delivered to clients during this time were either not filled out or

mailed in. As no facility to follow up on non respondents was available, these lost respondents could not be recovered. Also, by the time the strike was over, the participating accounting firms had entered the start of their busy season and distribution of questionnaires was given low priority. Regaining the initial enthusiasm exhibited by participating accounting firms proved to be difficult. Data collection became a tedious task as researcher phone calls would often not be returned and promised actions would not be delivered.

6.2.3 RESPONSE RATES

A total of 283 questionnaires were distributed to accounting firms and other contact people for distribution. Of these, 120 were returned by contacts who had decided to end participation in the survey, resulting in a total of 163 questionnaires being distributed to various clients. A total of 56 usable questionnaires were returned (no breakdown is available on how many client firms responded) resulting in a response rate of 34%. This response rate was lower than expected. A higher response rate was expected as the contact people had agreed to solicit agreement to participate from their clients *before distributing* the questionnaires. Based on follow up discussions with some of these contacts it appears that some firms sent the questionnaires out without consulting with the clients, while others contacted the clients first and then sent out the questionnaires. It also seems that some clients did not fill out the questionnaires even though they had told their contact that they would. Additionally, some contacts may not have distributed all of the questionnaires allocated to them. This lower than expected response rate resulted in a change in approach to analysing the Diffusion of Information Technology model by using *PLS* instead of *LISREL*. It was decided that the 19 responses from the pilot study would be included in the data analysis in order to have enough questionnaires to use *PLS*. All results reported for the final survey, including reliability results, included the pilot questionnaires. The pilot questionnaires were included as there were only minor differences in the two questionnaires for the research issues in question.

A convenience sample of clients of B.C. public accounting firms was used due to various constraints. Face to face contact with individuals of the participating public

accounting firms (and with selected clients) was required for purposes of cultivating interest in the study and to overcome potential concerns about confidentiality of the client data base.

Questionnaires were sent to both Computerized Accounting System users and non-Computerized Accounting System users. It is important to include non-Computerized Accounting System users as it has been pointed out that one should not leave out the "zero value" or control group when exploring the effects of an intervention (Attewell, 1989). The intervention being controlled for in this case, the Computerized Accounting System, is consistent with Moore's approach. However, it is difficult to control for the intervention of the public accountant by acquiring data from firms who do not use accountants for any reason. As discussed earlier, these firms may not exist or would be extremely difficult to locate. Due to these limitations, any results obtained for the validation of Moores' model can only be generalized to firms that use Public Accountants. This limitation to the scope of generalizability is not severe, as it has been previously mentioned that most firms use Public Accountants.

An initial sample size goal of 200-300 responses was set in order to accommodate the objective of testing Moore's Diffusion of Information Technology model using *LISREL*. However, as stated earlier, several unexpected problems arose that dramatically reduced the number of questionnaires that could be expected to be returned. As a result of these data collection problems it was decided to use *PLS* instead of *LISREL* as *PLS* is widely considered an acceptable alternative to *LISREL* (Barclay et al, 1991).

6.3 CLIENT FIRM'S SURVEY

The results from the full study indicated general reliability support for the scales used to describe the variables in Moore's Diffusion of Information Technology model. All of the Perceived Characteristics of Innovating variables had reliability scores at the .70 level and higher except for *Result Demonstrability*, which dropped from a reliability score of .62 in the pilot study (Table 1) to a reliability score of .43 in the actual survey (Table 2), and *Voluntariness* which scored .69 (Table 2) dropping from .74 (Table 1). Except for *Result*

Demonstrability, the reliability results (Table 3) are comparable to those obtained by Moore (Table 4). The reliability scores would likely increase with a higher response rate.

6.3.1 RESULT DEMONSTRABILITY

Moore used the following definition for *Result Demonstrability*, proposed by Zaltman: "The more amenable to demonstration the innovation is, the more visible its advantages are, the more likely it is to be adopted" (Moore, 1989, pp. 110).

The reliability score of .43 (Table 2) for *Result Demonstrability* is considerably lower than Moore's result of .79 (Table 4). This result could reflect a difference between sample domains (firm size) or result from use of a subset (3 questions) of the 4 questions used to originally define this Perceived Characteristics of Innovating variable. A closer look at the responses of non-Computerized Accounting System users indicates that the majority of these individuals perform non-accounting tasks. This visual analysis is substantiated by Mann-Whitney tests, which confirm that there is a statistical difference between Computerized Accounting System users and non-users for *Result Demonstrability* (discussed later in this chapter, also see Table 7(b)). Additional reliability figures were obtained by obtaining a breakdown between Computerized Accounting System users and non-users. *Result Demonstrability* reliability improves to .71 (Table 3) when Computerized Accounting System user data only is used. A graph of *Result Demonstrability* non-Computerized Accounting System users was generated to determine why no reliability figure could be calculated for this variable. Inspection of this graph (Figure 5) shows that the three scales used to measure *Result Demonstrability* (U15, U23, and U33) received very inconsistent responses. Normally, a graph with scales that are highly reliable would have the scores for each scale moving in the same direction for each response. The graph in Figure 5 shows that the scores for each scale move in opposite directions for each response, in most cases.

Further inspection of Table 3 indicates that no other variable showed an obvious similar variability in responses by non-Computerized Accounting System users, although Voluntariness ($\alpha=.43$) indicated that non-users did appear to have some difficulty with

this measure also.

It is not clear why non-users would record responses that were as inconsistent as those observed for *Result Demonstrability* (and possibly *Voluntariness*).

6.4 CONDITIONING THE DATA

6.4.1 GENERAL

Before the data could be analysed, several steps were required to ensure that the results would be meaningful. These include checking the data for accuracy, dealing with missing data, and dealing with outliers. These are discussed below.

6.4.2 ACCURACY OF INPUT DATA

The data was originally input into a spreadsheet program by the researcher, who then rechecked large sections of each questionnaire. A printed copy of the input was then compared to the original questionnaire by two independent persons (the data checkers). Differences between the two were noted by each data checker on the print-out. The researcher then compared the items identified as being incorrect to the corresponding questionnaire and made appropriate corrections to the spreadsheet. Very few errors were detected by the data checkers. With a relatively small sample it is unlikely that there would be many undetected errors. After these error checking steps the accuracy of the data was considered to be very high.

6.4.3 MISSING DATA

Due to the variety in the types of questions, it was not possible to adopt one global approach in treating the data for missing values. Questionnaires that were missing data for large sections of the questionnaire were not used at all (there were 2 of these). Multi-item scales, such as those used to *define* a Perceived Characteristics of Innovating variable, would have the scale mean inserted if only one item was missing, otherwise the item was coded as missing.

6.4.4 OUTLIERS AND SKEWNESS

Typical regression analysis assumes normal distribution of the data. Outliers (data with extreme values) can unduly influence regression results due to their effect on the regression equation. The regression equations of interest in this study are those relating to the Diffusion of Information Technology model. Data relating to Perceived Characteristics of Innovating variables and Subjective Norm variables were reviewed for obvious *nonsensical* responses. One questionnaire was rejected as all Perceived Characteristics of Innovating questions were marked *neutral* (4 on a 7 point interval scale) indicating the respondent had not taken time to understand or read the questions. Descriptive statistics were also reviewed to determine if there were any other cases of outliers. Except for the *non-user* responses to *Result Demonstrability* (discussed in a previous section), no others were found.

A search for skewness is usually done to determine if the data distribution is normal as well as whether there may be more outliers. Moore found that his data was generally skewed but that transformations were not practical due to the design of the questionnaire (Moore, 1989). Transforming his data did not provide results different from the original data (Moore, 1989). Given the small sample size and the relatively large impact removing any questionnaires could have, whether they were outliers or not, it was determined that there would be little benefit in performing skewness tests.

It should be noted that normal distribution is an underlying assumption of regression analysis and for *LISREL*. However, *PLS* does not assume data is multivariate normal (Barclay et al, 1991).

6.4.5 NON-LINEARITY AND HOMOSCEDASTICITY

An examination of scattergrams is used to reveal if the relationship between two variables show *linearity* (straight line) and *homoscedasticity* (variability in scores are approximately equivalent for all values of the two variables). Both of these, revealed by the presence of an oval shaped scattergram, are required assumptions for multivariate regression.

Scattergrams were produced for the variables of interest and no significant violations of these two assumptions were detected. Thus the data appeared to be of good quality for further analysis. The accuracy was found to be high and missing data was minimal.

SECTION B: DESCRIPTIVE STATISTICS

6.5 GENERAL

As well as the demographic data generated (Table 5), various descriptive statistics were generated for the research variables including the mean, standard deviation, and maximum and minimum reported values. These are summarized in Table 6. A comparison of Computerized Accounting System users vs. non-Computerized Accounting System users is provided in Table 7(a) and 7(b), including *Mann-Whitney U* test results. These results will be discussed in detail later in this chapter. The Mann-Whitney U test is used to determine if there are differences between Computerized Accounting System users and non-Computerized Accounting System users. The Mann-Whitney (M-W) test is used in order to avoid relying upon the t-test and its assumptions (normal distribution). The M-W test is a conservative test. This test was also used by Moore as part of his data analysis. Regression analysis results on the variables of interest are provided in Table 8 through Table 11. Regression results are discussed in the following sections.

General comparisons will be made to Moore's study, based on whether the results support the hypothesis that is being tested. Specific numerical comparisons will be made to Moore's study where the results from this study differ from Moore's. A summary of results from hypothesis testing for this study can be found in Table 13(a), and for Moore's study in Table 13(b).

References to question numbers will refer to the final questionnaire (Appendix II-A1) unless otherwise noted.

6.6 DEMOGRAPHICS

Demographic data is summarized in Table 5 with Adjusted Frequency figures used (these are corrected for missing data). The general categories reported on include Department of Employment; Organization Level; Education; Age; and Sex. Where relevant, comparisons are made to Moore's survey.

The main focus of the data gathering effort was the accounting/finance function. A total of 51.5% of respondents were engaged full time in the accounting area. The remaining 48.5% were distributed throughout other departments, including Administration (19%) and Other (29%) - "Other" consisted of areas not falling into Accounting or Administration. In many small and medium size firms, the concept of "department" is not well developed, resulting in difficulty classifying many of the respondents.

Over 54% of respondents operated at Supervisory or higher levels of management. Another 23% were from specialized positions (Professional/Technical). The remaining 23% of respondents were at the clerical level. This response rate seems to indicate that the targeted individuals in the client firms were reached.

There is a surprisingly high level of respondents that did not obtain education beyond high school (18%) while another 10% received some training from a trade school. The remaining 72% received some College/University education, including 8% with Postgraduate degrees. [From Moore: High School=12%; Trade School=19%; College/University=69%; Postgraduate=18%]. It appears that for small/medium sized firms that the level of education is not as important as it is for larger firms.

The majority of respondents are under 30 (39%), followed by 30-39 (36%); 40-49 (19%); and 50+ (6%). These differ from Moore's considerably [Under 30=16%; 30-39=45%; 40-49=27%; 50+=12%]. It would be dangerous to generalize to any large extent as the methods of gathering the above information differ and may cause the perceived differences noted (ie. Moore had respondents gathered into a room to fill out the questionnaire, some potential respondents may have had to stay behind to "run the shop" and these may have been the younger employees). However, there appear to be definite differences in the age groups of

employees working in smaller firms.

The SEX profile is also in sharp contrast to Moore's study. This study had 33% male respondents and 67% female, while Moore had 63% males and 37% females respond. Again, definite differences in smaller firms. The smaller sample size in this study may contribute to some of this difference.

The overall demographic profile of this study indicates sharp differences from Moore's survey. Respondents are generally younger, more likely to be female, and have less formal education than in larger firms. These findings generally support earlier studies (discussed in Chapter 2) on demographic characteristics of people employed in small to medium sized firms.

6.7 ATTITUDE TOWARDS INNOVATING

The dependent variable *Attitude* was generated from a four item semantic differential scale (good-bad; harmful-beneficial; wise-foolish; and negative-positive) in response to the question *Overall, my using a CAS in my job is ...* (B-1). Various descriptive statistics were gathered on *Attitude*. These statistics are based on all 75 questionnaires. On a seven point scale (1=most positive, 7=most pessimistic) an overall average of 2.2 (Table 6(a)) indicates that attitudes are generally quite positive towards the Computerized Accounting System. Results of M-W tests on *Attitude* were also generated (Table 7(b)) and show that there is a significant difference ($M-W = -3.7, p=.000$) between Computerized Accounting System users (mean = 1.8) and non-users (mean = 3.3). These M-W results provide a method of determining to what extent the overall mean of 2.2 is influenced by users and non-users. The descriptive statistics results in general, and M-W results for *users* specifically, indicate support for H_1 [*One's attitude towards using Computerized Accounting Systems will influence one's innovativeness with respect to Computerized Accounting System usage*]. The claim for support of H_1 is based on the assertion that the more positive the attitude the more a *Computerized Accounting System* will be used. Since users (ie. people who are innovative) have more positive attitudes than non-users (ie. non-innovative people), the hypothesis is supported. This is similar to Moore's findings.

6.8 PERCEIVED CHARACTERISTICS OF INNOVATING

Perceived Characteristics of Innovating scales were recorded so that higher numbers reflected a higher degree of agreement with the perception associated with that variable. All of the Perceived Characteristics of Innovating variables except for *Voluntariness* (3.1) had a mean score of 4 (neutral) or higher (Table 6(a)). The most positive Perceived Characteristics of Innovating variables are *Relative Advantage* (5.50), *Compatibility* (5.43), and *Result Demonstrability* (5.19).

Based on the M-W test, all of the Perceived Characteristics of Innovating variables are significantly different between Computerized Accounting System users and non-users at the $p \leq .05$ level (Table 7(b)) except Ease of Use (.14). All of Moore's Perceived Characteristics of Innovating variables were significantly different at $p \leq .05$. The uniformity of scores for the variable Ease of Use amongst all small/medium firm respondents may be a result of the closer working relationship amongst users and non-users contributing to common opinions about Computerized Accounting Systems. There is support for H_2 [*Relative Advantage will have a contribution more than any other Perceived Characteristics of Innovating on one's attitude towards adopting Computerized Accounting Systems*] based on the Mean Scores descriptives (Table 6(a)) and the M-W scores (USERS column, Table (7(b))) . As *Result Demonstrability* (-5.59) and *Compatibility* (-4.86) have higher U-test z-scores than *Relative Advantage* (-4.81) (Table 7(b)) only moderate support to H_2 is provided as *Relative Advantage* is expected to have the highest z-score. These findings are the same as Moore's.

Voluntariness is measured on a ranking scale (from 1 to 7) in a manner similar to the method used for *Perceived Characteristics of Innovating*, with higher scores indicating a more positive response. As discussed previously in this section, *Voluntariness* had a mean score of 3.13 (Table 6(a)), which indicates a more unfavorable (negative) response than the seven *Perceived Characteristics of Innovating* variables. The M-W test (Table 7(b)) shows that Computerized Accounting System users means (2.72) are significantly lower than non-Computerized Accounting System users means (4.13), indicating support for H_6

[*Voluntariness is negatively related to one's innovativeness with respect to Computerized Accounting System usage*]. This finding is the same as Moore's.

6.9 SUBJECTIVE NORMS

Values for *Subjective Norm* scores were calculated by multiplying the Normative Belief (ranging from 1 to 7) by the Motivation to Comply (ranging from -3 to +3). The range of scores could vary from -21 to +21. The mean scores reported in this study (Table 6(a)) are mixed and range near zero which is neutral (-2.8 to 1.5). Moore's ranged from 1.7 to 7.3.

Based on the M-W tests (Table 7(b)), the only significant differences between Computerized Accounting System users and non-Computerized Accounting System users, at $p \leq .05$, arise from *Senior Management* (.019) and *Subordinates* (.003). In general, H_4 [*The Subjective Norm will influence one's innovativeness with respect to Computerized Accounting System usage*] is not supported. This differs from Moore's study where H_4 was supported (all of Moore's Subjective Norm variables showed significant differences between users and non-users). These M-W results are quite different from Moore's and again seem to indicate differences between large and small firms. In smaller offices, employees are more likely to interact with people in other functional areas (cross-pollination of ideas) and the influence of reference groups would be more uniform. Large firms would likely have less uniform opinions about reference groups due to the lack of interaction with people in other functional areas.

6.10 INNOVATIVENESS MEASURES

Innovativeness was previously discussed in chapter 5. The item *usage*, the surrogate for *adoption*, was measured in four different ways: months since first use of Computerized Accounting System, hours of use, frequency of use, and number of functions used. Descriptive statistics for each of these measures can be found in Table 6(b). Because Innovativeness information was only gathered for *Computerized Accounting System users*, M-W tests could not be run on Innovativeness variables and *N/A* appears for the boxes where statistics are not applicable in Table 7(b). As a result of this data gathering approach, mean scores reported in

Table 6(b) and Table 7(b) for all Innovativeness variables are identical.

The Innovative measure *Months elapsed since Computerized Accounting System adoption* was calculated by taking the average of the two measures *time of first CAS use* (B-3) and *CAS use by function, in months* (B-6(b)). An average of 56 months (Table 7(b)) was calculated. This is approximately 4 3/4 years and is higher than Moore's 40.3 month average (3 1/3 years). The reasons for this difference are not readily apparent. Traditionally it has been held that larger firms adopt information technology before smaller firms. Perhaps the particular information technology of interest, Computerized Accounting Systems, diffuse earlier than the other Personal Work Station items that Moore examined. It should be noted that no statistical tests were done to determine if the values for both studies were significantly different. If such tests were run it is possible that they could show no statistical difference in adoption periods between the two studies.

Hours of use of Computerized Accounting System per week is calculated by using a single question which asked *how many hours per week each CAS function was used* (B-6(a)). The hours for each application were summed for each Computerized Accounting System user and an overall average was calculated from the total hours calculated, for all Computerized Accounting System users. An average of 21.6 hours per week (Table 7(b)) is more than the 15.9 hours reported by Moore. This average indicates that accounting/finance employees spend a good deal of their time with Computerized Accounting System. No statistical tests were performed to determine if the values for both studies were significantly different.

Frequency of Computerized Accounting System use is calculated in two ways. In the first method, a general frequency of use is calculated by taking an average of the results for the two questions which ask *how long the CAS user has been using the CAS* (B-4 and B-9) as these two items ask the same question. Both items consist of a seven point scale, and an average of 6 (about once per day, Table 7(b)) was calculated. In the second method, frequency values for a question that asked for frequency of use by function (B-5), were obtained by summing the coded values from a seven point scale (1=not at all, 4=about once per week, 7=more than once per day), for each of the eight applications. Ranges of values for

an individual Computerized Accounting System user could vary from 8³ (didn't use any Computerized Accounting System applications) to 56 (used all eight applications more than once per day). An average value of 27.8 functions was calculated using the second method. This was lower than Moore's result of 35; however Moore's Personal Work Station listed 12 functions to the 8 Computerized Accounting System items identified in this study. As noted in the footnote, the average value reported in this study may be understated as well. No statistical tests were performed to determine if the values for both studies were significantly different.

The *number of functions used* is calculated by averaging the responses to the questions asking the *frequency of use by function* (B-5), *how many hours per week each CAS function was used* (B-6(a)), and *how many months each CAS function was used* (B-6(b)). Theoretically, if one of these questions received an answer then all three questions should have had an answer. Each question was coded a zero (0) for no response or a one (1) for a response. By averaging the responses to each function for the three questions, effects from missing data was likely to be minimized. An average of 4.5 Computerized Accounting System functions (Table 7(b)) are used, compared to 5.9 Personal Work Station functions for Moore. There is a higher proportion of Computerized Accounting System functions used (4.5/8) than Personal Work Station functions used (5.9/12). It is not clear if this difference is due to the selection of functions. The Computerized Accounting System functions are basically a subset of the Personal Work Station functions and the most popular functions may have been chosen. Alternatively, the nature of the task, accounting, may contribute to heavier use of information technology. No statistical tests were performed to determine if the values for both studies were significantly different.

There were no specific hypotheses associated with Innovativeness.

³Respondents tended to only fill in part of the question, creating a potential "missing data" problem. The method chosen to record the responses resulted in a "Minimum Score" of 4 instead of the theoretical 8 discussed. This approach may result in understated Frequency of use results.

6.11 COMPUTERIZED ACCOUNTING SYSTEM SUPPORT

This area was not explored by Moore, therefore no comparative statistics are available. The statistics in Table 7(b) are for Computerized Accounting System users only, as no data is available from non-Computerized Accounting System users, therefore N/A appears in the other columns. Mean scores tabulated in Table 6(b) are identical to those in Table 7(b), as no data from non-Computerized Accounting System users was gathered for *Computerized Accounting System Support*. Scores are tabulated on a seven point scale (1=not at all, 4=once per week, 7=more than once per day). All four sources of Computerized Accounting System Support range from 2.2 to 2.6 (2=less than once per month, 3=about 1-3 times per month). This suggests that there is generally not very much reliance on the Support Group. Also, no one group appears to be more dominant than any other. These results do not support the following hypothesis: H_8 [*The involvement of a Support Group will contribute to a successful adoption of a Computerized Accounting System*]; H_9 [*The involvement of a Friend will contribute to a successful Computerized Accounting System*]; H_{10} [*The involvement of other Employees will contribute to a successful Computerized Accounting System*]; H_{11} [*The involvement of an external Accountant will contribute to a successful Computerized Accounting System*]; and H_{12} [*The involvement of an external Consultant will contribute to a successful Computerized Accounting System*].

SECTION C: REGRESSION ANALYSIS

6.12 GENERAL

Moore's research hypotheses and *Diffusion of Information Technology* model, as well as *Computerized Accounting System Support*, were tested using multiple regression and *PLS*. This was done by examining the effects of the different independent variables (*Perceived Characteristics of Innovating, Voluntariness, Attitude, Subjective Norm, and Computerized Accounting System Support*) on each of the *Innovativeness* measures. The results are discussed in this section. *PLS* results are discussed in the next section.

6.13 THE EFFECT OF PERCEIVED CHARACTERISTICS OF INNOVATIVENESS AND VOLUNTARINESS ON ATTITUDE

The initial regression model analysed was the seven Perceived Characteristics of Innovating variables and *Voluntariness* on *Attitude*. The procedure followed paralleled that of Moore (1989). A STEPWISE regression was run, with the F-value probability set at $p \leq .05$ for entry and $p > .10$ for removal of a variable once in the equation. Following this regression, a second regression was run where all variables were forced into the equation in the same order as the STEPWISE regression. The end result of the forced entry procedure is to produce a regression with all variables in the equation, but the stepped entry allows the direct contribution of each variable to R^2 to be examined.

The regression results on the full equation provide an $R^2 = .776$ and an adjusted $R^2 = .749$ (Table 8), indicating that the Perceived Characteristics of Innovating variables are significant in the formation on *Attitude* towards using computerized accounting systems. The regression results indicate that the various Perceived Characteristics of Innovating variables have different effects on *Attitude*. Only *Relative Advantage* is highly significant ($p = .00$, $R^2 = .73$). Visibility ($p = .04$, incremental $R^2 = .03$ [$= .76 - .73$]) is marginally significant. None of the other variables contribute to R^2 in any meaningful way. These results are summarized in Table 8 where part *I* lists the results for the forced step regression and part *II* lists the results for the regression on the full equation. [Moore's study had an adjusted $R^2 = .677$, and more of the Perceived Characteristics of Innovating variables were significant].

The regression results support H_2 [*Relative Advantage will have a contribution more than any other Perceived Characteristics of Innovation on one's attitude towards adopting Computerized Accounting Systems*], as *Relative Advantage's* contribution to $R^2 = .73$ while the full equation had an $R^2 = .78$. This result was similar to Moore's.

There was no support for H_7 [*Voluntariness will be negatively related to one's attitude towards using Computerized Accounting Systems*], as *Voluntariness* was not significant. Moore's results showed a negative Beta for *Voluntariness* (which was significant),

and supported *H7*.

Voluntariness results may be affected by the low reliability of non-users responses (Table 3), which was discussed in Chapter 5.

A second regression, including variables for *Perceived Characteristics of Innovating, Voluntariness, and Subjective Norm*, was run on *Attitude*. The purpose of this regression was to examine the influence of Subjective Norm on Attitude. A composite score for Subjective Norm was computed by summing the scores of the individual Subjective Norms for each measure.

The regression results are provided in Table 9, *PCI and SN* column. There is very little change from the results of the regression without Subjective Norm as Subjective Norm is not statistically significant in this regression. Thus *H5 [The Subjective Norm will influence one's attitude toward adopting the Computerized Accounting System]* is not supported. In Moore's study *H5* was supported as Subjective Norm was significant.

The difference in results between this study and Moore's may be due to the differences in sample size as well as sample selection. The individual reference groups comprising the composite Subjective Norm are *Friends, Peers, Superiors, Subordinates* and *Senior Management*. Individual scores for each reference group could range from -21 to 21 (this was discussed in Chapter 5). The composite measure calculated for Subjective Norm will therefore be a neutral value (near zero) if the reference groups are not that important to the respondent or if the scores are extreme on either side of zero. A small sample size may not be able to differentiate between these two possible explanations. A larger sample size would indicate significance, if there was a trend in the scores in the same direction for the reference groups, or if one (or more) reference group was clearly dominant and the remaining group scores were near neutral. A larger sample size would not help if two reference groups with opposite scores were dominant.

Sample selection, and possibly firm size may be a factor as larger firms tend to have established cultures and prevailing opinions on information technology use. Moore's sample

consisted of individuals from six large firms, whereas this study contained responses from many more (smaller) firms, possibly 20 or more. Moore's respondents would likely show a more dominant culture affecting Attitude as, at most, there are six different cultures and possibly less. A dominant culture could emphasize one reference group or combination over another. It would be difficult to determine if Moore's significant results for Subjective Norm are due to the small sample size of large firms or the presence of a corporate culture that is common to large firms. The current study could have up to 20 or more cultures, which may result in no clearly dominant reference group. As no significant results for Subjective Norm were found in this study, there is a likelihood that there is no dominant corporate culture common to small businesses in general.

The current regression involving Subjective Norm does not provide enough information to determine if the hypothesis being tested is being correctly rejected (or accepted).

A further regression was run with *Computerized Accounting System Support, Perceived Characteristics of Innovating, Voluntariness and Subjective Norm on Attitude*. This equation is similar to the previous regression with the addition of Computerized Accounting System Support. The purpose of this regression was to determine the influence of Computerized Accounting System Support on Attitude in order to examine the extensions made to the Diffusion of Information Technology model. This regression was run with Computerized Accounting System Support included as a composite score (individual support groups consisted of *Friend, Employee, Accountant, and Consultant*). The regression results indicated that the composite Computerized Accounting System Support score was not significant in the regression equation ($p=.31$). These results are summarized on *Table 9, PCI, SN & SUPPORT* column. H_{14} [*The involvement of a Support Group will have a positive influence on Attitude*], was not supported.

The regression results on *Support* clearly indicate that this variable has no effect on *Attitude*. This result is unexpected and may be an artifact of the variable *Attitude* (discussed below).

The results of the regressions on *Attitude*, while not as supportive of the Diffusion of Information Technology model as Moore achieved, raise the same issue - the operationalization of *Attitude*. Only *Relative Advantage* ($p=.00$), *Visibility* ($p=.04$) and *Ease of Use* ($p=.10$) at $p\leq .10$ were statistically significant (Table 8). *Relative Advantage* by itself provides an R^2 of .73 while the full equation has an R^2 of .78. The finding that *Attitude* captures *Relative Advantage* and not the Perceived Characteristics of Innovating variables in general, seems convincing and supports Moore's conclusion that this appears to be the case (Moore, 1989). The unexpected lack of significance of Support on Attitude may be a result of the poor operationalization of *Attitude*.

6.14 THE EFFECT OF ATTITUDE, SUBJECTIVE NORM, PERCEIVED CHARACTERISTICS OF INNOVATIVENESS, VOLUNTARINESS AND SUPPORT ON INNOVATIVENESS

6.14.1 GENERAL

Regression analysis was also run on the independent variables and *Innovativeness*. An initial regression used *Attitude*, *Subjective Norm*, and *Voluntariness* as independent variables. An additional independent variable, *Support*, was added in a subsequent regression run to examine the influence of this variable on *Innovativeness*. A different regression on individual *Perceived Characteristics of Innovating* variables and *Subjective Norm* variables was also run. This second regression omitted the intervening variables *Attitude* and the overall *Subjective Norm* measure. Once again *Support* was added in a subsequent run to measure its impact on *Innovativeness*.

6.14.2 ATTITUDE, SUBJECTIVE NORM AND VOLUNTARINESS ON INNOVATIVENESS

Four regressions were run, one for each of the dependent Innovativeness measures (*Number of Functions Used*, *Frequency of Use*, *Months Since Adopted*, and *Hours of Use Per Week*). The dependent variables for each regression run were *Attitude*, *Subjective Norm*

and *Voluntariness*. The results of the regressions, summarized in Table 10(a), will be discussed in the following paragraphs. The regressions were done with all independent variables and each dependent variable entering the equation at once.

Subjective Norm is not significant in any of the regressions. H_4 [*The Subjective Norm will influence one's innovativeness with respect to Computerized Accounting System usage*], is not supported. This is consistent with Moore's findings.

Voluntariness is not significant in any of the regressions, thus rejecting H_7 [*Voluntariness will be negatively related to one's attitude towards using Computerized Accounting System*]. Moore's study supported H_7 for all Innovative measures.

Attitude is significant for all Innovativeness variables, although the betas are all negative, rejecting H_1 [*One's attitude towards using Computerized Accounting Systems will influence one's innovativeness with respect to Computerized Accounting System usage*]. Moore found that *Attitude* was significant for all *Innovativeness* variables and all had positive betas, supporting H_1 .

As *Voluntariness* was not significant for any of the Innovativeness variables, H_6 [*Voluntariness is negatively related to one's innovativeness with respect to Computerized Accounting System usage*], is not supported. Moore's results supported H_6 .

The adjusted R^2 values for the four regression equations range from a low of .193 to a high of .223. The variations in R^2 indicate that the independent variables capture different degrees of the variance in the different forms of innovativeness. This low range of adjusted R^2 values indicate that these independent variables do not explain Innovativeness very well. These results are fairly comparable to Moore's findings.

An additional series of four regressions were run including *Computerized Accounting System Support* as an independent variable in the above regression equation. The results from these regressions are summarized in Table 10(b). The composite Computerized Accounting System Support measure was used in this regression. Computerized Accounting System Support was significant for all Innovativeness variables. This result supports H_8 [*The*

involvement of a Support Group will contribute to a successful adoption of a Computerized Accounting System].

With the addition of Computerized Accounting System Support, the influence of the other independent variables on the various Innovativeness variables changed. With the addition of the Support Group variable (compared to the regressions without the Support Group variable), Voluntariness became significant for Hours ($p=.05$ vs $p=.14$), while Attitude became less significant for all Innovativeness variables [Functions ($p=.04$ vs $p=.00$); Frequency ($p=.05$ vs $p=.00$); Months ($p=.090$ vs $p=.040$); Hours ($p=.11$ vs $p=.00$)]. Thus, the inclusion of Computerized Accounting System Support has weakened the importance of Attitude on Innovativeness (ie. weaker support for H_1). This effect indicates that Computerized Accounting System Support has an influence in the Diffusion of Information Technology model.

6.14.3 PERCEIVED CHARACTERISTICS OF INNOVATING, SUBJECTIVE NORM, AND VOLUNTARINESS ON INNOVATIVENESS

Individual *Perceived Characteristics of Innovating* variables and individual *Subjective Norm* variables were regressed on the dependent Innovativeness variables in order to measure the magnitude of their direct effects on adoptive behaviour. As each individual Perceived Characteristics of Innovating and Subjective Norm measure were expected to have different influences on the dependent variables, STEPWISE regression was used with the probability to enter a variable into the equation set at $p \leq .05$. As in the previous regression runs, *Computerized Accounting System Support* was added as an independent variable to subsequent regression runs. In this case, the individual Support Group measures were used instead of the composite scale in order to examine the influence each scale has on Innovativeness. Regression statistics without Support Group are included in Table 11 (a) and with Support Group in Table 11 (b).

For the regression without Support Group, the Subjective Norm variables were significant only for the Innovativeness variable Number Of Functions Used (Peers $p=.00$, Subordinates $p=.00$) and weakly significant for Frequency of Use (Subordinates $p=.07$). The

overall Subjective Norm results weakly support H_4 [*The Subjective Norm will influence one's innovativeness with respect to Computerized Accounting System usage*]. This result is similar to Moore's where Subjective Norm variables found to be significant were Functions Used and Frequency.

Result Demonstrability is significant for all Innovativeness measures (Functions $p=.00$; Frequency $p=.01$; Months $p=.00$; Hours $p=.03$). Moore had similar results.

Voluntariness is only weakly significant for Months of Use ($p=.07$), thus not supporting H_6 [*Voluntariness is negatively related to one's innovativeness with respect to Computerized Accounting System usage*]. Moore's results supported H_6 for all Innovativeness measures.

Relative Advantage was significant for Functions ($p=.05$), Frequency ($p=.00$) and weakly significant for Months ($p=.06$). Moore's results only found Months significant.

The addition of individual Group Support variables to the regression equations, discussed in the preceeding paragraphs, indicated that these variables did have an affect on Innovativeness. The regression results are summarized in Table 11(b).

Consultant was significant for all Innovativeness variables, [Functions ($p=.00$), Frequency ($p=.00$), Months ($p=.04$) and Hours ($p=.00$)] with all betas positive. This result supports H_{12} [*The involvement of an external Consultant will contribute to a successful Computerized Accounting System*].

Personnel was significant for Functions ($p=.00$) and Frequency ($p=.00$), moderately supporting H_{10} [*The involvement of other Employees will contribute to a successful Computerized Accounting System*].

Accountant was not significant, rejecting H_{11} [*The involvement of an external Accountant will contribute to a successful Computerized Accounting System*].

Friend was not significant, rejecting H_9 [*The involvement of a Friend will contribute to a successful Computerized Accounting System*].

The overall regression results for the equations including Support Group variables provide support for H_8 [*The involvement of a Support Group will contribute to a successful adoption of Computerized Accounting System*].

Voluntariness became more significant for Hours ($p=.01$) than without the presence of Support Group while Visibility became not significant for Hours. There were less *Weakly Significant* variables once Support Group was added to the regression equation.

6.14.4 OTHER REGRESSIONS

A series of regressions of *Support Group*, the independent variable on *Subjective Norm*, *Attitude* and *Perceived Characteristics of Innovating*, as dependent variables, were run. None of these regressions were done by Moore, therefore no comparative statistics are available. The results from these regressions are summarized in Table 12(a) and Table 12(b).

The regression *Support Group* on *Subjective Norm* was suggested by the Fishbein & Ajzen model. One of the links in this model is between *Communications Network* (Support Group in this study) and *Subjective Norm* (see Figure 3). The individual variables of Support Group were regressed against the composite Subjective Norm. Regression results indicated that the individual Support Group variables were not significant and H_{13} [*The involvement of a Support Group will have a positive influence on Subjective Norm*] was not supported.

The regression *Support Group* on the individual *Subjective Norm* variables was then run to see if the composite Subjective Norm was masking its individual components. While Support Group Personnel was the only significant variable, the low adjusted R^2 's and F 's indicate that the relationship between Support Group and Subjective Norm is weak at best.

The regression *Support Group* on *Perceived Characteristics of Innovating* was suggested by both the Fishbein & Ajzen model and Moore's model. The Fishbein & Ajzen model indicate a link between *Communications Network* and *Attitude Towards Adopting*

(Figure 3). Moore's model indicates that *Attitude Towards Adopting* is determined by the *Perceived Characteristics of Innovating* variables (Figure 1).⁴ It seems logical to regress Communications Network (Support Group) on the individual Perceived Characteristics of Innovating variables if they have become a surrogate for Attitude.

Regression of the individual *Support Group* variables were run against the *Perceived Characteristics of Innovating* (individual) dependent variables.

The Support Group variable *Accountant* was significant for Compatibility ($p=.01$), Ease of Use ($p=.03$), Relative Advantage ($p=.00$) and Result Demonstrability ($p=.00$)

The Support Group variable *Consultant* was significant for Visibility ($p=.00$).

The Support Group variable *Friend* was significant for Image ($p=.00$) and Trialability ($p=.02$).

The Support Group variable *Personnel* was significant for Compatibility ($p=.02$).

These results provide general support for H_{15} [*The involvement of a Support Group will have a positive influence on Perceived Characteristics of Innovation variables*].

A regression of *Support Group* on the individual *Innovativeness* variables was run without the presence of other independent variables in order to determine how large an effect the individual Support Group variables have on Innovativeness. The results are summarized in Table 12(b). Consultant and Personnel were both significant for all Innovativeness variables. The adjusted R^2 values and F values are generally high, indicating that Support Group has a significant effect on Innovativeness. The regression results support H_8 [*The involvement of a Support Group will contribute to a successful adoption of computerized accounting system*], H_{10} [*The involvement of other Employees will contribute to a successful computerized accounting system*] and H_{12} [*The involvement of an external Consultant will contribute to a successful computerized accounting system*]. These results were consistent to the earlier regression results reported (Table 11(b)).

⁴As reported in a previous section of this paper, regression results indicated that some of the Perceived Characteristics of Innovating (PCI) variables better represented the concept "Attitude" than did the composite scales designed to represent "Attitude". When Moore used LISREL to test his model, he used these PCI variables to represent the concept "Attitude" instead of the original Attitude scales.

A regression of *Support Group* on *Voluntariness* was run to determine if there was any effect between these variables. The results are summarized in *Table 12(b)*. Personnel ($p=.02$) was the only significant Support Group variable, however the R^2 and F values were fairly low.

The rationale for running this regression was to see if the perception of Voluntariness was influenced by the Support Group. The results do not support this.

SECTION D: PATH MODELING

Since there were some problems with simple regression analysis that caused difficulty interpreting results for the *Diffusion of Information Technology* model for both studies the *Attitude* variables generated may not have captured the construct *Attitude*. It also appeared that the construct *Subjective Norm* (*Subjective Norm*) may not have been appropriately specified, because the regression analysis indicated that individual *Subjective Norm* variables accounted for more variance on the dependent variables than did *Subjective Norm* itself. Additionally, the construct *Innovativeness* could not be generated using normal regression techniques due to the differences in the scales of the *Innovativeness* variables (eg. months vs hours vs functions used). These factors indicated that an alternate method to regression analysis would assist in constructing *Subjective Norm*, *Attitude* and *Innovativeness* from their individual components. One such method is known alternatively as causal modeling (Barclay et al, 1991; Bagozzi, 1982), structural equation modeling (Fornell et al, 1982) or path modeling (Wold, 1985). For convenience the term *path modeling* will be used throughout this paper.

Path modeling utilizes second generation⁵ multivariate analysis techniques in order to obtain statistical information that cannot generally be obtained by first generation statistical techniques (Barclay et al, 1991; Dimnik, 1986). Path modeling is a method of research, and can be used to determine internal consistency, reliability, construct validity, and for hypothesis testing (Bagozzi, 1982). Borrowed from econometrics (path models and manifest variables) and psychometrics (latent variables) (Wold, 1985), all path models have in common the traits of latent variables linked to manifest variables by paths.

6.15 CHOICE OF PATH MODEL COMPUTER IMPLEMENTATION - LISREL vs PLS

The two most common computer implementations of path modeling are *LISREL* and *Partial Least Squares (PLS)*. Both of these programs have their strengths and weaknesses for analysing models. The choice of which program to use depends on the stage of theory development being tested and the goals of the researcher. *PLS* is generally used in the early stages of theory development while *LISREL* is better suited to models based on well developed theory. *LISREL* is based on assumptions of multivariate normality in data whereas *PLS* requires no such assumptions. *LISREL* requires large sample sizes while *PLS* can be used with much smaller sample sizes (Barclay et al, 1991).

After analysing the various characteristics of this study it was determined that the use of *PLS* would be most appropriate. This study is examining the *Diffusion of Information Technology* model first developed by Moore. While the theories underlying this model have become established in other fields, the synthesis of Rogers and Fishbein & Ajzen's theories has not been tried before. The applicability of this approach has yet to be firmly established. Additionally, preliminary results from regression analysis indicated that multivariate normality

⁵The term "second generation" is used to denote the use of more sophisticated mathematical models and statistical computer programs. A second generation multivariate technique must meet four requirements (Fornell, C., A Second Generation of Multivariate Analysis Methods, 1982, cited in Barclay et. al., 1991): the technique must 1) analyze multiple criterion and predictor variables; 2) analyze unobservable theoretical variables; 3) analyze errors in measurement; and 4) be applicable in a confirmatory (ie. hypothesis testing) context.

Additionally, "first generation multivariate analysis procedures are special cases of second generation techniques. Multiple regression, multiple discriminant analysis, analysis of variance and covariance, and principal components analysis are all special cases of canonical correlation ... which itself is a special case of PLS ..." (Barclay et. al. 1991, pg. 4).

assumptions may not apply to the data in this sample. Finally, a relatively small sample size was obtained which indicated that the use of *LISREL* would not be feasible.

6.15.1 DESIGN OF PLS PATH MODEL

PLS path models are comprised of *manifest variables* (indicators) and *latent variables* (constructs). The arrangement of manifest variables (*MVs*) and latent variables (*LVs*) determine the framework for the *PLS* model. Each *PLS* model has two sets of equations: one equation describing the path (links) of each *MV* to each *LV* (outer design matrix); the second equation describing the path connecting *LVs* to each other (inner design matrix). The *Diffusion of Information Technology* model, with *MVs* and *LVs* identified, can be seen in Figure 6. This model design is comparable with the *LISREL* model used by Moore (see Figure 3).

The outer design matrix for the *Diffusion of Information Technology* model is illustrated in Figure 6. Latent Variables are linked to Manifest Variables by paths. Paths can flow in either direction (indicated by arrows), depending on the underlying theory supporting the model.

- (1) *LV Subjective Norm* has as its indicators *MVs Supervisors, Peers, Senior Management, Subordinates, Friends and Perceived Voluntariness*. The *MV, Friends*, which was omitted from the Moore's *LISREL* analysis, was included in the *PLS* analysis in order to fully analyse the *Diffusion of Information Technology* model. The *MV* indicator *Perceived Voluntariness* has been included because the regression results indicated a strong interaction with Subjective Norm. The inclusion of this *MV* is consistent with the approach used by Moore.
- (2) *LV Voluntariness* has as its indicator *MV Perceived Voluntariness*.
- (3) *LV Attitude* has as its indicator *MVs, Relative Advantage, Image, Compatibility, Ease of Use, Trialability, Visibility, and Result Demonstrability*. These *MVs* are actually *Perceived Characteristics of Innovating* indicators and not the original indicators derived

for *Attitude*. As discussed in the regression analysis section, the *Perceived Characteristics of Innovating* indicators had a greater direct effect on *Innovativeness* than *Attitude* alone, indicating that *Attitude* had not been operationalized appropriately. As *PLS* uses the related *MVs* to synthesize the *LVs* it was decided that *LV Attitude* could be derived from the *Perceived Characteristics of Innovating* indicators.

- (4) *LV Innovativeness* has as its indicators *MVs Hours, Months, and Functions*. One indicator, *Frequency of Use*, was not included in the model due to the difficulty in interpreting the composite scale. Although Moore's analysis indicated that *MV Functions* and *Frequency* "may be tapping the same dimension of Innovativeness" (Moore, 1989, pg. 186), results from this study indicate that they may actually be tapping different dimensions (see Table 11(a) and Table 11(b), noting the differences between these variables regression results).

The inner design matrix has the path structure indicated in Figure 6. Path links in the inner design are from one Latent Variable to another.

When using standardized scales, path loadings represent correlations (Barclay, 1991). The interpretation of non-standardized loadings are different and depend on the underlying premise of the model as set out by the model builder (Lohmoller, 1984). In the current model the scales are standardized and path loadings between *LVs* and *MVs* represent the relative importance of the composite scale score to the *LV*. The path loadings between *LVs* can also range from zero to one. The higher the loading the more important the relationship/link. Loadings greater than .3 are considered to be acceptable (Chin, 1992).

6.15.2 ANALYSIS OF SAMPLE SIZE REQUIREMENTS

With *PLS*, a more modest sample size than with *LISREL* is used, because the less rigorous statistical assumptions require a minimum sample size of ten times: (1) the number of indicators from the most complex *formative* construct; or, (2) the largest number of predictors

leading to an *endogenous* construct (Barclay et al, 1991). A *formative* construct (or *Latent Variable* in PLS terminology) is an *LV* that is a construction, or composite, of its *MVs* (Barclay et. al., 1991; Lohmoller,1984). [*Reflective* construct's on the other hand are *LVs* with *MVs* that are products or reflect the underlying construct of the *LV* (Barclay et. al., 1991; Lohmoller,1984)]. An *endogenous* construct is an *LV* that is predicted by other *LVs*. The construct for an *LV* that is not predicted by other *LVs* is call an *exogenous* construct.

"The use of small samples ... seems to violate a traditional concern with sample size versus parameters to estimate. PLS can deal with this situation because ... the iterative algorithm behind PLS estimates parameters in only small subsets of a model during any given iteration. The subset estimation process consists of simple and multiple regressions so that the sample required is that which would support the most complex multiple regression encountered." (Barclay et al, 1991, pp. 15).

The determination of whether *MVs* are formative or reflective in regards to their associated *LV* depends on the researchers prior experience with the model and the understanding of the real world situation being studied. If the constructs are not well developed then the *MVs* for that construct are considered formative. For the purposes of PLS analysis of the *Diffusion of Information Technology* model (Figure 6) only the *Subjective Norm* *MVs* will be treated as formative indicators, while *Subjective Norm* and *Communication Network* will be treated as formative in the extended model (Figure 7). The *MV* for the other *LVs* will be treated as reflective indicators.

In Figure 6, *Subjective Norm* and *Voluntariness* are exogenous *LVs*, while *Attitude* and *Innovativeness* are endogenous *LVs*. The largest number of formative indicators is five (*Subjective Norm*) while the endogenous *LV* with the largest number of predictor *LVs* is *Innovativeness* with three (*Subjective Norm*, *Voluntariness*, and *Attitude*). This would indicate a minimum sample size of 50 (10 times the 5 *Subjective Norm* *MVs*).

In Figure 7, *Voluntariness* and *Communications Channel* are exogenous *LVs*, while *Subjective Norm*, *Attitude* and *Innovativeness* are endogenous *LVs*. The largest number of formative indicators is five (*Subjective Norm*) while the endogenous *LV* with the largest number of predictor *LVs* is *Innovativeness* with four (*Communications Channel*, *Subjective Norm*, *Voluntariness*, and *Attitude*). This would indicate a minimum sample size of 50 (10

times the 5 *Subjective Norm* *MVs*).

A sample size of 50 is much less than the sample size of 500-600 Moore required for his initial development of the *Diffusion of Information Technology* model using *LISREL*. The total number of usable questionnaires available for analysis is 75, which exceeds the minimal required sample size.

6.15.3 GOODNESS OF FIT DETERMINATION

The *Diffusion of Information Technology* model illustrated in Figure 6 was assessed by comparing *PLS* statistical results to various reduced versions of this model. This approach was used as *PLS* does not have any single "goodness of fit" measure. Three common diagnostics used for *PLS* analysis are based on root mean square (RMS) covariances. These are Multiple R^2 (R^2), Commuality (H^2), and Redundancy (F^2).

R^2 is the explained variance in the endogenous constructs (*LVs*).

H^2 is the proportion of variance the *MV* have in common with the principal component. This is a predictability measure. Mathematically, H^2 is calculated (Lohmoller, 1984):

$$H^2_n = 1 - SSE_n / SSO_n$$

where SSE is the sum of squared prediction errors;

SSO is the sum of squared observation errors; and

n is the sample size.

F^2 measures the average squared multiple correlation between each endogenous construct and all exogenous constructs. The redundancy is the proportion of the variance that can be predicted by the predictors of the *LV*. This is a test of predictive relevance. Mathematically the formula is similar to Commuality except that it applies to *LVs* whereas Commuality applies to *MVs* (Lohmoller, 1984):

$$F^2_n = 1 - SSE_n / SSO_n$$

Generally, the fit of the inner model is satisfactory if R^2 is high enough; the fit of the outer model is satisfactory if H^2 is high enough; and the fit of the total model is satisfactory if F^2 is high enough (Lohmoller, 1984). Determining if there is a fit or not is clearly a judgement call.

The models which were compared to the full Diffusion of Information Technology model in Figure 6 were determined by eliminating the exogenous *LV* Voluntariness, then both exogenous *LVs* (Voluntariness and Subjective Norm). Finally, a model that eliminated only low scoring Perceived Characteristics of Innovating variables was generated. The same models were run again, this time using only data points from Computerized Accounting System users. One final model was run which extended the model in Figure 6 with the added *LV* Communications Channel (see Figure 7). The results from these comparisons are contained in Table 14.

The Diffusion of Information Technology model was run using *PLS*, with a number of different configurations. The full model shown in Figure 6 was run ($R^2=.18$, $H^2=.53$, $F^2=.11$) and compared to a similar model minus *LV* Voluntariness ($R^2=.13$, $H^2=.46$, $F^2=.06$); minus both Voluntariness and Subjective Norm ($R^2=.14$, $H^2=.28$, $F^2=.04$); minus four Perceived Characteristics of Innovating variables ($R^2=.20$, $H^2=.56$, $F^2=.13$) [Result Demonstrability, Ease of Use, Trialability, and Image, all of which had low individual scores on several indices (path loading values, R^2 , H^2 , F^2)].

The same models were run again, this time using Computerized Accounting System user data only (53 subjects). This set of *PLS* runs was generated because previous SPSS analysis had indicated that there were significant differences between Computerized Accounting System users and non-users for several of the *MVs* (refer to Table 7(b)). While the sample size of 53 was somewhat less than the rule-of-thumb requirement for a minimum sample of 70, it was expected that this would not greatly affect results. Results were not that different from the full data set for the full model ($R^2=.10$, $H^2=.42$, $F^2=.05$); minus *LV* Voluntariness ($R^2=.10$, $H^2=.36$, $F^2=.04$); minus both Voluntariness and Subjective Norm

($R^2=.15$, $H^2=.37$, $F^2=.05$); minus four Perceived Characteristics of Innovating variables ($R^2=.12$, $H^2=.46$, $F^2=.06$) [Result Demonstrability and Image, all of which had low individual scores on several indices (path loading values, R^2 , H^2 , F^2)].

A final *PLS* comparison on the Diffusion of Information Technology model (Figure 6) was made to an extended model which included the *LV* Communications Network (Figure 7). The extended model was included as Communications Channel was shown by regression analysis to have some influence on the other *LVs*. However, the results with the full data set ($R^2=.20$, $H^2=.54$, $F^2=.12$) were similar to the original, full model. Further analysis on individual *LVs* indicated that the extended model increased R^2 s for the *LVs* it loaded on (Subjective Norm = .07; Attitude = .41; and Innovativeness = .34) compared to the original model (Attitude = .28; and Innovativeness = .28; not calculated for Subjective Norm). The differences in the "fit" indicators for the various models are not that large and would probably not be statistically different from the original model. The extended model may have more explanatory power than the original model due to the presence of indirect affects that Communications Channel has on the other *LVs*. The overall small numbers for the fit indicators suggest that the increased explanatory power may also not be statistically significant.

Based on these analysis, no alternative model was shown to be superior (on a qualitative basis) to the original Diffusion of Information Technology model represented in Figure 6. A model with four Perceived Characteristics of Innovating variables removed indicated higher scores on the indices examined, however there were no theoretical grounds for removing these *MVs*. Compared to the original model, an extended model had slightly improved direct explanatory power and additional indirect explanatory power.

6.15.4 ASSESSMENT OF HYPOTHESES TESTING

As no tests for statistical significance between the various models have been done it is not possible to quantitatively evaluate each hypothesis. Qualitative interpretations are possible

however, based on analysis of path loadings and R^2 results. The first seven hypotheses described in Chapter 4 are based on the full model (Figure 6) while the remaining eight hypotheses are based on the extended model (Figure 7). The various hypotheses and conclusions are presented below:

H1 to H7 are analyzed based on the original Diffusion of Information Technology model described in Figure 6 and the extended model described in Figure 7. Based on qualitative analysis the conclusions for some of these hypotheses change depending on which model is used.

H₁: One's attitude towards using Computerized Accounting System will influence one's innovativeness with respect to Computerized Accounting System usage. The hypothesis indicates that a positive coefficient is required to increase innovativeness. For the original model (.624) and the extended model (.440) the path coefficient is positive thus H₁ is supported

H₂: Relative Advantage will have a contribution more than any other Perceived Characteristics of Innovating on one's attitude towards adopting Computerized Accounting Systems. Path loading for *MV* Relative Advantage on *LV* Attitude is the largest for the original model (.9141) and the extended model (.9180), supporting H₂.

H₃: Computer Avoidance will have a contribution less than any other Perceived Characteristics of Innovating on one's attitude towards adopting Computerized Accounting Systems. This hypothesis is not explored in this study.

H₄: The Subjective Norm will influence one's innovativeness with respect to Computerized Accounting System usage. For the original model (-.061) and for the extended model (.056) the path coefficient have a very small loading value indicating no support for H₄,

H₅: The Subjective Norm will influence one's attitude toward adopting the Computerized Accounting System. The original model (.122) and extended model (.053) have very small path coefficients, which indicate no support for H₅.

H₆: Voluntariness is negatively related to one's innovativeness with respect to Computerized Accounting System usage. The path coefficient of for the original model (.324) and for the extended model (.313) indicates rejection of H₆.

H₇: Voluntariness will be negatively related to one's attitude towards using Computerized Accounting Systems. The path coefficient for the original model (-.469) and for the extended model (-.406) indicates that the hypothesis is supported.

H₈ to H₁₅ are based on the extended Diffusion of Information Technology model (see *Figure 7*).

H₈. The involvement of a Support Group will contribute to a successful Computerized Accounting System. A positive path coefficient of .321 (Innovativeness) indicates support for H₈.

Hypothesis H₉-H₁₂ are indirectly tested as they are *MVs* and contribute to the overall Support Group (Communications Channel) *LV* path loading.

H₉. The involvement of a Friend will contribute to a successful Computerized Accounting System. As the path coefficient is small (.0694), this suggests that the hypothesis is not supported.

H₁₀. The involvement of other Employees will contribute to a successful Computerized Accounting System. As the path coefficient of Personnel is positive (.3837), this suggests that the hypothesis is weakly supported as the indirect effect (.3837*.321=.123) is small.

H₁₁. The involvement of an external Accountant will contribute to a successful Computerized Accounting System. As the path coefficient is small and negative (-.0209), this suggests that the hypothesis is not supported.

H₁₂. The involvement of an external Consultant will contribute to a successful Computerized Accounting System. As the path coefficient is large (.7121), this suggests that the hypothesis is supported as the indirect effect (.7121*.321=.229) is moderate.

H₁₃. The involvement of a Support Group will have a positive influence on Subjective Norm. As the path coefficient is .271, this suggests that the hypothesis is supported.

H₁₄. The involvement of a Support Group will have a positive influence on Attitude. As the path coefficient is .381, this suggests that the hypothesis is supported.

H₁₅. The involvement of a Support Group will have a positive influence on Perceived Characteristics of Innovating variables. This hypothesis was tested indirectly using PLS, via following the paths. The indirect score of .350 (.381*.9180) supports the hypothesis.

[These results are summarized in Table 13(a).]

6.16 SUMMARY OF RESULTS: PATH ANALYSIS

Using *PLS* statistical results, it was shown that a reduced alternative model with four *Perceived Characteristics of Innovating* variables removed, provided a marginally (possibly not statistically different) better fit indicators than the original *Diffusion of Information Technology* model. However, the better indicator scores did not appear to be different enough to justify adopting the reduced model. An extended *Diffusion of Information Technology* model, including the *LV* Communications Network, did not provide any better fit indicators than the original model either. Qualitative analysis of individual *LV* and *MV* indicators suggest that improved predictive power may result when using the extended model. The path loadings in both the inner and outer model change to varying degrees when *LV* Communication Channel is added to the original model (compare Figure 6 to Figure 7). The introduction of this *LV* into the model may have removed some of the "noise" from the model which may have previously skewed the loading values. As no statistical analysis has been performed on the changes in loading values, no significance is claimed for the observed minor changes in loading values.

SECTION E: SUMMARY OF DATA ANALYSIS

6.17 GENERAL

Three different techniques were used to analyse the data. The initial analysis included a comparison of the descriptive statistics between users and non-users of computerized accounting system adopters. Next, regression analysis was performed on the data to examine the effect of various independent variables on the dependent variables. Finally, path analysis was used to examine the theoretically derived Diffusion of Information Technology model developed by Moore and compare this model to other versions of this model to determine which model had the best fit to the data.

6.18 SUMMARY OF DESCRIPTIVE STATISTICS

While there were significant differences between Computerized Accounting System users and non-users on several of the variables, there were fairly uniform Subjective Norms by all respondents. Overall, 71% of the sample were identified as Computerized Accounting System users, which indicates that non-users have a large impact on the overall results. The average time elapsed since initial adoption is just under five years. Computerized Accounting Systems are used fairly often, with over 4 computerized accounting system functions being used for 22 hours per week.

6.19 SUMMARY OF HYPOTHESES TESTING

H₁: One's attitude towards using a Computerized Accounting System will influence one's innovativeness with respect to Computerized Accounting System usage.

This hypothesis was supported by descriptive statistics, not supported by regression analysis, and partially supported by *PLS*. Regression analysis indicated that while *Attitude* was significant in the adoption process for all Innovativeness variables, all of the betas were also negative. *PLS* results indicated that the loadings were negative in value for the standard model and positive for the extended model. The confusing *Attitude* results (Table 10(b)) may have been an artifact of the scales used to measure *Attitude*. Substituting the *Perceived Characteristics of Innovating* variables for *Attitude* resulted in significant (positive) *Perceived*

Characteristics of Innovating variables for all *Innovativeness* variables (Table 11(a)).

H₂: Relative Advantage will have a contribution more than any other Perceived Characteristics of Innovating on one's attitude towards adopting computerized accounting system.

This hypothesis was generally supported using all methods. The regression results indicated that *Relative Advantage* was generally the most significant *Perceived Characteristics of Innovating* variable. PLS analysis was mixed with the original model supporting the hypothesis and the extended model rejecting the hypothesis.

H₃: Computer Avoidance will have a contribution less than any other Perceived Characteristics of Innovating on one's attitude towards adopting Computerized Accounting Systems. This hypothesis is not explored in this study.

H₄: The Subjective Norm will influence one's innovativeness with respect to Computerized Accounting System usage.

This hypothesis is only supported by *PLS*.

H₅: The Subjective Norm will influence one's attitude toward adopting the Computerized Accounting System.

This hypothesis is supported only at the *PLS* stage.

H₆: Voluntariness is negatively related to one's innovativeness with respect to Computerized Accounting System usage.

This hypothesis was not supported by any method.

H₇: Voluntariness will be negatively related to one's attitude towards using Computerized Accounting Systems.

This hypothesis was generally not supported, except for the extended model using *PLS*.

H₈: The involvement of a Support Group will contribute to a successful Computerized Accounting System.

This hypothesis was supported by regression and *PLS* analysis.

H₉. The involvement of a Friend will contribute to a successful Computerized Accounting System.

This hypothesis was supported by regression and *PLS* analysis.

H₁₀. The involvement of other Employees will contribute to a successful Computerized Accounting System.

This hypothesis was supported using *PLS* analysis.

H₁₁. The involvement of an external Accountant will contribute to a successful Computerized Accounting System.

This hypothesis was supported using *PLS* analysis.

H₁₂. The involvement of an external Consultant will contribute to a successful Computerized Accounting System.

This hypothesis was supported using regression analysis and *PLS*.

H₁₃. The involvement of a Support Group will have a positive influence on Subjective Norm.

This hypothesis was supported using *PLS* only.

H₁₄. The involvement of a Support Group will have a positive influence on Attitude.

This hypothesis was partially supported by regression analysis and supported by *PLS*.

H₁₅. The involvement of a Support Group will have a positive influence on Perceived Characteristics of Innovating variables.

This hypothesis was not tested using descriptive statistics or *PLS*. It was supported using regression analysis.

These results are summarized in Table 13(b).

CHAPTER 7: CONTRIBUTIONS, IMPLICATIONS AND LIMITATIONS

7.1 INTRODUCTION

There has been much written on the topic of diffusion of innovations and the impact of Information Technology on organizations. While this information may be generally useful, very little of it seems to apply to the small business domain. Research done on large corporations is usually concerned with big business problems and big business solutions. The relevance of these solutions to smaller firms is questionable, as small firms usually have different problems than large firms, or experience large firm problems in ways that are unique to the small business domain. More research addressing real world problems from a small business perspective is required which was the goal of this study.

7.2 SUMMARY OF THE RESEARCH PROCESS

The motivation for this research came, in part from the lack of useful information available to Public Accountants (and other information consultants) on how to prepare their clients for the successful introduction (diffusion) of new Information Technologies. The particular information technology of interest was the Computerized Accounting System. After researching the information system literature it was determined that the most effective tool for obtaining the type of information that information consultants required was from a model on diffusion of information technology developed by Moore.

This study has looked at the diffusion of information technology model first developed by Moore, in order to evaluate its robustness and generalizability to a small business, accounting domain. Quantitative and qualitative analysis were done using general descriptive data, regression analysis, and path analysis. As part of this analysis, the role of the information consultant in the diffusion process was examined.

The major research questions answered are:

1. What role do independent information consultants, such as accounting firms, play in the *Diffusion of Information Technology* process?
2. Is the *Diffusion of Information Technology* model a general model?

Before the first question could be answered, the second question had to be addressed, as the solutions to both are related. In order to determine if the Diffusion of Information Technology was a general model, three different statistical approaches were applied. These included analysing the differences between computerized accounting system users and non-users by general descriptive tests, performing regression analysis of the independent variables on the dependent variables, and finally, applying path analysis using *PLS*.

7.3 THE RESEARCH QUESTIONS ANSWERED

7.3.1 QUESTION TWO

Is the *Diffusion of Information Technology* model a general model?

Results showed overall support for the general model. The role of information consultants was not very significant when applied to the general model but did show some effect on individual components of the model. The answer, therefore, is a qualified "yes". Based on the results of hypotheses testing for H_1 to H_7 (excluding H_3 which was not tested), no individual hypothesis was fully supported across all three statistical tests applied (H_1 received some support using all three methods). However, each hypothesis received either partial support to definite support from at least one of the tests.

The regression results indicated that a larger sample size may have obtained more significant results for some of the variables. What is clear from the results is that there are some statistically significant differences between large firms and small firms. In the large firm study where the Diffusion of Information Technology model was first developed, basically all of the variables were significant and provided support for all of the hypotheses. In this study most of the variables were not significant and at best, moderate support was provided to the

hypotheses. While a larger sample size would make more of the variables significant, it appears that, based on regression results, several variables would probably not become significant.

7.3.2 QUESTION ONE

What role do independent information consultants such as accounting firms play in the *Diffusion of Information Technology* process?

Hypotheses H₈ to H₁₅ directly addressed this question. Statistical analysis indicate that there is a relationship between the presence of outside support and adoption of computerized accounting systems. Regression analysis indicate that the *Computerized Accounting System* Support composite variable is significant for all four Innovativeness variables (number of Functions used, Frequency of use, Months since adopted, and Hours of use per week). The individual CAS Support variables had different levels of significance for each of the Innovativeness variables.

The CAS Support group *Consultant* was significant when regressed on *number of functions used* ($p=.000$), *frequency of use* ($p=.001$), *months since CAS first adopted* ($p=.035$), *hours of use per week* ($p=.000$), and *Visibility* ($p=.001$).

The CAS Support group *Accountant* was significant when regressed on the *Perceived Characteristics of Innovating* variables *Compatibility* ($p=.012$), *Ease of Use* ($p=.026$), *Relative Advantage* ($p=.000$), and *Result Demonstrability* ($p=.000$).

The CAS Support group *Friend* was significant when regressed on the *Perceived Characteristics of Innovating* variables *Image* ($p=.004$) and *Trialability* ($p=.017$).

The CAS Support group *Personnel* was significant when regressed on the *Innovativeness* variables *number of functions used* ($p=.001$) and *frequency of use* ($p=.000$); on the *Perceived Characteristics of Innovating* variable *Compatibility* ($p=.023$); *Voluntariness* ($p=.020$); and on the *Subjective Norm* variables *Friend* ($p=.085$), *Senior Management* ($p=.044$) and *Subordinate* ($p=.042$).

The results indicate that *CAS Support* variables *Information Consultants* and *Personnel* have both a direct and an indirect affect on the *Computerized Accounting System* adoption process. The direct affect can be seen from regression analysis and the indirect affect comes from both regression and path analysis, where the *Perceived Characteristics of Innovating* variables are used to synthesize *Attitude* which has a direct affect on adoption (Innovativeness).

The role of the *Public Accountant* is significant indirectly on *Innovativeness* through its influence on the construct *Attitude*. The Accountant was shown to have significant influence on the *Perceived Characteristics of Innovating* variables *Compatibility*, *Ease of Use*, *Relative Advantage* and *Result Demonstrability*. PLS analysis indicated the direction and magnitude of this influence on *Innovativeness* through the intervening variable *Attitude*.

7.4 CONTRIBUTIONS

This study has shown that the *Diffusion of Information Technology* model can be used across different information technology domains and for large or small organizations. The strength of this model is that once the attitudinal and societal characteristics of information technology adoption are understood, information consultants will have the ability to predict if an *information technology* will be adopted for a given organization. They will also be able to recommend to clients a methodology to maximize the success of the introduction and adoption of an information technology.

The reduced *Diffusion of Information Technology* questionnaire (39 Questions) has sufficient reliability to be used in similar research. This questionnaire captures *Perceived Characteristics of Innovating* variables adequately, but does not capture the construct *Attitude*. Although the development of suitable *Attitude* scales would normally be a recommendation, the use of path analysis programs like PLS to indirectly synthesize this variable suggests that further scale development for *Attitude* may not be warranted.

The inclusion of *Communications Channel* (ie. *Support Group*) as an extension to the *Diffusion of Information Technology* model is an attempt to improve the robustness of this

model. Statistical analysis show that this extension does reveal some interactions in the *Diffusion of Information Technology* model not previously evident. However, the explanatory power of the model has only been modestly improved.

This study will add to the small but growing body of research literature specifically oriented towards smaller organizations. While the *Diffusion of Information Technology* model is generalizable and robust in both large and small business domains, it seems that a subset (in *PLS* terminology) of manifest variables would be more appropriate to the small firm domain. Selection of variables to include in a subset of *MVs* is problematic, given the lack of quantitative analysis using *PLS*.

7.5 LIMITATIONS OF THE STUDY

This study, while providing some interesting results about the information technology adoption process, has some underlying limitations which must be kept in mind.

Sample size is always of some concern, as researchers are almost never satisfied with their sample. While the sample size of 75 was adequate for purposes of *PLS* analysis, there were several regression results that would probably have become significant with a larger sample. It was difficult to directly compare results with those obtained by Moore as he had a much larger sample size (600) and nearly everything was significant for his study. It becomes difficult to claim differences are due to firm size, or type of *information technology* examined, when results may be due to very large sample sizes.

The sample selection methodology, while ensuring a high degree of confidentiality to respondents, resulted in a loss of control of sample selection. The sample should be called a convenience sample because there was very little randomness in the selection process. With the problems encountered in collecting completed questionnaires it is most likely that participating accounting firms selected potential respondents on the basis of *individuals who would be most likely to fill out the questionnaire*.

The demographic's data for the sample indicate that approximately one third of the respondents were non-users. There were significant differences between users and non-users

for several categories. The relatively large proportion of non-users may have swamped or masked some of the results on *computerized accounting system* adoption. Also, a large portion (65%) of respondents were female, whereas the Moore study had the reverse ratio.

The data collection method, self-reported data using a questionnaire, is controversial. Use of self-reported data is criticized because it is often unreliable. While some attempts at improving reliability were made (asking the same question more than once), the general problems with questionnaire data still remain.

While the *Diffusion of Information Technology* model is purported to be a generalizable model, and statements are made about the generalizability of results from this study, it should be kept in mind that the results are applicable to this study only. While it is human nature to make inferences and extrapolate results it should be noted that such inferences and extrapolations are made at the risk of over-interpreting the results from an individual study.

7.6 CONCLUSION

The role that information consultants currently play in the adoption process for small and medium size firms is understood a little better. While there is a strong association between the presence of information consultants and the successful adoption of a *computerized accounting systems*, many small businesses do not rely on this support group to help them with new *information technology*. It appears that *computerized accounting system* users who have used a *computerized accounting system* for a long period of time, and/or use many *computerized accounting system* functions, are more likely to rely on a support group. It is not clear if the presence of the support group leads to long and versatile *computerized accounting system* use, or if the experience gained due to the passage of time and/or heavy use has convinced users to seek outside help. If the latter case is true, then *Public Accountants* have a lot of work to do to get the message out that experience doesn't have to come the hard way.

The extension to the *Diffusion of Information Technology* model, by including *Support Group*, has provided a modest improvement to the explanatory and predictive power of the model. Clearly, there is much that is still not known about the factors that can lead to the successful adoption of information technology. However, the extended *Diffusion of Information Technology* model does provide some insight into this process.

TABLES

TABLE 1

| RELIABILITY COEFFICIENT: PILOT TEST (SPSS) | | |
|---|-----------------------|--------------------------------|
| <u>VARIABLE NAME</u> | <u># ITEMS</u> | <u>CRONBACH'S ALPHA</u> |
| PCI: | | |
| COMPATIBILITY | 4 | .84 |
| EASE OF USE | 6 | .74 |
| IMAGE | 4 | .59 |
| RELATIVE ADVANTAGE | 8 | .96 |
| RESULT DEMONSTRABILITY | 3 | .62 |
| TRIALABILITY | 5 | .85 |
| VISIBILITY | 4 | .28 |
| VOLUNTARINESS | 4 | .74 |
| SYSTEM USAGE: | | |
| HOURS OF USE | 2 | .80 |
| MONTHS OF USE | 2 | .97 |
| NUMBER OF FUNCTIONS USED | 4 | .45 |
| USE FREQUENCY | 2 | .22 |
| CAS SUPPORT | 5 | .94 |

TABLE 2

| RELIABILITY COEFFICIENT: ACTUAL STUDY (SPSS) | | |
|---|-----------------------|----------------------------------|
| <u>VARIABLE NAME</u> | <u># ITEMS</u> | <u>CRONBACH'S ALPHA</u> |
| | | CAS USERS & NON-USERS |
| PCI: | | |
| COMPATIBILITY | 4 | .92 |
| EASE OF USE | 6 | .75 |
| IMAGE | 4 | .87 |
| RELATIVE ADVANTAGE | 8 | .97 |
| RESULT DEMONSTRABILITY | 3 | .43 |
| TRIALABILITY | 5 | .81 |
| VISIBILITY | 5 | .86 |
| VOLUNTARINESS | 4 | .69 |
| SYSTEM USAGE: | | |
| HOURS OF USE | 1 | ----- |
| MONTHS OF USE | 2 | .59 |
| NUMBER OF FUNCTIONS USED | 3 | .96 |
| USE FREQUENCY | 2 | .97 |
| CAS SUPPORT | 3 | .81 |

| TABLE 3 | | | | |
|--|----------------|--|------------------|---------------------------|
| RELIABILITY COEFFICIENT: ACTUAL STUDY (SPSS) | | | | |
| VARIABLE NAME | # ITEMS | CRONBACH'S ALPHA | | |
| | | CAS USERS & NON-USERS | CAS USERS | CAS NON- USERS |
| COMPATIBILITY | 4 | .9230 | .7796 | .8954 |
| EASE OF USE | 6 | .7506 | .7022 | .8702 |
| IMAGE | 4 | .8657 | .8267 | .8574 |
| RELATIVE ADVANTAGE | 8 | .9691 | .9005 | .9586 |
| RESULT DEMONSTRABILITY | 3 | .4263 | .7147 | .0000* |
| TRIALABILITY | 5 | .8109 | .8403 | .8114 |
| VISIBILITY | 5 | .8563 | .6815 | .8969 |
| VOLUNTARINESS | 4 | .6861 | .7363 | .4254 |
| | | | | |
| TOTAL ITEMS | 39 | | | |
| NUMBER OF RESPONSES | | N=75 | N=53 | N=22 |
| | | | | |
| *Results were totally unreliable for CAS non-users (see Figure 5 for graph of responses) | | | | |

| TABLE 4 | | |
|---|----------------|-------------------------|
| RELIABILITY COEFFICIENT: MOORE | | |
| VARIABLE NAME | # ITEMS | CRONBACH'S ALPHA |
| RELATIVE ADVANTAGE | 9 | .93 |
| VOLUNTARINESS | 4 | .84 |
| RESULT DEMONSTRABILITY | 4 | .79 |
| COMPATIBILITY | 4 | .86 |
| EASE OF USE | 8 | .82 |
| VISIBILITY | 5 | .70 |
| TRIALABILITY | 5 | .72 |
| IMAGE | 5 | .80 |
| COMPUTER AVOIDANCE (item dropped from DIT model by Moore, not included in this study) | 6 | .71 |
| | | |
| | | |
| TOTAL ITEMS | 50 | |

| TABLE 5(a) | | | |
|--|---------------|---------------------------|---------------------------|
| DEMOGRAPHIC BACKGROUND OF SURVEY RESPONDENTS | | | |
| | <u>Number</u> | <u>Relative Frequency</u> | <u>Adjusted Frequency</u> |
| DEPARTMENT OF EMPLOYMENT | | | |
| Administration | 13 | 17.3% | 18.6% |
| Accounting / Finance | 37 | 49.3% | 52.9% |
| Other | 20 | 26.7% | 28.5% |
| Missing | 5 | 6.7% | ----- |
| Total | 75 | 100.0% | 100.0% |
| ORGANIZATION LEVEL | | | |
| Executive | 15 | 20.0% | 20.8% |
| Middle Management | 13 | 17.3% | 18.1% |
| Supervisory | 11 | 14.7% | 15.3% |
| Professional | 12 | 16.0% | 16.7% |
| Technical | 4 | 5.3% | 5.6% |
| Clerical/Support | 15 | 20.0% | 20.8% |
| Other | 2 | 2.7% | 2.7% |
| Missing | 3 | 4.0% | ----- |
| Total | 75 | 100.0% | 100.0% |
| EDUCATION | | | |
| Some High School | 3 | 4.0% | 4.0% |
| High School Graduate | 10 | 13.3% | 13.3% |
| Some Technical College | 4 | 5.3% | 5.3% |
| Technical College Graduate | 3 | 4.0% | 4.0% |
| Some Community College | 7 | 9.4% | 9.4% |
| Community College Graduate | 6 | 8.0% | 8.0% |
| Some University | 14 | 18.7% | 18.7% |
| University Graduate | 22 | 29.3% | 29.3% |
| Postgraduate | 6 | 8.0% | 8.0% |
| Missing | 0 | 0.0% | ----- |
| Total | 75 | 100.0% | 100.0% |

| TABLE 5(b) | | | |
|--|-----------------|--------------------|--------------------|
| DEMOGRAPHIC BACKGROUND OF SURVEY RESPONDENTS | | | |
| | Number | Relative Frequency | Adjusted Frequency |
| AGE | | | |
| Less than 30 years old | 27 | 36.0% | 38.0% |
| 30 to 39 years old | 27 | 36.0% | 38.0% |
| 40 to 49 years old | 13 | 17.4% | 18.3% |
| 50 years old and older | 4 | 5.3% | 5.7% |
| Missing | 4 | 5.3% | ----- |
| Total | 75 | 100.0% | 100.0% |
| SEX | | | |
| Male | 26 | 34.7% | 34.7% |
| Female | 49 | 65.3% | 65.3% |
| Missing | 0 | 0.0% | ----- |
| Total | 75 | 100.0% | 100.0% |
| OTHER | | | |
| Average Firm Size (Sales) | \$500k-\$1,000k | <\$250k | >\$10,000k |
| Average Firm Size (Full Time Employees) | 26 | 1 | 92 |
| Avg. Accounting Staff (Full Time Employees) | 3 | 1 | 12 |

| TABLE 6(a) | | | | | |
|--|------------------|---------------|-----------------------|------------------------------|------------------------------|
| SURVEY VARIABLES - DESCRIPTIVE STATISTICS | | | | | |
| | # SCALE ITEMS | MEAN SCORE | STANDARD DEVIATION | MAXIMUM REPORTED SCORE | MINIMUM REPORTED SCORE |
| <u>PERCEIVED CHARACTERISTICS</u> (Scale Range: 1 to 7) | | | | | |
| Compatibility | 4 | 5.427 | 1.577 | 7.000 | 1.000 |
| Ease of Use | 6 | 5.118 | 1.003 | 7.000 | 2.167 |
| Image | 4 | 3.977 | 1.366 | 7.000 | 1.000 |
| Relative Advantage | 8 | 5.503 | 1.560 | 7.000 | 1.000 |
| Result Demonstrability | 3 | 5.187 | 1.179 | 7.000 | 2.667 |
| Trialability | 5 | 4.128 | 1.426 | 7.000 | 1.000 |
| Visibility | 5 | 4.856 | 1.484 | 7.000 | 1.000 |
| Voluntariness | 4 | 3.130 | 1.480 | 5.750 | 1.000 |
| <u>ATTITUDE</u> (Scale Range: 1 to 7) | 4 | 2.200 | 1.214 | 6.250 | 1.000 |
| <u>SUBJECTIVE NORMS</u> (Scale Range: -21 to 21) | | | | | |
| Friends | 1 | -1.067 | 6.003 | 21.000 | -18.000 |
| Peers | 1 | 1.467 | 5.512 | 21.000 | -8.000 |
| Supervisors | 1 | .547 | 5.194 | 21.000 | -8.000 |
| Senior Management | 1 | -2.320 | 5.403 | 21.000 | -15.000 |
| Subordinates | 1 | -2.773 | 5.562 | 21.000 | -21.000 |

| TABLE 6(b) | | | | | |
|--|------------------|---------------|-----------------------|------------------------------|------------------------------|
| SURVEY VARIABLES - DESCRIPTIVE STATISTICS | | | | | |
| | # SCALE ITEMS | MEAN SCORE | STANDARD DEVIATION | MAXIMUM REPORTED SCORE | MINIMUM REPORTED SCORE |
| <u>INNOVATIVENESS MEASURES</u> | | | | | |
| Frequency of Use (Scale range: 4 to 56) | 1 | 27.792 | 8.725 | 49.000 | 4.000 |
| Months Since First Use (Scale range: 1 to 199) | 2 | 55.955 | 27.560 | 120.500 | 2.000 |
| Hours of Use per Week (Scale range: 1 to 40) | 1 | 21.584 | 12.606 | 40.000 | 3.000 |
| Number of Functions Used (Scale range: 0 to 8) | 3 | 4.497 | 1.790 | 7.667 | 1.000 |
| | | | | | |
| <u>CAS SUPPORT</u> (Scale range: 1 to 7) | | | | | |
| Personnel from Firm | 3 | 2.629 | 1.150 | 5.333 | 1.000 |
| Friend | 3 | 2.157 | .993 | 5.000 | 1.000 |
| Accountant | 3 | 2.308 | 1.025 | 4.667 | 1.000 |
| Consultant | 3 | 2.277 | 1.041 | 4.333 | 1.000 |

| TABLE 7(a) | | | | | | | |
|---|-------------------|--------------|-------------------|------------------|-------------------|--------------|-------------------|
| USERS VERSUS NON-USERS | | | | | | | |
| I. PROPORTION OF USERS VERSUS NON-USERS IN SAMPLE | | | | | | | |
| | | <u>USERS</u> | | <u>NON-USERS</u> | | <u>TOTAL</u> | |
| | <u>Org. Level</u> | <u>#</u> | <u>% of level</u> | <u>#</u> | <u>% of level</u> | <u>#</u> | <u>% of level</u> |
| | Executive | 12 | 22% | 3 | 12% | 15 | 20.0% |
| | Middle Management | 11 | 21% | 2 | 9% | 13 | 17.3% |
| | Supervisory | 4 | 7% | 7 | 32% | 11 | 14.7% |
| | Professional | 11 | 21% | 1 | 5% | 12 | 16.0% |
| | Technical | 2 | 4% | 2 | 9% | 4 | 5.3% |
| | Clerical | 10 | 19% | 5 | 23% | 15 | 20.0% |
| | Other | 1 | 2% | 1 | 5% | 2 | 2.7% |
| | Missing | 2 | 4% | 1 | 5% | 3 | 4.0% |
| | | | | | | | |
| | Total | 53 | | 22 | | 75 | |
| | Percent of Sample | | 71% | | 29% | | 100% |
| | | | | | | | |

| TABLE 7(b) | | | | | |
|--|----------------------------------|----------|-----------|----------------------------|--------|
| USERS VERSUS NON-USERS | | | | | |
| II. VARIABLE MEANS AND TESTS FOR DIFFERENCES (M-W TESTS) | | | | | |
| | <u>PERCEIVED CHARACTERISTICS</u> | USERS | NON-USERS | U-TEST Z-SCORE (M-W) | SIGNIF |
| | Compatibility | 6.10 | 3.80 | -4.86 | .0000 |
| | Ease of Use | 5.25 | 4.81 | -1.47 | .1420 |
| | Image | 4.35 | 3.08 | -3.45 | .0006 |
| | Relative Advantage | 6.18 | 3.87 | -4.81 | .0000 |
| | Result Demonstrability | 5.67 | 4.02 | -5.59 | .0000 |
| | Trialability | 4.33 | 3.65 | -1.90 | .0575 |
| | Visibility | 5.31 | 3.76 | -3.25 | .0011 |
| | Voluntariness | 2.72 | 4.13 | -3.74 | .0002 |
| | <u>ATTITUDE</u> | 1.76 | 3.25 | -3.72 | .0002 |
| | <u>SUBJECTIVE NORMS</u> | | | | |
| | Friends | -.68 | -2.00 | -1.02 | .3063 |
| | Peers | .98 | 2.64 | -.72 | .4719 |
| | Supervisors | .06 | 1.73 | -.11 | .9146 |
| | Senior Management | -1.38 | -4.59 | -2.35 | .0189 |
| | Subordinates | -1.74 | -5.27 | -2.95 | .0032 |
| | <u>INNOVATIVENESS MEASURES</u> | | | | |
| | Months elapsed since adoption | 55.96 | N/A | N/A | N/A |
| | Hours of use per week | 21.58 | N/A | N/A | N/A |
| | Frequency of use - general | once/day | N/A | N/A | N/A |
| | Frequency of use - detail | 27.79 | N/A | N/A | N/A |
| | Number of functions used | 4.50 | N/A | N/A | N/A |
| | <u>CAS SUPPORT</u> | | | | |
| | Personnel from Firm | 2.63 | N/A | N/A | N/A |
| | Friend | 2.16 | N/A | N/A | N/A |
| | Accounting Firm | 2.31 | N/A | N/A | N/A |
| | Consultant | 2.28 | N/A | N/A | N/A |

| TABLE 8 | | | | | |
|---|------------------------|---------------------------------------|----------------|---------|-------------|
| REGRESSION RESULTS | | | | | |
| PERCEIVED CHARACTERISTICS AND VOLUNTARINESS ON ATTITUDE | | | | | |
| I. SUMMARY OF STEPPED FORCED ENTRY OF VARIABLES | | | | | |
| STEP | VARIABLE IN | BETA IN | R ² | F (EQN) | SIG F (EQN) |
| 1 | Relative Advantage | -.852 | .726 | 193 | .000 |
| 2 | Visibility | -.240 | .755 | 111 | .000 |
| 3 | Voluntariness | .113 | .763 | 76 | .000 |
| 4 | Ease of Use | -.095 | .769 | 58 | .000 |
| 5 | Image | -.073 | .773 | 47 | .000 |
| 6 | Trialability | .057 | .775 | 39 | .000 |
| 7 | Compatiblity | .076 | .776 | 33 | .000 |
| 8 | Result Demonstrability | -.019 | .776 | 29 | .000 |
| | | | | | |
| | | | | | |
| II. STATISTICS FOR VARIABLES IN THE FINAL EQUATION | | | | | |
| | VARIABLE | BETA | STD ERR BETA | F (B) | SIG F |
| | Relative Advantage | -.632 | .123 | 16.061 | .000 |
| | Visibility | -.210 | .083 | 4.260 | .043 |
| | Voluntariness | .113 | .067 | 1.924 | .170 |
| | Ease of Use | -.123 | .090 | 2.720 | .104 |
| | Image | -.079 | .061 | 1.360 | .248 |
| | Trialability | .050 | .069 | .377 | .541 |
| | Compatiblity | .083 | .123 | .269 | .605 |
| | Result Demonstrability | -.019 | .078 | .062 | .805 |
| | Variance Explained | $R^2 = .776$ Adjusted $R^2 = .749$ | | | |

| TABLE 9 | | | | | | |
|--|----------------------------------|--------|----------------------------------|--------|----------------------------------|--------|
| REGRESSION RESULTS | | | | | | |
| PCI'S, VOLUNTARINESS, SN AND SUPPORT ON ATTITUDE | | | | | | |
| Equation | PCI Only | | PCI and SN | | PCI,SN & SUPPORT | |
| Beta Weights | Beta | Sig. F | Beta | Sig. F | Beta | Sig. F |
| Relative Advantage | -.632 | .000 | -.653 | .000 | -.681 | .000 |
| Visibility | -.210 | .043 | -.199 | .054 | -.200 | .053 |
| Voluntariness | .113 | .170 | .092 | .277 | .083 | .326 |
| Ease of Use | -.123 | .104 | -.109 | .155 | -.101 | .188 |
| Image | -.079 | .248 | -.085 | .216 | -.087 | .206 |
| Trialability | .050 | .541 | .057 | .492 | .060 | .464 |
| Compatiblity | .083 | .605 | -.083 | .603 | .083 | .603 |
| Result Demonstrability | -.019 | .805 | -.020 | .793 | -.048 | .552 |
| Subjective Norm | | | -.069 | .282 | -.077 | .235 |
| CAS Support | | | | | .074 | .314 |
| | | | | | | |
| Variance Explained | $R^2 = .776$ Adj $R^2 = .749$ | | $R^2 = .780$ Adj $R^2 = .750$ | | $R^2 = .783$ Adj $R^2 = .750$ | |

| TABLE 10 (a) | | | | | | |
|---|-----------------|-------|--------|---------------------|-------|-------|
| REGRESSION RESULTS | | | | | | |
| ATTITUDE, SN, AND VOLUNTARINESS ON INNOVATIVENESS | | | | | | |
| VARIABLES | | | | | | |
| DEPENDENT | INDEPENDENT | Beta | Sig. F | Adj. R ² | F | F Sig |
| NUMBER OF FUNCTIONS USED | Voluntariness | -.023 | .861 | .193 | 6.903 | .0004 |
| | Attitude | -.471 | .000 | | | |
| | Subjective Norm | -.074 | .503 | | | |
| FREQUENCY OF USE | Voluntariness | -.092 | .472 | .223 | 8.069 | .0001 |
| | Attitude | -.454 | .000 | | | |
| | Subjective Norm | -.035 | .746 | | | |
| MONTHS SINCE ADOPTED | Voluntariness | -.107 | .405 | .207 | 7.445 | .0002 |
| | Attitude | -.433 | .001 | | | |
| | Subjective Norm | -.067 | .538 | | | |
| HOURS OF USE PER WEEK | Voluntariness | -.191 | .138 | .218 | 7.881 | .0001 |
| | Attitude | -.382 | .003 | | | |
| | Subjective Norm | -.073 | .500 | | | |

| TABLE 10 (b) | | | | | | |
|---|-----------------|-------|------|---------------------|--------|-------|
| REGRESSION RESULTS | | | | | | |
| ATTITUDE, SN, VOLUNTARINESS & SUPPORT ON INNOVATIVENESS | | | | | | |
| VARIABLES | | | | | | |
| DEPENDENT | INDEPENDENT | Beta | Sig | Adj. R ² | F | F Sig |
| NUMBER OF FUNCTIONS USED | Voluntariness | -.052 | .605 | .524 | 21.338 | .0000 |
| | Attitude | -.221 | .035 | | | |
| | Subjective Norm | -.087 | .302 | | | |
| | Support | .617 | .000 | | | |
| FREQUENCY OF USE | Voluntariness | -.122 | .185 | .597 | 28.390 | .0000 |
| | Attitude | -.189 | .050 | | | |
| | Subjective Norm | -.050 | .524 | | | |
| | Support | .654 | .000 | | | |
| MONTHS SINCE ADOPTED | Voluntariness | -.124 | .304 | .309 | 9.260 | .0000 |
| | Attitude | -.289 | .022 | | | |
| | Subjective Norm | -.075 | .462 | | | |
| | Support | .354 | .001 | | | |
| HOURS OF USE PER WEEK | Voluntariness | -.214 | .054 | .425 | 14.669 | .0000 |
| | Attitude | -.182 | .110 | | | |
| | Subjective Norm | -.084 | .366 | | | |
| | Support | .492 | .000 | | | |

| TABLE 11 (a) | | | | | |
|---|--|------------|--------|---------------------|----|
| REGRESSION RESULTS | | | | | |
| PCI AND SUBJECTIVE NORMS ON INNOVATIVENESS | | | | | |
| EQUATION 1: DEPENDENT VARIABLE - NUMBER OF FUNCTIONS USED | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | Result Demonstrability | .447 | .000 | .504 | 20 |
| 2 | SN Peers | -.297 | .001 | | |
| 3 | SN Subordinates | .268 | .004 | | |
| 4 | Relative Advantage | .217 | .049 | | |
| | Weakly Significant: Ease of Use | -.186 | .061 | | |
| EQUATION 2: DEPENDENT VARIABLE - FREQUENCY OF USE | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | Relative Advantage | .403 | .000 | .461 | 33 |
| 2 | Result Demonstrability | .365 | .001 | | |
| | Weakly Significant: SN Subordinate | .158 | .072 | | |
| | Ease of Use | -.172 | .091 | | |
| | | | | | |
| EQUATION 3: DEPENDENT VARIABLE - MONTHS SINCE CAS FIRST ADOPTED | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | Result Demonstrability | .597 | .000 | .347 | 40 |
| | Weakly Significant: Relative Advantage | .224 | .058 | | |
| | Voluntariness | -.179 | .065 | | |
| | Compatibility | .210 | .078 | | |
| | | | | | |
| EQUATION 4: DEPENDENT VARIABLE - HOURS OF USE PER WEEK | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | Result Demonstrability | .445 | .025 | .362 | 22 |
| 2 | Visibility | .268 | .013 | | |

| TABLE 11 (b) | | | | | |
|---|--|------------|--------|---------------------|----|
| REGRESSION RESULTS | | | | | |
| PCI, SUBJECTIVE NORMS, & SUPPORT ON INNOVATIVENESS | | | | | |
| EQUATION 1: DEPENDENT VARIABLE - NUMBER OF FUNCTIONS USED | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | Result Demonstrability | .349 | .000 | .660 | 30 |
| 2 | SN Peers | -.281 | .000 | | |
| 3 | SUPP Personnel | .290 | .001 | | |
| 4 | SUPP Consultant | .282 | .001 | | |
| 5 | SN Subordinate | .199 | .009 | | |
| EQUATION 2: DEPENDENT VARIABLE - FREQUENCY OF USE | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | SUPP Personnel | .400 | .000 | .727 | 41 |
| 2 | SUPP Consultant | .225 | .001 | | |
| 3 | Relative Advantage | -.464 | .006 | | |
| 4 | Result Demonstrability | .201 | .014 | | |
| 5 | SN Peers | -.135 | .030 | | |
| | Weakly Significant: SN Subordinate | .127 | .062 | | |
| EQUATION 3: DEPENDENT VARIABLE - MONTHS SINCE CAS FIRST ADOPTED | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | Result Demonstrability | .497 | .000 | .378 | 23 |
| 2 | Consultant | .221 | .035 | | |
| | Weakly Significant: Voluntariness | -.169 | .076 | | |
| EQUATION 4: DEPENDENT VARIABLE - HOURS OF USE PER WEEK | | | | | |
| Entry Step | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| 1 | SUPP Consultant | .436 | .000 | .510 | 27 |
| 2 | Result Demonstrability | .312 | .001 | | |
| 3 | Voluntariness | -.225 | .010 | | |

| TABLE 12(a) | | | | | |
|---|--------------------------|------------|--------|---------------------|-----|
| REGRESSION RESULTS | | | | | |
| CAS SUPPORT ON OTHER DEPENDENT VARIABLES | | | | | |
| EQUATION 1: DEPENDENT VARIABLE - SUBJECTIVE NORM (COMPOSITE) | | | | | |
| Dep. Variable | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| SNc | No Significant Variables | --- | --- | --- | --- |
| EQUATION 2: DEPENDENT VARIABLE - SUBJECTIVE NORM (COMPONENTS) + VOLUNTARINESS | | | | | |
| Dep. Variable | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| Friend | SUPP Personnel | .200 | .085 | .027 | 3 |
| Peer | No Significant Variables | --- | --- | --- | --- |
| Supervisor | No Significant Variables | --- | --- | --- | --- |
| Senior Mgmt | SUPP Personnel | .234 | .044 | .042 | 4 |
| Subordinate | SUPP Personnel | .236 | .042 | .043 | 4 |
| EQUATION 3: DEPENDENT VARIABLE - PERCEIVED CHARACTERISTICS OF INNOVATING | | | | | |
| Dep. Variable | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| Compatibility | SUPP Accountant | .302 | .012 | | |
| " | SUPP Personnel | .272 | .023 | .225 | 12 |
| | ***** | | | | |
| Ease of Use | SUPP Accountant | .257 | .026 | .053 | 5 |
| Image | SUPP Friend | .325 | .004 | .093 | 9 |
| Rel. Advant. | SUPP Accountant | .487 | .000 | .227 | 23 |
| Res. Demon. | SUPP Accountant | .532 | .000 | .273 | 29 |
| Trialability | SUPP Friend | .275 | .017 | .063 | 6 |
| Visibility | SUPP Consultant | .377 | .001 | .131 | 12 |

| TABLE 12(b) | | | | | |
|---|----------------------|------------|--------|---------------------|----|
| REGRESSION RESULTS | | | | | |
| CAS SUPPORT ON OTHER DEPENDENT VARIABLES | | | | | |
| EQUATION 4: DEPENDENT VARIABLE - INNOVATIVE (USE) VARIABLES | | | | | |
| Dep. Variable | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| Frequency " | SUPP Consultant | .424 | .000 | .606 | 58 |
| | SUPP Personnel | .481 | .000 | | |
| | ***** | | | | |
| Functions " | SUPP Consultant | .445 | .000 | .503 | 38 |
| | SUPP Personnel | .383 | .000 | | |
| | ***** | | | | |
| Hours " | SUPP Consultant | .522 | .000 | .384 | 24 |
| | SUPP Personnel | .181 | .092 | | |
| | ***** | | | | |
| Months " | SUPP Consultant | .327 | .008 | .218 | 11 |
| | SUPP Personnel | .234 | .053 | | |
| EQUATION 5: DEPENDENT VARIABLE - VOLUNTARINESS | | | | | |
| Dep. Variable | Independent Variable | Final Beta | Sig. F | Adj. R ² | F |
| Voluntariness | SUPP Personnel | -.267 | .020 | .059 | 6 |

| TABLE 13 (a) | | | |
|---------------------------------------|------------------------------|------------------------|------------------|
| SUMMARY RESULTS OF HYPOTHESIS TESTING | | | |
| HYPOTHESES | ADOPTERS VS. NON-ADOPTERS | REGRESSION ANALYSIS | PLS ANALYSIS |
| H1: ATTITUDE -> INNOVATIVENESS | SUPPORTED | NOT SUPPORTED | SUPPORTED |
| H2: RELATIVE ADV > OTHER PCI | SUPPORTED | SUPPORTED | SUPPORTED |
| H3: AVOIDANCE < OTHER PCI | N/A | N/A | N/A |
| H4: SN -> INNOVATIVENESS | NOT SUPPORTED | NOT SUPPORTED | NOT SUPPORTED |
| H5: SN -> ATTITUDE | N/A | NOT SUPPORTED | NOT SUPPORTED |
| H6: VOLUNTARY -> INNOVATIVENESS | SUPPORTED | NOT SUPPORTED | NOT SUPPORTED |
| H7: VOLUNTARY -> ATTITUDE | N/A | NOT SUPPORTED | SUPPORTED |
| H8: SUPPORT -> INNOVATIVENESS | NOT SUPPORTED | SUPPORTED | SUPPORTED |
| H9: FRIEND -> INNOVATIVENESS | NOT SUPPORTED | NOT SUPPORTED | NOT SUPPORTED |
| H10: EMPLOYEE -> INNOVATIVENESS | NOT SUPPORTED | SUPPORTED | SUPPORTED |
| H11: ACCOUNTANT -> INNOVATIVE | NOT SUPPORTED | NOT SUPPORTED | NOT SUPPORTED |
| H12: CONSULTANT -> INNOVATIVE | NOT SUPPORTED | SUPPORTED | SUPPORTED |
| H13: SUPPORT -> SN | N/A | NOT SUPPORTED | SUPPORTED |
| H14: SUPPORT -> ATTITUDE | N/A | NOT SUPPORTED | SUPPORTED |
| H15: SUPPORT -> PCI'S | N/A | SUPPORTED | SUPPORTED |

| TABLE 13 (b) | | | |
|--|------------------------------|------------------------|------------------|
| SUMMARY RESULTS OF HYPOTHESIS TESTING (MOORE) | | | |
| HYPOTHESES | ADOPTERS VS. NON-ADOPTERS | REGRESSION ANALYSIS | PLS ANALYSIS |
| H1: ATTITUDE -> INNOVATIVENESS | SUPPORTED | SUPPORTED | SUPPORTED |
| H2: RELATIVE ADV > OTHER PCI | NOT SUPPORTED | SUPPORTED | NOT SUPPORTED |
| H3: AVOIDANCE < OTHER PCI | SUPPORTED | NOT SUPPORTED | SUPPORTED |
| H4: SN -> INNOVATIVENESS | SUPPORTED | NOT SUPPORTED | SUPPORTED |
| H5: SN -> ATTITUDE | N/A | SUPPORTED | SUPPORTED |
| H6: VOLUNTARY -> INNOVATIVE | SUPPORTED | SUPPORTED | SUPPORTED |
| H7: VOLUNTARY -> ATTITUDE | N/A | SUPPORTED | SUPPORTED |

| TABLE 14 | | | |
|--|--|-----------------------------------|-----------------------------------|
| GENERAL PLS STATISTICS FOR TESTED MODELS | | | |
| MODEL | MULTIPLE R ² (R ²) | AVG. COMMUN. (H ²) | AVG. REDUND. (F ²) |
| All data points: Full Model | .1837 | .5275 | .1097 |
| Full - Voluntariness | .1281 | .4636 | .0584 |
| Full - Voluntariness - SN | .1357 | .2835 | .0424 |
| Full - 4 PCI's | .1992 | .5558 | .1252 |
| Full + Communications Channel | .1960 | .5389 | .1238 |
| CAS User data points: Full | .0957 | .4173 | .0470 |
| Full - Voluntariness | .1012 | .3593 | .0379 |
| Full - Voluntariness - SN | .1501 | .3745 | .0470 |
| Full - 4 PCI's | .1209 | .4575 | .0624 |
| Full + Communications Channel | .1242 | .4062 | .0559 |

FIGURES

FIGURE 1
Diffusion of Information Technology Model - Moore, 1989

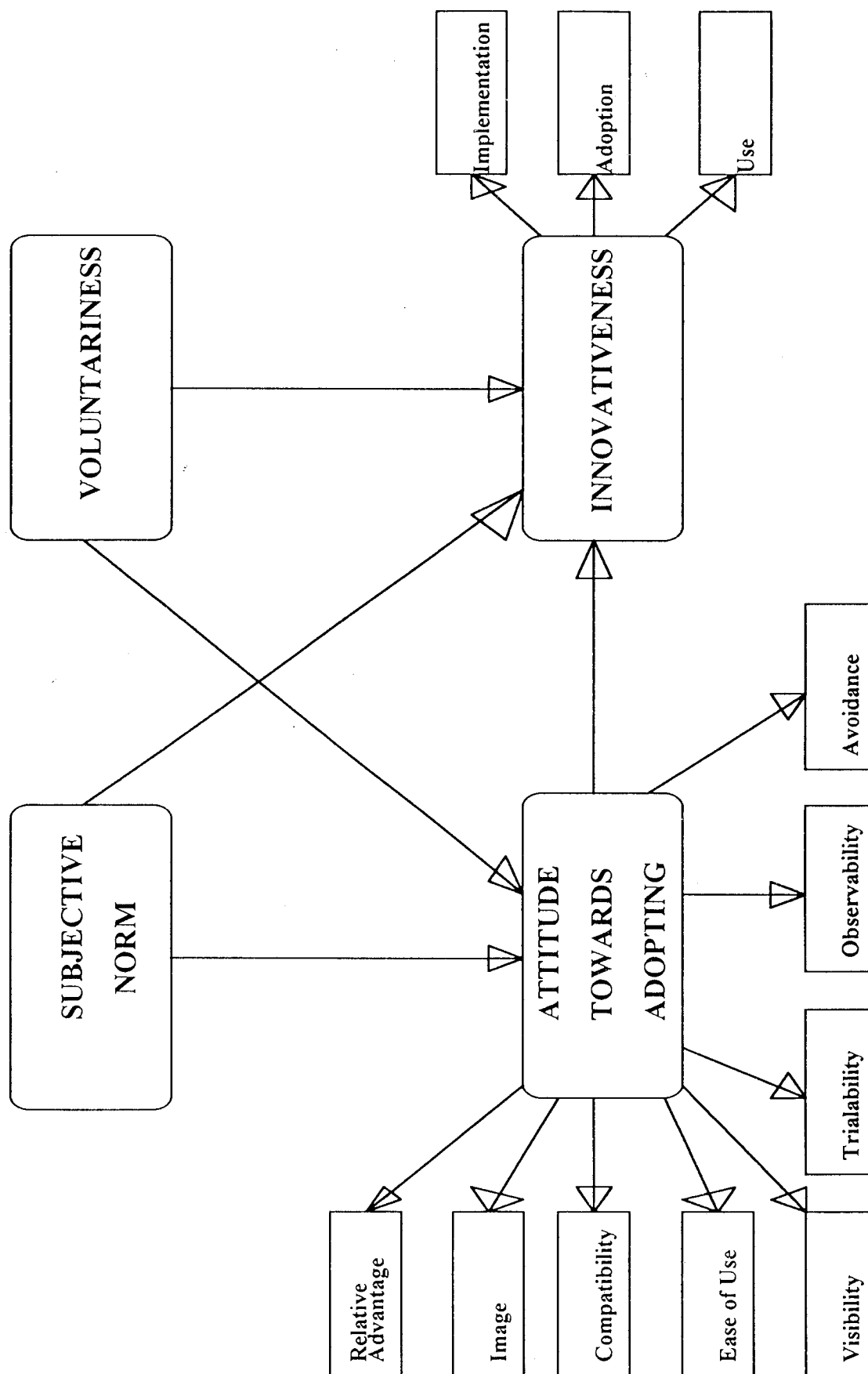


FIGURE 2

Diffusion of Innovations Model - Rogers, 1983

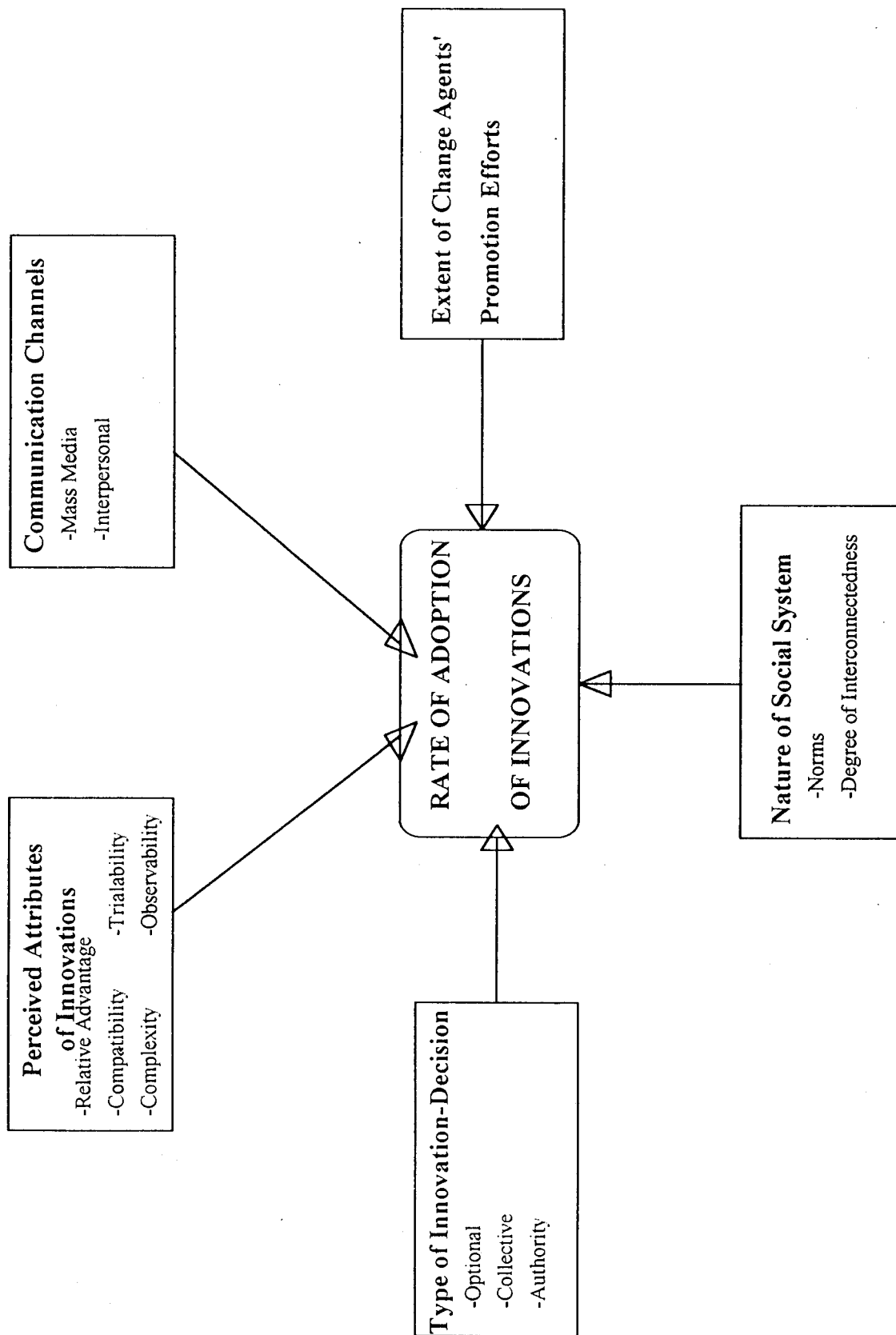


FIGURE 3

Innovation Decision Model - Fishbein & Ajzen, 1975 (Adapted by Moore, 1989)

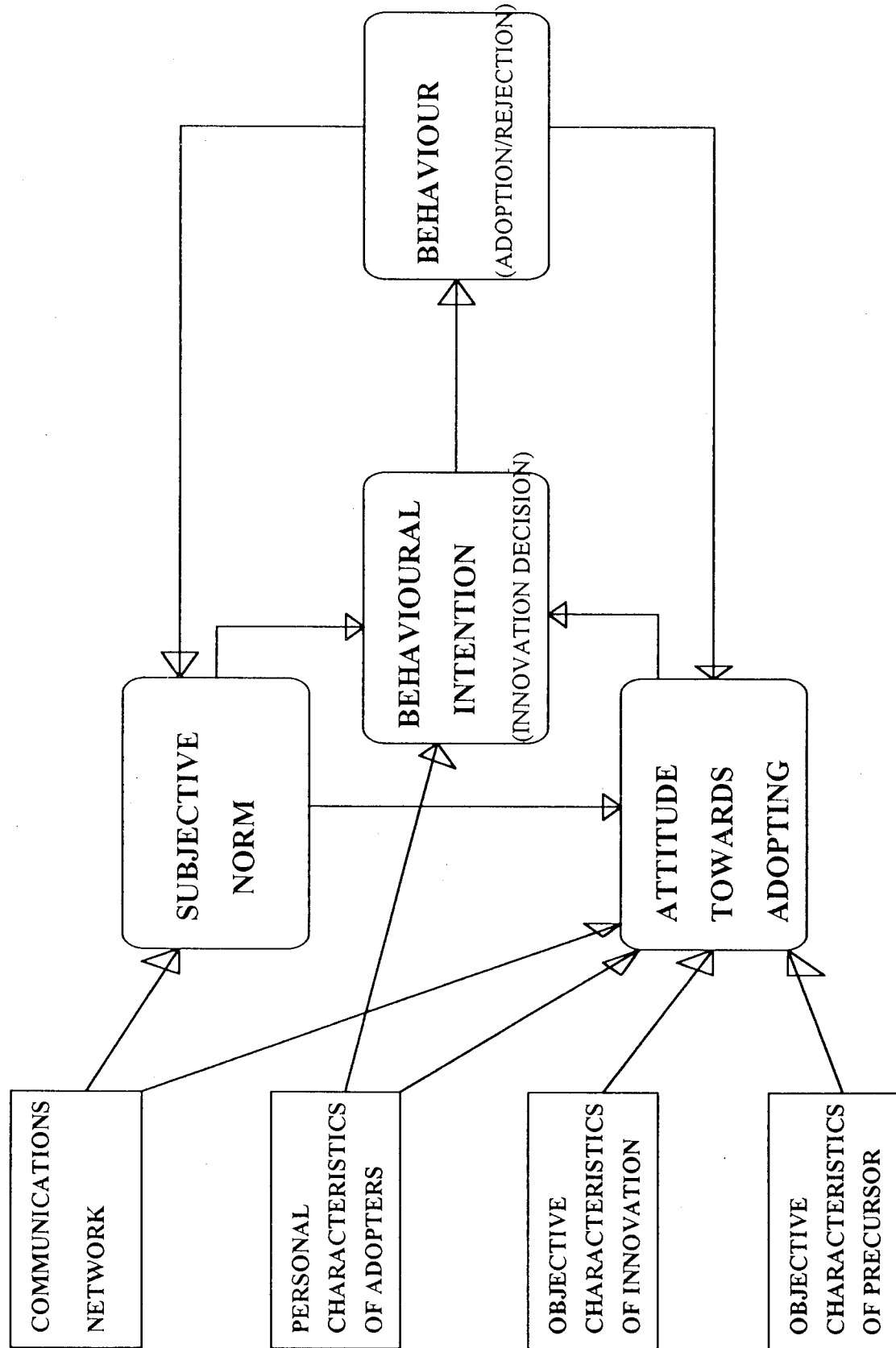


FIGURE 4

Stages of the Innovation Decision Process Model
Rogers, 1983 (Adapted by Moore, 1989)

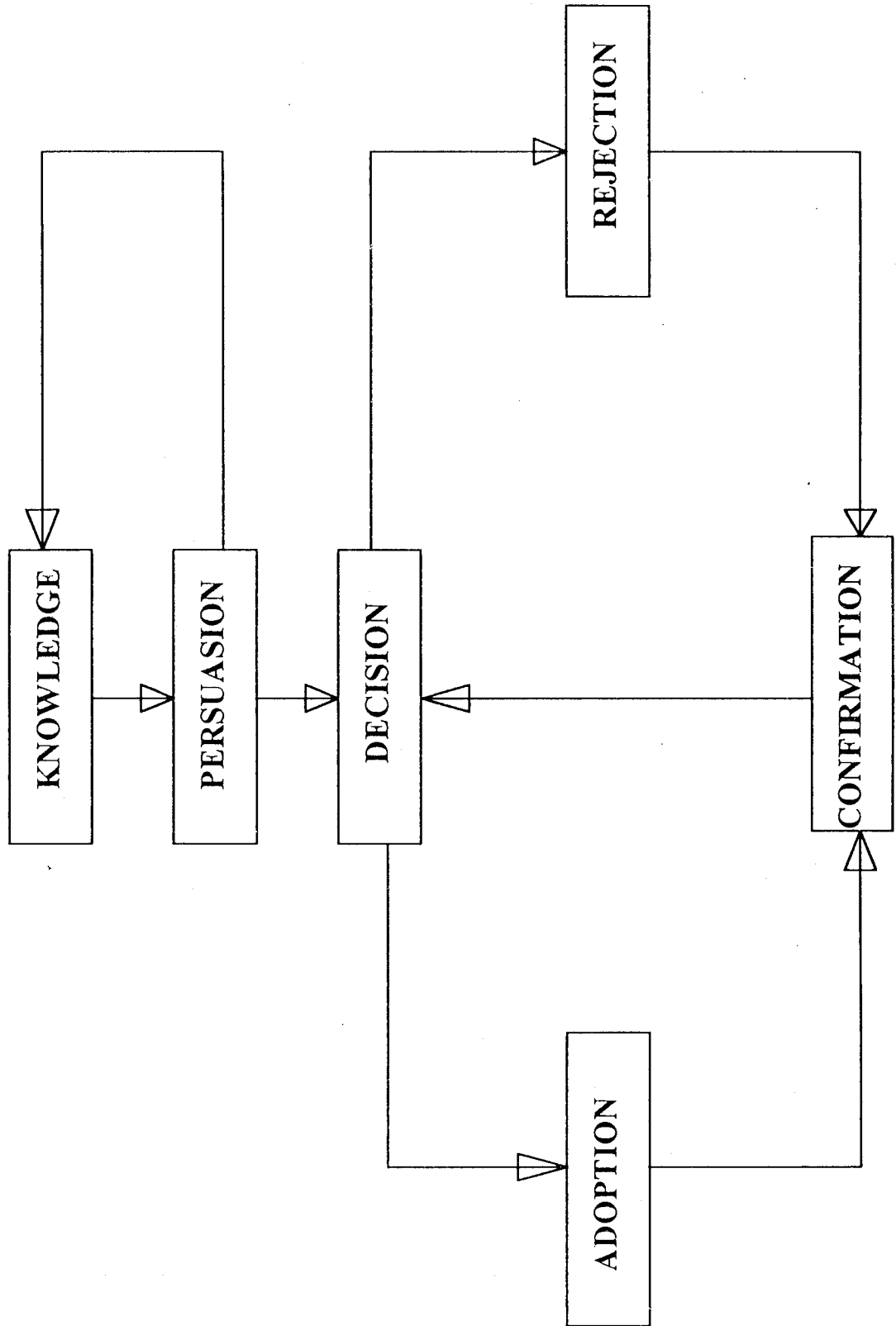


FIGURE 5

NON-CAS USERS
RESULT DEMONSTRABILITY

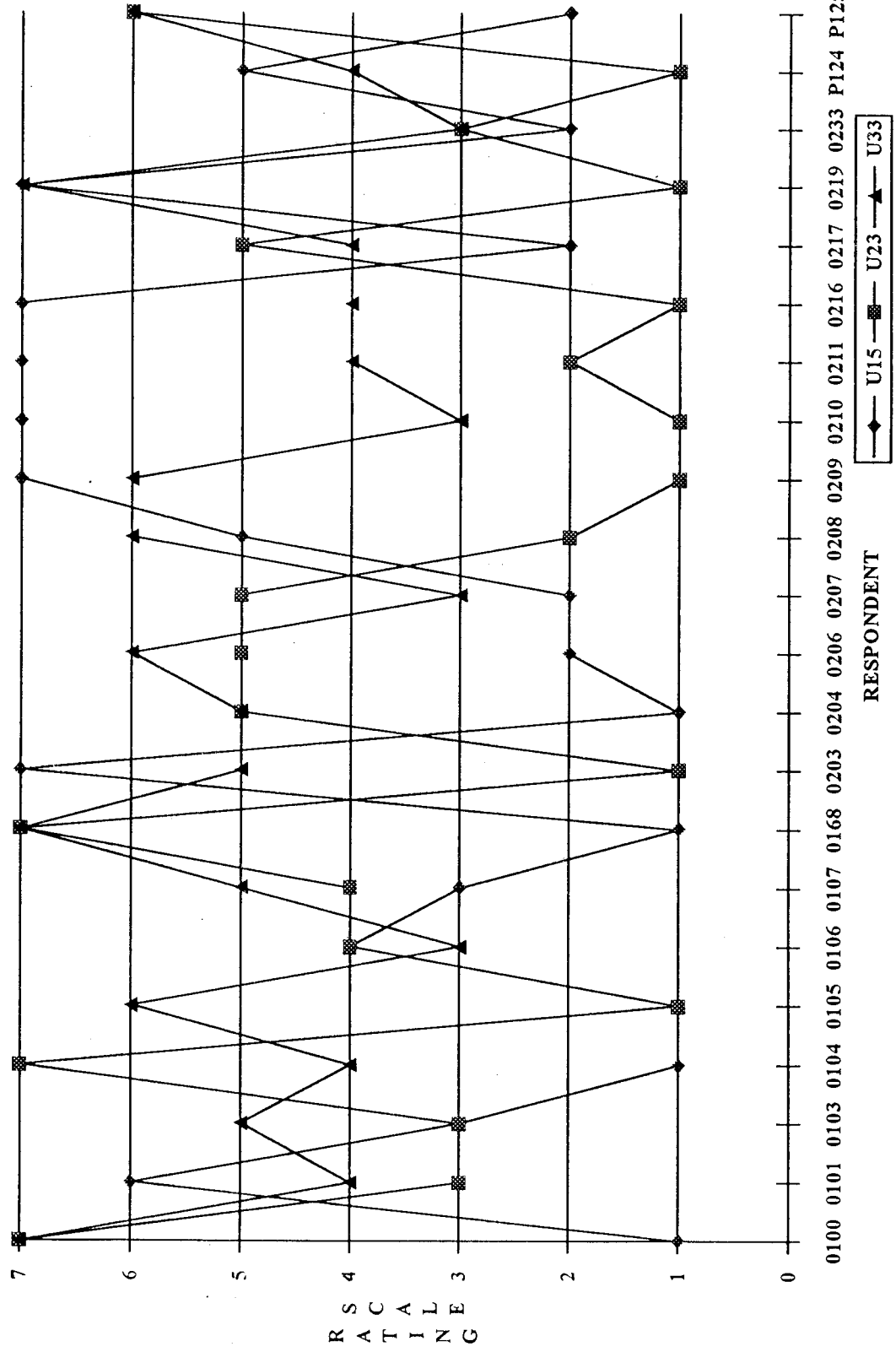


FIGURE 6

DIFFUSION OF INFORMATION TECHNOLOGY MODEL

PLS LOADINGS ON ORIGINAL MODEL

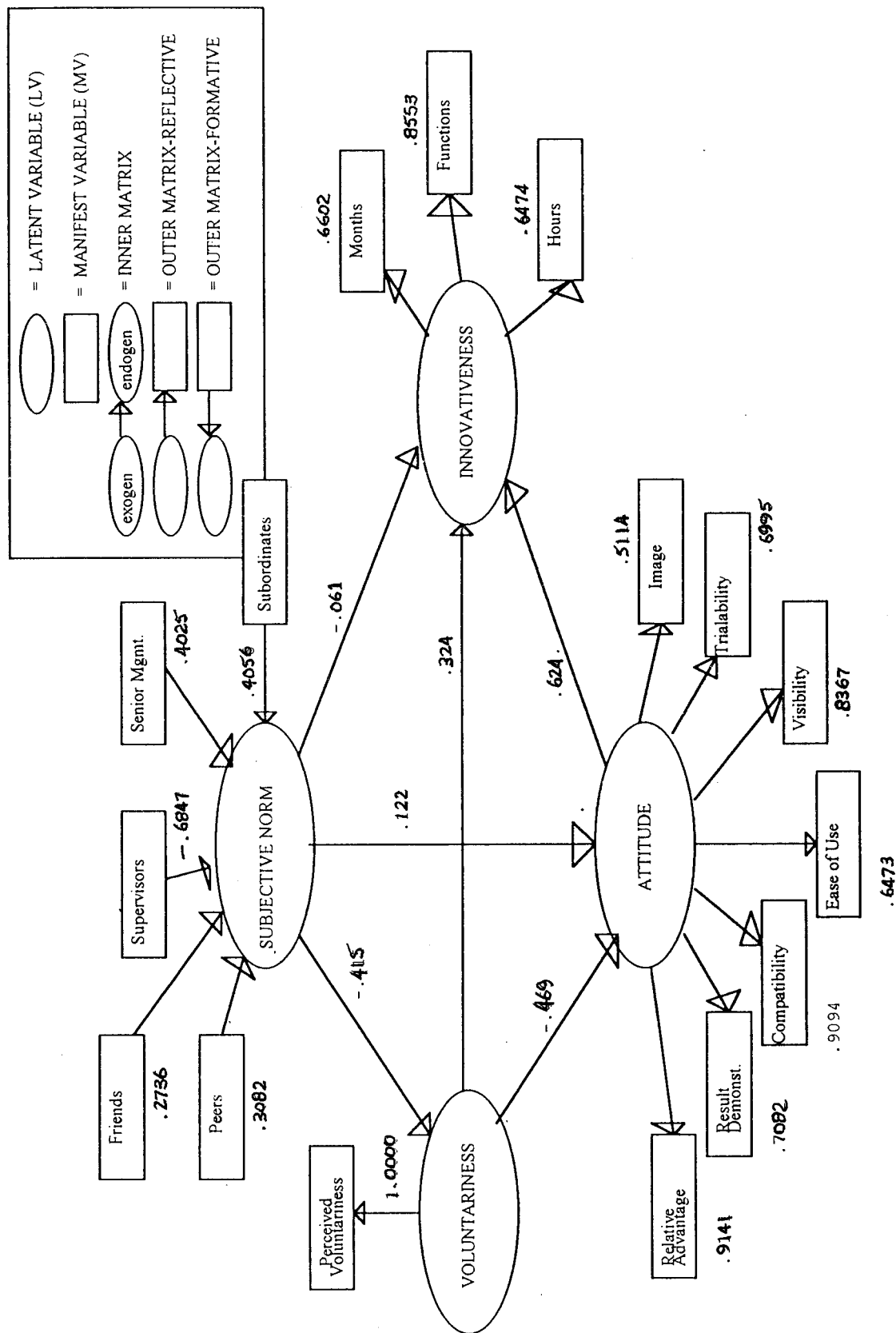
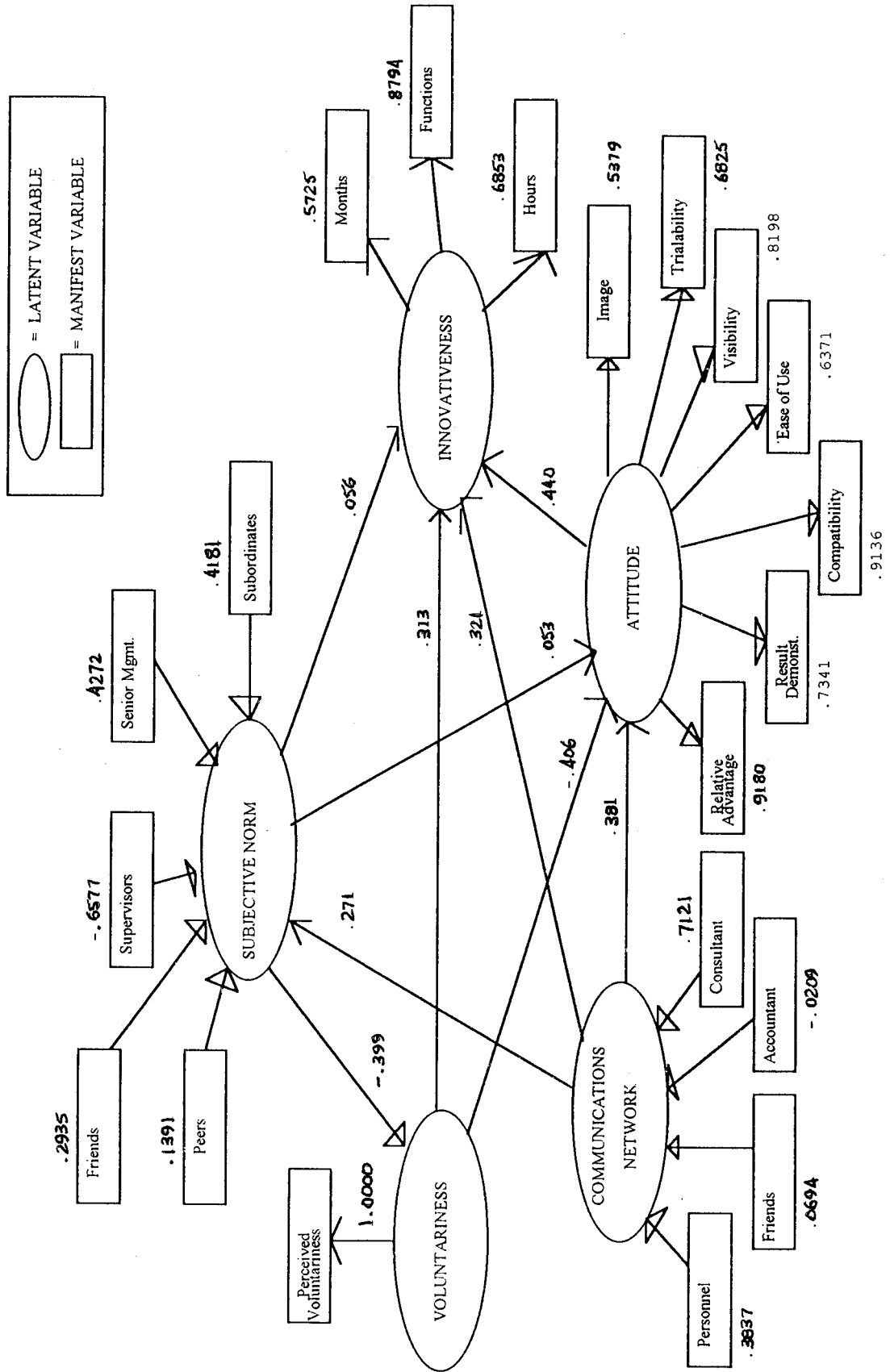


FIGURE 7

DIFFUSION OF INFORMATION TECHNOLOGY MODEL

PLS LOADINGS ON EXTENDED MODEL



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BIBLIOGRAPHY

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APPENDICES

| | <u>APPENDIX I-A</u> |
|--------------------------------------|--|
| Relative Advantage: | the degree to which an innovation is perceived as being better than its precursor |
| Compatibility: | the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters |
| Ease of Use: (Complexity) | the degree to which an innovation is perceived as being difficult to use |
| Trialability: | the degree to which an innovation may be experimented with before adoption |
| Observability: | the degree to which the results of an innovation are observable to others |
| Image: | the degree to which use of an innovation is perceived to enhance one's image or status in one's social system |
| Voluntariness: | the degree to which use of the innovation is perceived as being voluntary, or of free will |
| Visibility: | the degree to which the innovation is apparent to the sense of sight |

| | <u>APPENDIX I-B</u> |
|-------------------------------|---|
| <u>INNOVATIVENESS:</u> | (Moore, 1989, pp. 133) |
| Adoptive | degree to which an individual is relatively early in adopting an innovation. |
| Implementation | degree to which an individual puts an innovation to use within a given use domain. |
| Use | degree to which an individual who has adopted the innovation uses it to solve novel problems, or in a new use domain. |

| APPENDIX I-C | |
|--|--|
| (From Stone, 1978) | |
| VALIDITY ITEM | DEFINITION |
| Content Validity | Measurement items are representative sample of domain of items associated with variable being measured. |
| Construct Validity | Appropriate operational definition of an abstract variable (construct). |
| Criterion-related Validity | Use of scores obtained from one measure (predictor) to infer individual's probable standing on another variable (criterion). |
| Face Validity | Item <i>appears</i> to measure what it claims to measure. |
| Incremental Validity | Item provides an improvement in predictive power in conjunction with other measure(s) over the use of the other measure(s) alone. |
| Convergent/Discriminant Validity | Scores on the measure correlate highly with scores on other independent measures of the variable and correlate low on measures of other variables. |
| Note: There are several other Validity items, only the most commonly used items are discussed above. | |

APPENDIX II-A

Appendix II - A1

Questionnaire

WELCOME!

You are about to participate in a study of opinions about the usage of microcomputers in the accounting function. In some sections you will be asked questions about and see reference to the term **CAS**, which stands for **COMPUTERIZED ACCOUNTING SYSTEM**. A **CAS** is defined for the purposes of this study as a set of computerized tools for an **individual**, and usually consists of a personal or **microcomputer** with one or more software packages, such as an accounting program, and/or other software such as spreadsheet, database, word processing, etc. in support of the accounting function. The key aspect of a **CAS** is that it is computer technology that you would use directly, as opposed to having someone else use for you.

In completing the questionnaire, please remember:

1. All the information you give is kept confidential.
2. We need answers to all questions. Please don't skip any.
3. Be honest - tell it like it is.
4. Please don't talk to others about how you respond to the questions. We would like your opinion, not the opinion of your associates.
5. Even if you have never used a **CAS**, please answer all the relevant questions as best as you can.
6. Move rapidly through the questionnaire. We are interested in your first impressions, so please don't spend an excessive amount of time on each question.

INSTRUCTIONS

In the attached questionnaire, we ask questions which make use of rating scales with seven places; you are asked to place an 'X' in the place that best describes your opinion. For example, if you were asked to rate "Driving a car in winter is easy" on such a scale, it would appear as follows:

Driving a car in winter is easy.

| | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|
| likely | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

If you think that it is **extremely likely** that driving a car in winter is easy, you would make your mark as follows:

Driving a car in winter is easy.

| | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|
| likely | X | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

If you think that it is **neither likely nor unlikely** that driving a car in winter is easy, you would make your mark as follows:

Driving a car in winter is easy.

| | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|
| likely | | | | X | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

In addition to the "likely-unlikely" pairs, other pairs such as "disagree-agree" will also be used. They should be answered in the same fashion. In making your ratings, please remember the following points:

1. Place your marks in the middle of spaces, **NOT ON THE BOUNDARIES**.

| | | | | | | | |
|--------|-------------|-------|----------|-----------------|----------|-------|-----------|
| likely | | X | | | | X | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| | THIS | | | NOT THIS | | | |

2. Never put more than one 'X' on a single answer line.

One other question format will be used. In this case, you will be asked to circle a number or letter corresponding to a particular answer for a question. Please be careful to see that your circle goes around only the letter or number which corresponds to your desired response.

TO BEGIN, WE WOULD LIKE TO ASK YOU ABOUT YOUR EXPERIENCE WITH
COMPUTERS AND OTHER HIGH-TECHNOLOGY PRODUCTS AND SERVICES.

A-1 Have you ever used a multi-function telephone (including such functions as call forward, speed dialing, call waiting, etc.). (Place an 'X' beside the appropriate answer):

_____ NO

_____ YES

If yes, which functions do you use? (Place an 'X' beside the appropriate functions):

_____ CALL TRANSFER

_____ (CONSULTATIONS) HOLD

_____ THREE-WAY CONFERENCE

_____ CALL FORWARDING

_____ CALL PARKING

_____ CALL PICKUP

_____ CALL WAITING

_____ RING AGAIN/AUTOMATIC CALL BACK

_____ SPEED CALLING

_____ LAST NUMBER DIALLED

_____ SAVE NUMBER AND REPEAT

A-2 How often do you use the products listed below? (Place an 'X' under the appropriate column for each applicable area):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|---------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| a. Automated Teller Machine | | | | | | | |
| b. Programmable Calculators | | | | | | | |
| c. Home Computers | | | | | | | |
| d. Business Computers | | | | | | | |
| e. Video Games | | | | | | | |
| f. Programmable Microwave Ovens | | | | | | | |

A-3 How often do you carry out the computer-related activities listed below; on paper, via electronic mail, on floppy disk, etc...? (Place an 'X' under the appropriate column for each applicable area):

| | Not at all | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|--|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| Receive computer output (reports/documents) | | | | | | | |
| Submit documents, etc. to others for word processing | | | | | | | |
| Submit data to others for computer analysis | | | | | | | |

A-8 My firm receives non-computer support from the following sources external to the firm (place an 'X' under the appropriate column for each applicable source):

| | none constant | | | | | | |
|------------------------------------|--|---|---|------|---|---|---|
| | 1 | 2 | 3 | some | 5 | 6 | 7 |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | | | | |
| Non-Accountant computer consultant | | | | | | | |
| None | | | | | | | |
| Other (please specify) | | | | | | | |

A-9 I am satisfied with the current level of support for non-computer areas I receive from the following sources external to the firm (place an 'X' under the appropriate column for each applicable source):

| | satisfied | | | | | | unsatisfied |
|------------------------------------|-----------|-------|----------|---------|----------|-------|-------------|
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | | | | |
| Non-Accountant computer consultant | | | | | | | |
| None | | | | | | | |
| Other (please specify) | | | | | | | |

A-10 How much access to the use of a CAS do you feel you currently have?

| | | | | | | | | |
|-----------|-----------|-------|----------|---------|----------|-------|-----------|---------|
| unlimited | | | | | | | | limited |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

A-11 How knowledgeable do you feel you are of the uses of the CAS?

| | | | | | | | | |
|-----------|-----------|-------|----------|---------|----------|-------|-----------|---------|
| unlimited | | | | | | | | limited |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

A-12 Have you ever used a CAS? (Place an 'X' beside the appropriate column):

_____ CURRENTLY USE A CAS _____

Please go on to the next page

_____ HAVE NEVER USED A CAS _____

Please go on to the next page

_____ USED TO USE A CAS BUT NO LONGER DO SO

Please answer A-13 to A-15 only if you used to use a CAS but no longer do.

A-13 Could you please indicate approximately when you first began to use a CAS, and when you stopped using it.

STARTED _____
 MONTH YEAR

STOPPED _____
 MONTH YEAR

A-14 Please indicate which of the CAS functions below you used by indicating the number of months you used them.

| | Accounting Software | Graphics Generation | Information Retrieval | Report Generation | Spreadsheet | Statistical Analysis | Text/word Processing | Other (please specify) |
|--------|------------------------|------------------------|--------------------------|----------------------|-------------|-------------------------|-------------------------|------------------------------|
| MONTHS | | | | | | | | |

A-15 Could you please indicate very briefly why you no longer use the CAS.

Please go on to the next page

FIRST WE WOULD LIKE TO GET YOUR IMPRESSIONS OF THE CAS. IN THE FOLLOWING, WE WILL PRESENT YOU WITH A NUMBER OF STATEMENTS EXPRESSING PARTICULAR VIEWPOINTS ABOUT THE CAS. WE WOULD LIKE YOU TO INDICATE HOW MUCH EACH STATEMENT REFLECTS YOUR PERSONAL VIEWPOINT BY PLACING AN 'X' IN THE APPROPRIATE PLACE ON THE DISAGREE-AGREE SCALES PROVIDED. ALTHOUGH THERE MAY APPEAR TO BE A NUMBER OF SIMILAR STATEMENTS, PLEASE PROVIDE A RESPONSE TO EACH ONE.

U-1 Using a CAS enables me to accomplish tasks more quickly.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-2 Using a CAS is completely compatible with my current situation.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-3 Using a CAS is compatible with all aspects of my work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-4 My superiors expect me to use a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-5 I believe that a CAS is cumbersome to use.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-6 Using a CAS improves my image within the organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-7 Using a CAS improves the quality of work I do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-8 Using a CAS makes it easier to do my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-9 I think that using a CAS fits well with the way I like to work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-10 My use of a CAS is voluntary (as opposed to required by my superiors or job description).

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-11 I have seen what others do using their CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-12 I've had a great deal of opportunity to try various CAS applications.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-13 In my organization, one sees CAS on many desks.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-14 My boss does not require me to use a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-15 I would have no difficulty telling others about the results of using a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-16 I know where I can go to satisfactorily try out various uses of a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-17 People in my organization who use a CAS have more prestige than those who do not.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-18 Although it might be helpful, using a CAS is certainly not compulsory in my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-19 My using a CAS requires a lot of mental effort.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-20 Using a CAS is often frustrating.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-21 People in my organization who use a CAS have a high profile.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-22 A CAS was available to me to adequately test run various applications.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-23 I believe I could communicate to others the consequences of using a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-24 I believe that it is easy to get a CAS to do what I want it to do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-25 Overall, I believe that a CAS is easy to use.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-26 Using a CAS improves my job performance.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-27 CAS are not very visible in my organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-28 Overall, I find using a CAS to be advantageous to my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-29 Before deciding whether to use any CAS applications, I was able to properly try them out.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-30 Learning to operate a CAS is easy for me.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-31 Using a CAS enhances my effectiveness on the job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-32 Using a CAS fits into my work style.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-33 I would have difficulty explaining why a CAS may or may not be beneficial.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-34 I was permitted to use a CAS on a trial basis long enough to see what it could do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-35 Using a CAS gives me greater control over my work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-36 Using a CAS increases my productivity.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-37 Having a CAS is a status symbol in my organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-38 It is easy for me to observe others using CAS in my firm.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-39 I have had plenty of opportunity to see the CAS being used.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

FINALLY, IN THIS SECTION WE WOULD LIKE TO ASK YOU A FEW QUESTIONS ABOUT YOUR USE OF THE CAS.

B-1 Overall, my using a CAS in my job is (place an X on all four scales):

| | | |
|----------|--|------------|
| good | <div style="display: flex; justify-content: space-between; border-top: 1px solid black; border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; font-size: small;"> extremely quite slightly neither slightly quite extremely </div> | bad |
| harmful | <div style="display: flex; justify-content: space-between; border-top: 1px solid black; border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; font-size: small;"> extremely quite slightly neither slightly quite extremely </div> | beneficial |
| wise | <div style="display: flex; justify-content: space-between; border-top: 1px solid black; border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; font-size: small;"> extremely quite slightly neither slightly quite extremely </div> | foolish |
| negative | <div style="display: flex; justify-content: space-between; border-top: 1px solid black; border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; font-size: small;"> extremely quite slightly neither slightly quite extremely </div> | positive |

B-2 Assuming that any decision to use the CAS is totally up to you, how would you rate your potential use of the CAS in the next six months?

| | | |
|------------|--|----------|
| likely | <div style="display: flex; justify-content: space-between; border-top: 1px solid black; border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; font-size: small;"> extremely quite slightly neither slightly quite extremely </div> | unlikely |
| improbable | <div style="display: flex; justify-content: space-between; border-top: 1px solid black; border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; font-size: small;"> extremely quite slightly neither slightly quite extremely </div> | probable |

B-3 Approximately when (month and year) did you first start using a CAS beyond any trial of it you may have carried out?

MONTH YEAR

B-4 How regularly do you now use a CAS? (Place an 'X' under the appropriate column):

| Not at all | Less than once per month | About 1-3 times per month | About once per week | 2-4 times per week | About once per day | More than once per day |
|------------|--------------------------------|---------------------------------|---------------------------|-----------------------|--------------------------|------------------------------|
| | | | | | | |

B-5 On average, how frequently do you currently use the following functions (place an 'X' under the appropriate column):

| | Not at all | Less than once per month | About 1-3 times per month | About once per week | 2-4 times per week | About once per day | More than once per day |
|------------------------|---------------|--------------------------------------|---------------------------------------|------------------------------|-----------------------------|-----------------------------|------------------------------------|
| Accounting Software | | | | | | | |
| Graphics Generation | | | | | | | |
| Information Retrieval | | | | | | | |
| Report Generation | | | | | | | |
| Spreadsheet | | | | | | | |
| Statistical Analysis | | | | | | | |
| Text/word Processing | | | | | | | |
| Other (please specify) | | | | | | | |

B-6 For each of the following questions, place an 'X' under the appropriate column for each applicable function:

- On average how many hours per week do you spend using the CAS on the following functions?
- Please indicate approximately how long (in months) you have been regularly using any of the following functions.

| | Accounting Software | Graphics Generation | Information Retrieval | Report Generation | Spreadsheet | Statistical Analysis | Text/word Processing | Other (please specify) |
|--------|---------------------|---------------------|-----------------------|-------------------|-------------|----------------------|----------------------|------------------------|
| HOURS | | | | | | | | |
| MONTHS | | | | | | | | |

B-7 Overall, how do you expect your usage of the CAS will change in the next six months? (Place an 'X' in the appropriate column):

| | | | | | | | | |
|----------|--------------------|---------------|------------|------|------------|---------------|--------------------|----------|
| increase | | | | | | | | decrease |
| | signifi- cantly | some- what | marginally | same | marginally | some- what | signifi- cantly | |

B-8 Overall, how has your usage of CAS changed in the last six months? (Place an 'X' in the appropriate column):

| | | | | | | | | |
|-----------|--------------------|---------------|------------|------|------------|---------------|--------------------|-----------|
| increased | | | | | | | | decreased |
| | signifi- cantly | some- what | marginally | same | marginally | some- what | signifi- cantly | |

B-9 I have been using a CAS for (place an 'X' under the appropriate column):

| Not at all | Less than once per month | About 1-3 times per month | About once per week | 2-4 times per week | About once per day | More than once per day |
|------------|--------------------------|---------------------------|---------------------|--------------------|--------------------|------------------------|
| | | | | | | |

B-10 When I started using my CAS, I received continuing support (training or help) for my CAS from the following sources (place an 'X' under the appropriate column for each source):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|------------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| Other personnel from my company | | | | | | | |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | | | | |
| Non-Accountant computer consultant | | | | | | | |
| Other (please specify) | | | | | | | |

B-11 I currently receive continuing support (training or help) for my CAS from the following sources (place an 'X' under the appropriate column for each source):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|------------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| Other personnel from my company | | | | | | | |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | | | | |
| Non-Accountant computer consultant | | | | | | | |
| Other (please specify) | | | | | | | |

B-14 I am satisfied with the current level of continuing support for my CAS that I receive from the following sources (place an 'X' under the appropriate column for each applicable source):

| | <div style="display: flex; justify-content: space-between;"> satisfied unsatisfied </div> | | | | | | | N/A (Don't receive any support) |
|------------------------------------|---|-------|----------|---------|----------|-------|-----------|---|
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| Other personnel from my company | | | | | | | | |
| Personal friend (non-employee) | | | | | | | | |
| Public accounting firm | | | | | | | | |
| Non-Accountant computer consultant | | | | | | | | |
| Other (please specify) | | | | | | | | |
| | | | | | | | | |

B-15 How effective do you feel the following were in helping you to get started in your use of a CAS?
(Place an 'X' under the appropriate column for each applicable source):

| | <div style="display: flex; justify-content: space-between;"> effective ineffective </div> | | | | | | |
|------------------------------------|---|-------|----------|---------|----------|-------|-----------|
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| Other personnel from my company | | | | | | | |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | | | | |
| Non-Accountant computer consultant | | | | | | | |
| Other (please specify) | | | | | | | |
| | | | | | | | |

B-16 How effective do you feel the following have been in helping you in your current use of a CAS?
 (Place an 'X' under the appropriate column for each applicable source):

| | effective | | | | ineffective | | |
|------------------------------------|-----------|-------|----------|---------|-------------|-------|-----------|
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| Other personnel from my company | | | | | | | |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | | | | |
| Non-Accountant computer consultant | | | | | | | |
| Other (please specify) | | | | | | | |
| | | | | | | | |

THANK YOU FOR YOUR PERSEVERANCE AND COOPERATION SO FAR. NOW,
 PLEASE GO ON TO THE NEXT PAGE.

IN THE FOLLOWING, WE WILL PRESENT YOU WITH A NUMBER OF STATEMENTS EXPRESSING PARTICULAR VIEWPOINTS ABOUT THE CAS. WE WOULD LIKE YOU TO INDICATE HOW MUCH EACH STATEMENT REFLECTS YOUR PERSONAL VIEWPOINT PLACING AN 'X' IN THE APPROPRIATE PLACE ON THE DISAGREE-AGREE SCALE. ALTHOUGH THERE MAY APPEAR TO BE A NUMBER OF SIMILAR STATEMENTS, PLEASE PROVIDE A RESPONSE TO EACH ONE.

N-1 Using a CAS would enable me to accomplish tasks more quickly.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-2 Using a CAS would improve the quality of work I do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-3 Using a CAS would be compatible with all aspects of my work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-4 My superiors expect me to use a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-5 I believe that a CAS would be cumbersome to use.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-6 Using a CAS would improve my image within the organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-7 Using a CAS would be completely compatible with my current situation.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-8 Using a CAS would make it easier to do my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-9 I think that using a CAS would fit well with the way I like to work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-10 My use of a CAS is voluntary (as opposed to required by my superiors or job description).

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-11 I have seen what others do using their CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-12 I've had a great deal of opportunity to try various CAS applications.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-13 In my organization, one sees CAS on many desks.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-14 My boss does not require me to use a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-15 I would have difficulty telling others about the results of using a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-16 I know where I can go to satisfactorily try out various uses of a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-17 People in my organization who use a CAS have more prestige than those who do not.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-18 Although it might be helpful, using a CAS is certainly not compulsory in my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-19 My using a CAS would require a lot of mental effort.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-20 Using a CAS would often be frustrating.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-21 People in my organization who use a CAS have a high profile.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-22 A CAS is available to me to adequately test run various applications.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-23 I believe I could communicate to others the consequence of using a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-24 I believe that it would be easy to get a CAS to do what I want it to do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-25 Overall, I believe that a CAS would be easy to use.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-26 Using a CAS would improve my job performance.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-27 CAS are not very visible in my organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-28 Overall, I would find using a CAS to be advantageous in my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-29 Before deciding whether to use any CAS applications, I would be able to properly try them out.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-30 Learning to operate a CAS would be easy for me.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-31 Using a CAS would enhance my effectiveness on the job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-32 Using a CAS would fit into my work style.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-33 If I were to use a CAS, I would have difficulty explaining why using a CAS may or may not be beneficial.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-34 I would be permitted to use a CAS on a trial basis long enough to see what it could do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-35 Using a CAS would give me greater control over my work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-36 Using a CAS would increase my productivity.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-37 Having a CAS is a status symbol in my organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-38 It is easy for me to observe others using a CAS in my firm.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

N-39 I have had plenty of opportunity to see the CAS being used.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

FINALLY, IN THIS SECTION WE WOULD LIKE TO ASK A FEW GENERAL QUESTIONS.

C-1 Overall, my using a CAS in my job would be (place an X on all four scales):

| | | | | | | | |
|------|-----------|-------|----------|---------|----------|-------|-----------|
| good | | | | | | | bad |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

| | | | | | | | |
|---------|-----------|-------|----------|---------|----------|-------|------------|
| harmful | | | | | | | beneficial |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

| | | | | | | | |
|------|-----------|-------|----------|---------|----------|-------|-----------|
| wise | | | | | | | foolish |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

| | | | | | | | |
|----------|-----------|-------|----------|---------|----------|-------|-----------|
| negative | | | | | | | positive |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

C-2 Assuming that any decision to use the CAS is totally up to you, how would you rate your potential use of the CAS in the next six months?

| | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|
| likely | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

| | | | | | | | |
|------------|-----------|-------|----------|---------|----------|-------|-----------|
| improbable | | | | | | | probable |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

C-3 Approximately how often in the past have you gone to the following for help in using a CAS? (Place an 'X' under the appropriate column for each applicable source):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day | Did not Use CAS |
|------------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|-----------------|
| Other personnel from my company | | | | | | | | |
| Personal friend (non-employee) | | | | | | | | |
| Public accounting firm | | | | | | | | |
| Non-Accountant computer consultant | | | | | | | | |
| Other (please specify) | | | | | | | | |

C-4 How effective do you feel the following were in helping you use a CAS? (Place an 'X' under the appropriate column for each applicable source):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day | Did not Use CAS |
|------------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|-----------------|
| Other personnel from my company | | | | | | | | |
| Personal friend (non-employee) | | | | | | | | |
| Public accounting firm | | | | | | | | |
| Non-Accountant computer consultant | | | | | | | | |
| Other (please specify) | | | | | | | | |

- C-5 Identify your SUPPORT GROUP, whose official function it would be to support you in the CAS (if more than one choose the primary source of help); (place an 'X' under the appropriate column for each applicable source):

| Other personnel from my company | Personal friend | Professional accounting firm | Non-accountant computer consultant | None |
|---------------------------------------|-----------------|---------------------------------|--|------|
| | | | | |

THANK YOU FOR YOUR PERSEVERANCE AND COOPERATION SO FAR. NOW,
PLEASE GO ON TO THE NEXT PAGE.

In this last section, we would like to ask you some questions about yourself. Remember, all answers are confidential, and no respondent can be identified, so please give as candid a response as possible.

FIRST, WE WOULD LIKE YOU TO ONCE AGAIN INDICATE AGREEMENT OR DISAGREEMENT WITH A NUMBER OF STATEMENTS; THIS TIME ABOUT YOURSELF. PLEASE PLACE AN 'X' IN THE APPROPRIATE SPACE.

I-1 I am generally cautious about accepting new ideas.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-2 I rarely trust new ideas until I can see whether the vast majority of people around me accept them.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-3 I am aware that I am usually one of the last people in my group to accept something new.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-4 I am reluctant about adopting new ways of doing things until I see them working for people around me.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-5 I find it stimulating to be original in my thinking and behaviour.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-6 I tend to feel that the old way of living and doing things is the best way.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-7 I am challenged by ambiguities and unsolved problems.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-8 I must see other people using new innovations before I will consider them.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-9 I am challenged by unanswered questions.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-10 I often find myself sceptical of new ideas.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

NEXT, WOULD YOU PLEASE INDICATE HOW LIKELY OR UNLIKELY EACH OF THE FOLLOWING STATEMENTS ARE BY ONCE AGAIN PLACING AN 'X' IN THE APPROPRIATE SPACE.

S-1 Most people who are important to me think I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-2 My close friends think that I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-3 My co-workers (peers) think that I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-4 My immediate superiors think that I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-5 Senior management thinks that I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-6 My subordinates think I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-7 Generally speaking, I want to do what most people who are important to me think I should do.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-8 Generally speaking, I want to do what my close friends think I should do.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-9 Generally speaking, I want to do what my co-workers think I should do.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-10 Generally speaking, I want to do what my immediate supervisors think I should do.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

S-11 Generally speaking, I want to do what senior management thinks I should do.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

| | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|
| likely | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely |

FINALLY, WE WOULD LIKE TO ASK A FEW QUESTIONS ABOUT YOURSELF FOR STATISTICAL PURPOSES. COULD YOU PLEASE INDICATE:

P-1 Your sex (place an 'X' beside the appropriate column):

_____ MALE

_____ FEMALE

P-2 Your present age: _____ years

P-3 Your department: _____

P-4 Your job title: _____

P-5 Years you have worked in your current department: _____ years

P-6 Years you have worked in this company: _____ years

P-7 What is the highest level of education that you completed? Place an 'X' beside the appropriate column):

- _____ GRADE SCHOOL
- _____ SOME HIGH SCHOOL
- _____ HIGH SCHOOL GRADUATE
- _____ SOME TECHNICAL COLLEGE
- _____ TECHNICAL COLLEGE GRADUATE
- _____ SOME COMMUNITY COLLEGE
- _____ COMMUNITY COLLEGE GRADUATE
- _____ SOME UNIVERSITY
- _____ UNIVERSITY GRADUATE
- _____ POSTGRADUATE

P-8 The job that best describes my organizational level is (place an 'X' beside the appropriate column):

☐ EXECUTIVE/TOP MANAGEMENT
☐ MIDDLE MANAGEMENT
☐ SUPERVISORY
☐ PROFESSIONAL
☐ TECHNICAL
☐ CLERICAL
☐ OTHER (please specify) _____

GENERAL BUSINESS INFORMATION

F-1 Number of: Employees Accounting Staff

Full Time _____

Part Time _____

F-2 Annual sales last year:

| < \$250,000 | < \$500,000 | < \$1,000,000 | < \$10,000,000 | > \$10,000,000 |
|-------------|-------------|---------------|----------------|----------------|
| | | | | |

F-3 Type of organization (e.g., profit, non-profit, CO-OP, etc...)

F-4 What industry does your firm operate in?

INDUSTRY: _____

F-5 Does your firm plan to implement or expand a CAS in the next two years?

YES _____ NO _____ DON'T KNOW _____

If YES, approximately how much do you expect your firm to spend on the CAS in this time?

\$ _____

F-6 THANK YOU VERY MUCH FOR YOUR PARTICIPATION!

If you wish to add any comments or further observations, please use the space below or simply attach them to this page.

Appendix II - A2

Pilot Study

WELCOME!

You are about to participate in a study of opinions about the usage of microcomputers in the accounting function. In some sections you will be asked questions about and see reference to the term **CAS**, which stands for **COMPUTERIZED ACCOUNTING SYSTEM**. A **CAS** is defined for the purposes of this study as a set of computerized tools for an individual, and usually consists of a personal or microcomputer with one or more software packages, such as an accounting program, and/or other software such as spreadsheet, database, word processing, etc. in support of the accounting function. The key aspect of a **CAS** is that it is computer technology that you would use directly, as opposed to having someone else use for you.

In completing the questionnaire, please remember:

1. All the information you give is kept confidential.
2. We need answers to all questions. Please don't skip any.
3. Be honest - tell it like it is.
4. Please don't talk to others about how you respond to the questions. We would like your opinion, not the opinion of your associates.
5. Even if you have never used a **CAS**, please answer all the relevant questions as best as you can.
6. Move rapidly through the questionnaire. We are interested in your first impressions, so please don't spend an excessive amount of time on each question.

INSTRUCTIONS

In the attached questionnaire, we ask questions which make use of rating scales with seven places; you are asked to place an 'X' in the place that best describes your opinion. For example, if you were asked to rate "Driving a car in winter is easy" on such a scale, it would appear as follows:

Driving a car in winter is easy.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

If you think that it is extremely likely that driving a car in winter is easy, you would make your mark as follows:

Driving a car in winter is easy.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | X | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

If you think that it is neither likely nor unlikely that driving a car in winter is easy, you would make your mark as follows:

Driving a car in winter is easy.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | X | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

In addition to the "likely-unlikely" pairs, other pairs such as "disagree-agree" will also be used. They should be answered in the same fashion. In making your ratings, please remember the following points:

1. Place your marks in the middle of spaces, **NOT ON THE BOUNDARIES**.

| | | | | | | | | |
|-------------|-----------|-------|----------|-----------------|----------|-------|-----------|----------|
| likely | | X | | | | | X | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| THIS | | | | NOT THIS | | | | |

2. Never put more than one 'X' on a single answer line.

One other question format will be used. In this case, you will be asked to circle a number or letter corresponding to a particular answer for a question. Please be careful to see that your circle goes around only the letter or number which corresponds to your desired response.

TO BEGIN, WE WOULD LIKE TO ASK YOU ABOUT YOUR EXPERIENCE WITH COMPUTERS AND OTHER HIGH-TECHNOLOGY PRODUCTS AND SERVICES.

- A-1 Have you ever used a multi-function telephone (including such functions as call forward, speed dialing, call waiting, etc.). (Place an 'X' beside the appropriate answer):

_____ NO

 X YES

If you use a multi-function phone, which functions do you use? (Place an 'X' beside the appropriate functions):

- _____ CALL TRANSFER
- _____ (CONSULTATIONS) HOLD
- X THREE-WAY CONFERENCE
- _____ CALL FORWARDING
- _____ CALL PARKING
- _____ CALL PICKUP
- _____ CALL WAITING
- _____ RING AGAIN/AUTOMATIC CALL BACK
- X SPEED CALLING
- X LAST NUMBER DIALLED
- _____ SAVE NUMBER AND REPEAT

A-2 How often do you use the products listed below? (Place an 'X' under the appropriate column for each applicable area):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|---------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| a. Automated Teller Machine | | X | | | | | |
| b. Programmable Calculators | X | | | | | | |
| c. Home Computers | X | | | | | | |
| d. Business Computers | | | | | | | X |
| e. Video Games | X | | | | | | |
| f. Programmable Microwave Ovens | | | | | | | X |

A-3 How often do you carry out the computer-related activities listed below; on paper, via electronic mail, on floppy disk, etc...? (Place an 'X' under the appropriate column for each applicable area):

| | Not at all | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|--|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| Receive computer output (reports/documents) | | | | | | | X |
| Submit documents, etc. to others for word processing | | | | | | | X |
| Submit data to others for computer analysis | X | | | | | | |

A-4 What is your current keyboarding (typing) ability?

a. Mark with an 'X': _____ HUNT & PECK

_____ X _____ TOUCH TYPE

b. Place an 'X' in the place that best reflects your speed

| | | | | | | |
|-------|----------|-----------|-----------|-----------|-----------|---------|
| | | | X | | | |
| 0 wpm | 1-15 wpm | 16-30 wpm | 31-45 wpm | 46-60 wpm | 61-75 wpm | >75 wpm |

A-5 How many educational courses (at any level) have you had about computers, but which did not include your personal hands-on use?

_____ 2 _____ COURSES

A-6 How many educational courses have you had which required your personal hands-on use of computers?

_____ 1 _____ COURSES

A-7 My firm receives non-CAS support for the following areas (place an 'X' under the appropriate column for each applicable area):

| | none constant | | | | | | |
|---------------------------|---------------|---|---|------|---|---|---|
| | 1 | 2 | 3 | some | 5 | 6 | 7 |
| Accounting | X | | | | | | |
| Audit | X | | | | | | |
| Business Advice | X | | | | | | |
| Financial Planning | X | | | | | | |
| Gov't Compliance | X | | | | | | |
| Marketing | X | | | | | | |
| Tax | X | | | | | | |
| Other (please specify) | | | | | | | |

A-8 My firm receives non-CAS support from the following sources external to the firm (place an 'X' under the appropriate column for each applicable source):

| | none constant | | | | | | |
|------------------------------------|--|---|---|------|---|---|---|
| | 1 | 2 | 3 | some | 5 | 6 | 7 |
| Personal friend (non-employee) | X | | | | | | |
| Public accounting firm | | | | X | | | |
| Non-Accountant computer consultant | X | | | | | | |
| None | | | | | | | |
| Other (please specify) | | | | | | | |

A-9 I am satisfied with the current level of support for non-CAS areas I receive from the following sources external to the firm (place an 'X' under the appropriate column for each applicable source):

| | satisfied | | | | | | unsatisfied |
|------------------------------------|-----------|-------|----------|---------|----------|-------|-------------|
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | X | | | | | |
| Non-Accountant computer consultant | | | | | | | |
| None | | | | | | | |
| Other (please specify) | | | | | | | |

A-10 How much access to the use of a CAS do you feel you currently have?

| unlimited | | | | | | | | limited |
|-----------|-----------|-------|----------|---------|----------|-------|-----------|---------|
| | X | | | | | | | |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

A-11 How knowledgeable do you feel you are of the uses of the CAS?

| | | | | | | | | |
|-----------|-----------|-------|----------|---------|----------|-------|-----------|---------|
| unlimited | | | X | | | | | limited |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

A-12 Have you ever used a CAS? (Place an 'X' beside the appropriate column):

 X CURRENTLY USE A CAS_____

PLEASE SKIP TO SECTION B

 HAVE NEVER USED A CAS_____

PLEASE SKIP TO SECTION C

 USED TO USE A CAS BUT NO LONGER DO SO

Please answer A-13 to A-15 only if you used to use a CAS but no longer do.

A-13 Could you please indicate approximately when you first began to use a CAS, and when you stopped using it.

STARTED

MONTH

YEAR

STOPPED

MONTH

YEAR

A-14 Please indicate which of the CAS functions below you used by indicating the number of months you used them.

| | Accounting Software | Graphics Generation | Information Retrieval | Report Generation | Spreadsheet | Statistical Analysis | Text/word Processing | Other (please specify) |
|--------|------------------------|------------------------|--------------------------|----------------------|-------------|-------------------------|-------------------------|------------------------------|
| MONTHS | | | | | | | | |

A-15 Could you please indicate very briefly why you no longer use the CAS.

PLEASE SKIP TO SECTION C

Please answer questions in this section only if you currently use the CAS.

FIRST WE WOULD LIKE TO GET YOUR IMPRESSIONS OF THE CAS. IN THE FOLLOWING, WE WILL PRESENT YOU WITH A NUMBER OF STATEMENTS EXPRESSING PARTICULAR VIEWPOINTS ABOUT THE CAS. WE WOULD LIKE YOU TO INDICATE HOW MUCH EACH STATEMENT REFLECTS YOUR PERSONAL VIEWPOINT BY PLACING AN 'X' IN THE APPROPRIATE PLACE ON THE DISAGREE-AGREE SCALES PROVIDED. ALTHOUGH THERE MAY APPEAR TO BE A NUMBER OF SIMILAR STATEMENTS, PLEASE PROVIDE A RESPONSE TO EACH ONE.

U-1 Using a CAS enables me to accomplish tasks more quickly. 7

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-2 Using a CAS is completely compatible with my current situation.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-3 Using a CAS is compatible with all aspects of my work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-4 My superiors expect me to use a CAS. 7

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-5 I believe that a CAS is cumbersome to use. 7

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-6 Using a CAS improves my image within the organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-7 Using a CAS improves the quality of work I do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | X | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-8 Using a CAS makes it easier to do my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | X | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-9 I think that using a CAS fits well with the way I like to work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | X | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-10 My use of a CAS is voluntary (as opposed to required by my superiors or job description).

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | X | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-11 I have seen what others do using their CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | X | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-12 I've had a great deal of opportunity to try various CAS applications.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | X | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

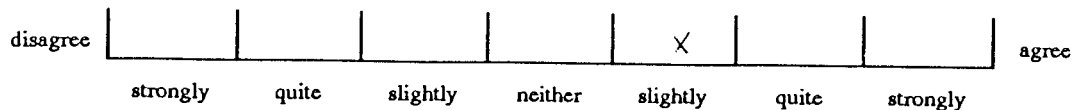
U-13 In my organization, one sees CAS on many desks.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | X | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

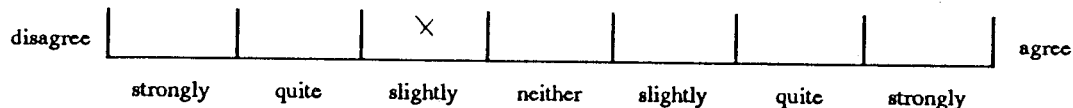
U-14 My boss does not require me to use a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | X | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

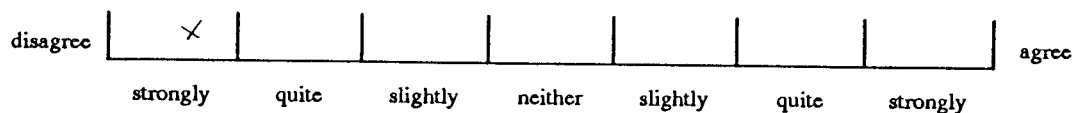
U-15 I would have no difficulty telling others about the results of using a CAS.



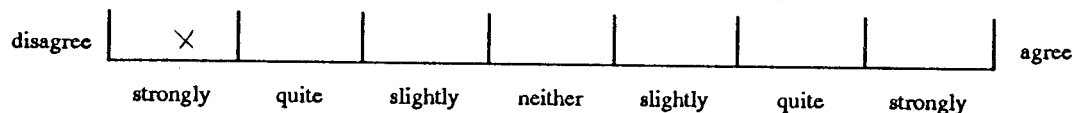
U-16 I know where I can go to satisfactorily try out various uses of a CAS.



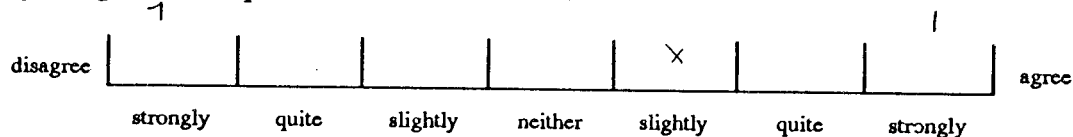
U-17 People in my organization who use a CAS have more prestige than those who do not.



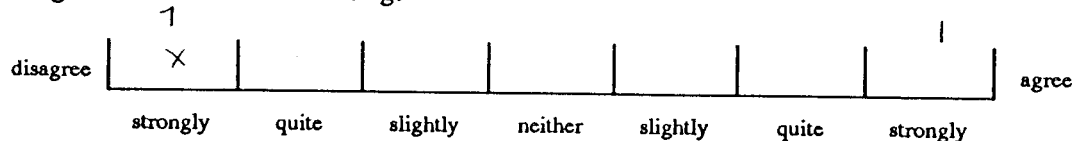
U-18 Although it might be helpful, using a CAS is certainly not compulsory in my job.



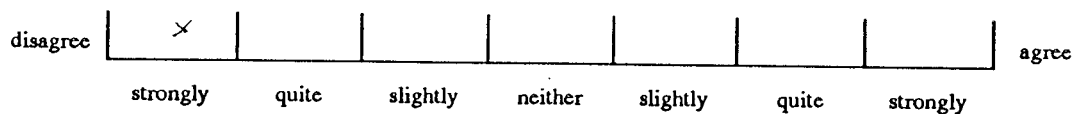
U-19 My using a CAS requires a lot of mental effort.



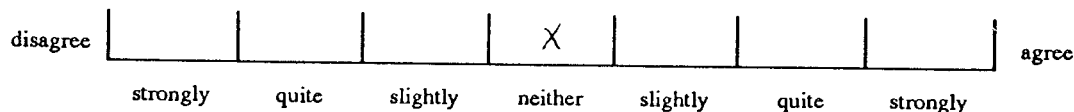
U-20 Using a CAS is often frustrating.



U-21 People in my organization who use a CAS have a high profile.



U-22 A CAS was available to me to adequately test run various applications.



U-23 I believe I could communicate to others the consequences of using a CAS.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | X | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-24 I believe that it is easy to get a CAS to do what I want it to do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | X | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-25 Overall, I believe that a CAS is easy to use.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | X | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-26 Using a CAS improves my job performance.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | X | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-27 CAS are not very visible in my organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | X | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-28 Overall, I find using a CAS to be advantageous to my job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | X | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-29 Before deciding whether to use any CAS applications, I was able to properly try them out.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | X | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-30 Learning to operate a CAS is easy for me.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | | X | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-31 Using a CAS enhances my effectiveness on the job.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | X | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-32 Using a CAS fits into my work style.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | X | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-33 I would have difficulty explaining why a CAS may or may not be beneficial.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | X | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-34 I was permitted to use a CAS on a trial basis long enough to see what it could do.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | X | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-35 Using a CAS gives me greater control over my work.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | X | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-36 Using a CAS increases my productivity.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | X | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-37 Having a CAS is a status symbol in my organization.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | X | | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

U-38 It is easy for me to observe others using CAS in my firm.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | | X | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

FINALLY, IN THIS SECTION WE WOULD LIKE TO ASK YOU A FEW QUESTIONS ABOUT YOUR USE OF THE CAS.

B-1 Overall, my using a CAS in my job is (place an X on all four scales):

| | | | | | | | | |
|----------|-----------|-------|----------|---------|----------|-------|-----------|------------|
| good | | | | | | | | bad |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| | 7 | | | | | | 1 | |
| harmful | | | | | | | | beneficial |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| | | | | | | | | |
| wise | | | | | | | | foolish |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| | 7 | | | | | | 1 | |
| negative | | | | | | | | positive |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| | | | | | | | | |

B-2 Assuming that any decision to use the CAS is totally up to you, how would you rate your potential use of the CAS in the next six months?

| | | | | | | | | |
|------------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| | 7 | | | | | | 1 | |
| improbable | | | | | | | | probable |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |
| | | | | | | | | |

B-3 Approximately when (month and year) did you first start using a CAS beyond any trial of it you may have carried out?

7 10 86
 MONTH YEAR

B-4 Overall, how many hours per week do you use a CAS? 30

HOURS

B-5 How regularly do you now use a CAS? (Place an 'X' under the appropriate column):

| Not at all | Less than once per month | About 1-3 times per month | About once per week | 2-4 times per week | About once per day | More than once per day |
|------------|--------------------------------|---------------------------------|---------------------------|-----------------------|--------------------------|------------------------------|
| | | | | | | X |

B-6 For each computer function listed below, please indicate whether you use it on a mainframe/mini computer, on a microcomputer, on both, or on neither. (Place an 'X' under the appropriate column):

| | Mainframe/ Mini | Micro | Both | Neither |
|-----------------------|--------------------|-------|------|---------|
| Accounting Software | | X | | |
| Graphics Generation | | | | X |
| Information Retrieval | | | | X |
| Report Generation | | X | | |
| Spreadsheet | | X | | |
| Statistical Analysis | | | | X |
| Text/word Processing | | | | X |
| Other (please specify | | | | |

B-7 On average, how frequently do you currently use the following functions (place an 'X' under the appropriate column):

| | Not at all | Less than once per month | About 1-3 times per month | About once per week | 2-4 times per week | About once per day | More than once per day |
|------------------------|------------|--------------------------|---------------------------|---------------------|--------------------|--------------------|------------------------|
| Accounting Software | | | | | | | X |
| Graphics Generation | X | | | | | | |
| Information Retrieval | | | | | | | X |
| Report Generation | | | | | | | X |
| Spreadsheet | | | | | | | X |
| Statistical Analysis | X | | | | | | |
| Text/word Processing | X | | | | | | |
| Other (please specify) | | | | | | | |

B-8 For each of the following questions, place an 'X' under the appropriate column for each applicable function:

- On average how many hours per week do you spend using the CAS on the following functions?
- Please indicate approximately how long (in months) you have been regularly using any of the following functions.

| | Accounting Software | Graphics Generation | Information Retrieval | Report Generation | Spreadsheet | Statistical Analysis | Text/word Processing | Other (please specify) |
|--------|---------------------|---------------------|-----------------------|-------------------|-------------|----------------------|----------------------|------------------------|
| HOURS | 4 | | 1 | 1 | 1 | | | |
| MONTHS | 18 | | 18 | 18 | 18 | | | |

B-9 Overall, how do you expect your usage of the CAS will change in the next six months? (Place an 'X' in the appropriate column):

| | | | | | | | | |
|-----------|--------------------|---------------|------------|------|------------|---------------|--------------------|-----------|
| increased | | | | X | | | | decreased |
| | signifi- cantly | some- what | marginally | same | marginally | some- what | signifi- cantly | |

B-10 Overall, how has your usage of CAS changed in the last six months? (Place an 'X' in the appropriate column):

| | | | | | | | | |
|-----------|--------------------|---------------|------------|------|------------|---------------|--------------------|-----------|
| increased | | | | X | | | | decreased |
| | signifi- cantly | some- what | marginally | same | marginally | some- what | signifi- cantly | |

B-11 I have been using a CAS for (place an 'X' under the appropriate column):

| | Less than once per month | About 1-3 times per month | About once per week | 2-4 times per week | About once per day | More than once per day |
|------------|--------------------------------|---------------------------------|---------------------------|-----------------------|--------------------------|------------------------------|
| Not at all | | | | | | |
| | | | | | | X |

B-12 When I started using my CAS, I received continuing support (training or help) for my CAS from the following sources (place an 'X' under the appropriate column for each source):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|------------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| Other personnel from my company | | | X | | | | X |
| Personal friend (non-employee) | X | | | | | | |
| Public accounting firm | X | | | | | | |
| Non-Accountant computer consultant | X | | | | | | |
| Other (please specify) | | | | | | | |

B-13 I currently receive continuing support (training or help) for my CAS from the following sources (place an 'X' under the appropriate column for each source):

| | Not at All | Less than Once per Month | About 1-3 Times per Month | Once per Week | About 2-4 Times per Week | About Once per Day | More than Once per Day |
|------------------------------------|------------|--------------------------|---------------------------|---------------|--------------------------|--------------------|------------------------|
| Other personnel from my company | | | X | | | | |
| Personal friend (non-employee) | X | | | | | | |
| Public accounting firm | X | | | | | | |
| Non-Accountant computer consultant | X | | | | | | |
| Other (please specify) | X | | | | | | |

B-16 I plan on getting my future CAS help from the following sources (place an 'X' under the appropriate column for each applicable source):

| | none | | | | | | | constant |
|------------------------------------|------|---|---|------|---|---|---|----------|
| | 1 | 2 | 3 | some | 5 | 6 | 7 | |
| Other personnel from my company | | | | | | | X | |
| Personal friend (non-employee) | | | | | | | | |
| Public accounting firm | | | | | | | X | |
| Non-Accountant computer consultant | | | | | | | | |
| Other (please specify) | | | | | | | | |

B-17 I am satisfied with the current level of continuing support for my CAS that I receive from the following sources (place an 'X' under the appropriate column for each applicable source):

| | satisfied | | | | | | unsatisfied |
|------------------------------------|-----------|-------|----------|---------|----------|-------|-------------|
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| Other personnel from my company | | X | | | | | |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | X | | | |
| Non-Accountant computer consultant | | | | | | | |
| None | | | | | | | |
| Other (please specify) | | | | | | | |

B-18 How effective do you feel the following were in helping you to get started in your use of a CAS?
(Place an 'X' under the appropriate column for each applicable source):

| | effective | | | | | | ineffective |
|------------------------------------|-----------|-------|----------|---------|----------|-------|-------------|
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| Other personnel from my company | X | | | | | | |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | X | | | |
| Non-Accountant computer consultant | | | | | | | |
| Other (please specify) | | | | | | | |

B-19 How effective do you feel the following have been in helping you in your current use of a CAS?
(Place an 'X' under the appropriate column for each applicable source):

| | effective | | | | | | ineffective |
|------------------------------------|-----------|-------|----------|---------|----------|-------|-------------|
| | extremely | quite | slightly | neither | slightly | quite | extremely |
| Other personnel from my company | X | | | | | | |
| Personal friend (non-employee) | | | | | | | |
| Public accounting firm | | | | X | | | |
| Non-Accountant computer consultant | | | | | | | |
| Other (please specify) | | | | | | | |

THANK YOU FOR YOUR PERSEVERANCE AND COOPERATION SO FAR. NOW, PLEASE SKIP TO THE FINAL SECTION, SECTION D.

In this last section, we would like to ask you some questions about yourself. Remember, all answers are confidential, and no respondent can be identified, so please give as candid a response as possible.

FIRST, WE WOULD LIKE YOU TO ONCE AGAIN INDICATE AGREEMENT OR DISAGREEMENT WITH A NUMBER OF STATEMENTS; THIS TIME ABOUT YOURSELF. PLEASE PLACE AN 'X' IN THE APPROPRIATE SPACE.

I-1 I am generally cautious about accepting new ideas.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | X | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-2 I rarely trust new ideas until I can see whether the vast majority of people around me accept them.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | X | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-3 I am aware that I am usually one of the last people in my group to accept something new.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | X | | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-4 I am reluctant about adopting new ways of doing things until I see them working for people around me.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | X | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-5 I find it stimulating to be original in my thinking and behaviour.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | X | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-6 I tend to feel that the old way of living and doing things is the best way.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | X | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-7 I am challenged by ambiguities and unsolved problems.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | | X | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-8 I must see other people using new innovations before I will consider them.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | X | | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-9 I am challenged by unanswered questions.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | X | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

I-10 I often find myself sceptical of new ideas.

| | | | | | | | | |
|----------|----------|-------|----------|---------|----------|-------|----------|-------|
| disagree | | | | X | | | | agree |
| | strongly | quite | slightly | neither | slightly | quite | strongly | |

NEXT, WOULD YOU PLEASE INDICATE HOW LIKELY OR UNLIKELY EACH OF THE FOLLOWING STATEMENTS ARE BY ONCE AGAIN PLACING AN 'X' IN THE APPROPRIATE SPACE.

S-1 Most people who are important to me think I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | X | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

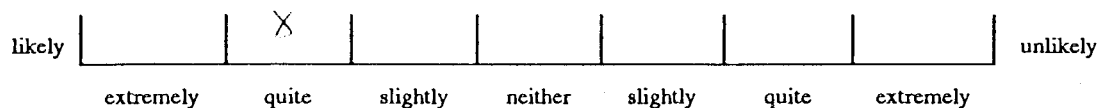
S-2 My close friends think that I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | | X | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

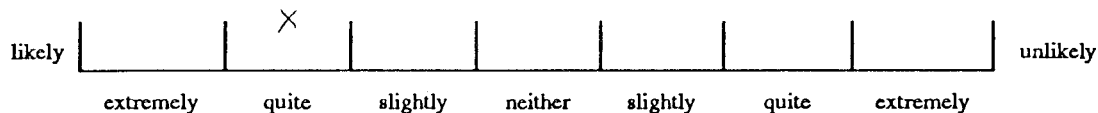
S-3 My co-workers (peers) think that I should use the CAS in my job.

| | | | | | | | | |
|--------|-----------|-------|----------|---------|----------|-------|-----------|----------|
| likely | | X | | | | | | unlikely |
| | extremely | quite | slightly | neither | slightly | quite | extremely | |

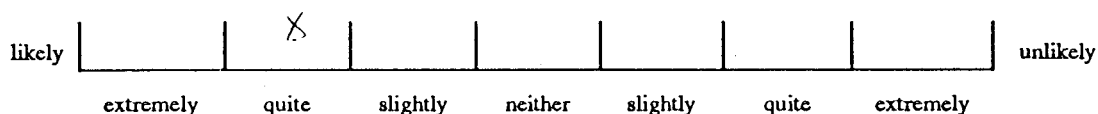
S-4 My immediate superiors think that I should use the CAS in my job.



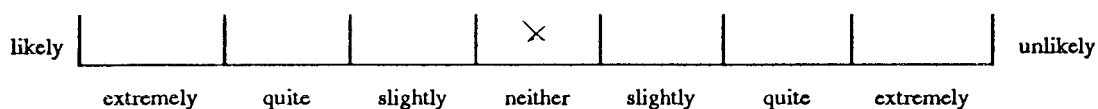
S-5 Senior management thinks that I should use the CAS in my job.



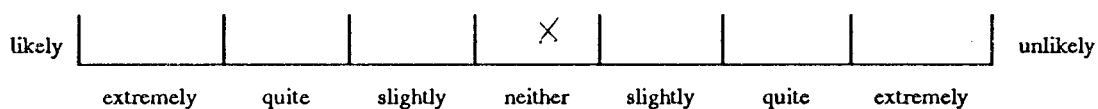
S-6 My subordinates think I should use the CAS in my job.



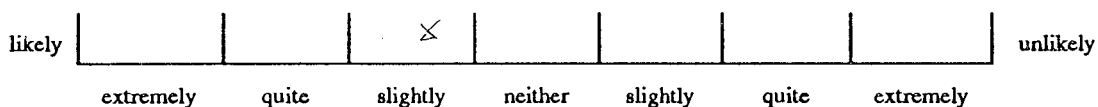
S-7 Generally speaking, I want to do what most people who are important to me think I should do.



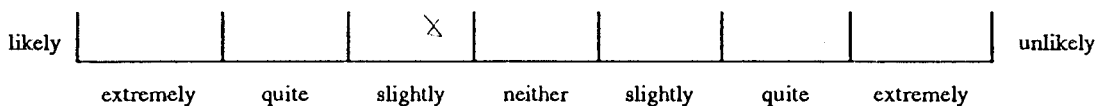
S-8 Generally speaking, I want to do what my close friends think I should do.



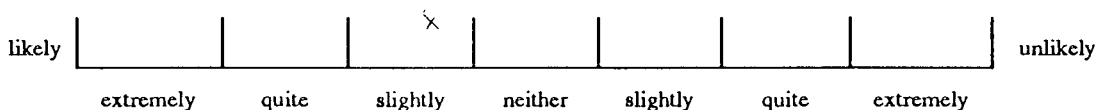
S-9 Generally speaking, I want to do what my co-workers think I should do.



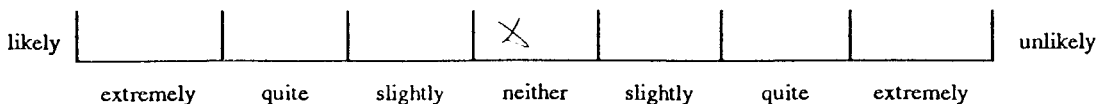
S-10 Generally speaking, I want to do what my immediate supervisors think I should do.



S-11 Generally speaking, I want to do what senior management thinks I should do.



S-12 Generally speaking, I want to do what my subordinates think I should do.



**FINALLY, WE WOULD LIKE TO ASK A FEW QUESTIONS ABOUT YOURSELF
FOR STATISTICAL PURPOSES. COULD YOU PLEASE INDICATE:**

P-1 Your sex (place an 'X' beside the appropriate column)

_____ MALE
X _____ FEMALE

P-2 Your present age: 28 years

P-3 Your department: ACCOUNTING

P-4 Your job title: ACCOUNTANT

P-5 Years you have worked in your current department. 1 1/2 years

P-6 Years you have worked in this company. 1 1/2 years

P-7 What is the highest level of education that you completed? (place an 'X' beside the appropriate column)

_____ GRADE SCHOOL
_____ SOME HIGH SCHOOL
_____ HIGH SCHOOL GRADUATE
_____ SOME TECHNICAL COLLEGE
_____ TECHNICAL COLLEGE GRADUATE
_____ SOME COMMUNITY COLLEGE
X _____ COMMUNITY COLLEGE GRADUATE
_____ SOME UNIVERSITY
_____ UNIVERSITY GRADUATE
_____ POSTGRADUATE

P-8 The job that best describes my organizational level is (place an 'X' beside the appropriate column)

_____ EXECUTIVE/TOP MANAGEMENT
_____ MIDDLE MANAGEMENT
_____ SUPERVISORY
_____ PROFESSIONAL/EXEMPT
X _____ TECHNICAL/NON-PROFIT
_____ CLERICAL
_____ OTHER (please specify)

F-1 Number of: Employees Accounting staff

Full time 7 3

Part time _____

F-2 Annual Sales last year (in thousands of dollars. k=1,000).

| < \$250k | \$250k-\$500k | \$500k-\$1,000k | \$1,000k-\$10,000k | > \$10,000k |
|-------------------------------------|---------------|-----------------|--------------------|-------------|
| <input checked="" type="checkbox"/> | | | | |

F-3 Type of organization (eg. profit, non-profit, CO-OP, etc....)

PRIVATE

F-4 Does your firm plan to implement or expand a CAS in the next two years? (Yes or No)

Yes _____ No _____ Don't Know ☒

If Yes, approximately how much do you expect to spend on the CAS in this time?

\$ _____.

F-5 THANK YOU VERY MUCH FOR YOUR PARTICIPATION!

If you wish to add any comments or further observations, please use the space below or simply attach them to this page.

Appendix II - B1

Client Letter

YOUR FIRM'S LETTERHEAD

Dear Client:

The University of British Columbia has contacted our firm about participating in a study on Information Technology (IT). They have also requested permission to contact our clients in order to ask you to participate in the study.

Our firm has met with the researchers from UBC to find out more about the nature of the study. We believe that the results from this study would be important to both our firm and to our clients' helping us to manage the new forms of IT that will be introduced into firms like yours over the next few years (and beyond).

We would like to encourage you to participate in this study and fill out the enclosed questionnaire(s). You may find more than one questionnaire with the enclosed material. Please distribute a questionnaire to the owner/manager, the chief accountant, and to any other accounting staff members interested in participating. Also, please use the enclosed return envelope to mail the completed questionnaires.

Confidentiality is assured and will be maintained in two ways:

1. Your responses cannot be traced back to your firm as the UBC researchers **do not and will not have access** to your name or address (unless you specifically include this information on the questionnaire). All mailings are handled by our firm.
2. Since you will be mailing the completed questionnaire back to the UBC researchers, no personnel from our accounting firm will have access to your responses.

If you have not been provided with enough questionnaires, please call our office or photocopy sufficient additional questionnaires.

If you have any questions about this study please contact the UBC researchers at the phone number on the attached letter.

Our firm is not sponsoring or otherwise associated with either the research study or the UBC researchers.

Appendix II - B2

Partner Letter



Faculty of Commerce
and Business Administration
2053 Main Mall
Vancouver, B.C. Canada V6T 1Z2
Fax: (604) 822-8489

Albert S. Dexter
Associate Professor
Management Information Systems
Telephone: (604) 822-8380

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September 13, 1991

Dear Sir/Madame:

We are conducting a study at the University of British Columbia on Information Technology (IT). We would like to determine how IT is affecting Small Business firms.

Many firms have installed computer systems, which are a type of IT. Some of these systems have been installed successfully while others have not been very successful. The purpose of our research is to determine what the difference is between firms that have successfully installed computer systems and those that were not so successfully installed. We will obtain this information from a questionnaire that asks respondents their opinions about using computers.

We hope to use the results from this study to help owners and managers make sound business decisions about acquiring other IT in the future. It is undeniable that firms will be purchasing other IT in the future. Technology such as Teleconferencing, Networking, Image Processing, Desktop Publishing, Multimedia, etc., are currently becoming established as the newest forms of IT that many businesses are looking at to improve their competitive position. Over the next five to ten years there will be other IT's that we can scarcely conceive as yet (could you have imagined our current IT ten years ago?).

We would like to get your opinions about using computers by filling out a questionnaire. This will take approximately 20 to 25 minutes. Your opinion is important, whether or not you currently use a computer, and we would like to hear from you. Please note that your answers will be completely confidential, and that anonymity is assured.

Once again, the results of this research should help us to better understand what people think about personally using computers. Other studies have shown that there is a link between what employees think and how an organization performs. Thus our results should enable organizations to better manage the spread of computers and other IT. As a token of our appreciation, once the study is completed, we would be pleased to send you a copy of our findings, conclusions and recommendations if you send us a card indicating your name and address. We hope to receive your completed questionnaire by the end of the week. Please mail it in the envelope provided.

If you have any questions about this questionnaire, please call Rick Laktin at (604)-270-8953.

Thank you for your assistance.

Sincerely,

Rick Laktin

Albert S. Dexter