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Perceived Effect of Personal Use of Managerial Workstations on Individual Productivity

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WALDEN UNIVERSITY

DISSERTATION APPROVAL

PERCEIVED EFFECT OF PERSONAL USE OF MANAGERIAL WORKSTATIONS ON INDIVIDUAL PRODUCTIVITY

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ABSTRACT

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B.B.A., Georgia State University, 1971

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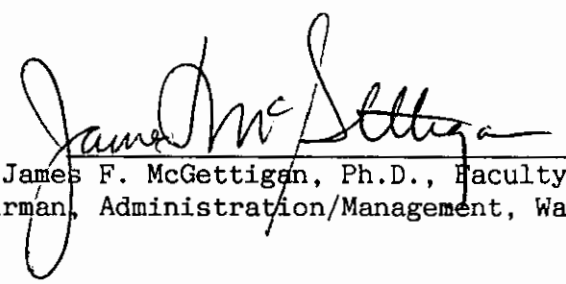

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A Dissertation Submitted in Partial Fulfillment of the
Requirements for the Degree of
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PERCEIVED EFFECT OF PERSONAL USE OF
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The purpose of this research was to determine the extent of penetration of managerial workstations into the management ranks; and whether age, education and exposure to automation do affect perceptions and subsequent productivity gains from workstation utilization.

Are the attitudes and beliefs of older managers the key factor in slowing progress in implementing change and reaping the benefits of productivity? Or, are companies failing in their implementation strategies and participative management approaches?

A descriptive-survey design was utilized. The cover letter and three-page questionnaire were circulated to 490 companies in the five-county metropolitan Atlanta area. Represented in this sample was a cross section of public and private sector organizations. Variables addressed in the six hypotheses were: nature of workstation use; involvement in planning; perception of benefit to productivity; and preferred method of training.

Data was entered into a data base for query manipulation. Statistical Package for the Social Sciences, (SPSS), software was utilized for analysis, using chi-square, Cramer's V and correlation analysis.

Findings support exposure to automation and the length of time the manager has been using the workstation in the daily setting, to be more influential than age. Communication with other workers via the workstation did not prove to be as strong a determinant of whether the manager perceived the workstation to be beneficial to his/her productivity.

Fully supported was the positive effect of having the manager participate in the initial planning for implementation of automation. Self-study was the preferred method of training.

Further research is needed on the effect of automation on decision-making and the most effective training strategies for this unique and critical population. Top managers cannot afford to ignore the value-added benefit potential to productivity afforded by managerial workstations.

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And, my thanks to the many respondents who gave me the necessary data to analyze.

DEDICATION

I dedicate this Dissertation to
my husband, John R. Allen, and to
my daughter, Pamela Jo Kealy. Their
undying love and endless support
made its accomplishment possible.

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CHAPTER I

INTRODUCTION

The one item that will not exist in the office of the future is the manager who cannot operate his or her own workstation!

Industrialization is a prime mover of overall cultural and social change. Social changes ultimately force the more autonomous institutions within society to change and adapt themselves creatively; the changing institution again influences the overall society (Ponsioen, 1969).

Before the second industrial revolution there were journeymen and laborers. Afterward, the greatest expansion was in the number of semiskilled machine tenders and, more important, skilled workers. The integration of information processing with productive machinery amounts to a third industrial revolution. Technologists will shift production from being manual to being knowledge-based. (Drucker, 1970).

America has become an information society. The majority of American workers are now white-collar workers, and about 45 percent of all

American workers work in offices. Office work is rapidly being "automated" which has tremendous implications for productivity. (Gibbons, 1985)

The demand for information will continue to grow. With computerization, the unit cost of collecting, processing, distributing, and using information will decline. More kinds of information will be gathered and used for new purposes, and many new information services and products will be created. Demand for information and increased productivity are two major factors in the future employment equation. The consequences of office automation for office employment will depend in large part on the interactions between them.

In the early 1900's, the telephone was introduced to the business scene. Many managers felt uncomfortable using this new technology, preferring to write letters and visit colleagues and customers. Others quickly grabbed onto this new technology and began using it to conduct their day-to-day business.

Within a few years, the accelerating pace of business required decisions to be made more rapidly. The managers using telephones were able to call their colleagues for information and to make quick decisions. Those managers who could not be reached by telephone because they fought using this new technology were slowly squeezed out of the decision-making process of their organization. These managers became obsolete in the business world that began relying on the telephone (Perry, 1987).

The use of the managerial workstation closely parallels the introduction of the telephone. When first introduced, the workstation appeared to be the toy of the technician, and then the equipment of the clerical staf. Eventually, more and more managers began experimenting with this new toy and found that it significantly increased their personal productivity. Part of this productivity gain is associated with a more rapid and effective means of transferring information among one's business colleagues.

Electronic mail and electronic conferencing enable many decisions to be made without the need for formal meetings or informal one-to-one discussions. Decisions and concurrence among managers can be obtained much more quickly through the use of communication facilities. Administrative work consists of tying information to decisions.

Workstation is a fancy name for a small computer connected to a telephone line that has some special capabilities. To be considered a workstation, the facility must have these capabilities:

--The workstation can receive messages when unattended.
--The workstation can store data electronically.
--The workstation can process data via computer programs.
--The workstation can transmit messages to other facilities and/or people with like capabilities.

An APPLE computer or IBM PCjr tied to a communication line could be a workstation. It is the use of electronic equipment to fulfill

day-to-day responsibilities, however, not the hardware and software that turns the above four capabilities into a workstation.

Perry (1987) contends that the workstation is becoming commonplace in many organizations, and tomorrow the manager without a workstation will be excluded from mainstream decision-making. Concepts that few dared to imagine a few years ago are a reality today. The technology is changing so rapidly that the dreams of today will become realities tomorrow. The workstation will become the vehicle that unleashes office productivity.

The only successful strategy for mastering the workstation is to become a "believer." Use of information technology by corporate managers and professionals is growing. Fewer managers are hesitating to use computers directly for fear of being viewed as technicians. In fact, sophisticated personal computer systems are looked at by managers as symbols of success according to Forcht and Pierson (1987).

In addition, company attitudes toward computers and office automation (OA) are changing. According to Sandburg (1986), top management is increasingly aware of the contribution computer-based technologies can make to long-term effectivenss of the organization. And, they are being quite selective in their awareness. Though many new applications may become justified on the basis of cost reduction/ displacement, management is coming to terms with the fact that the value added by interactive computing by business professionals cannot be

quantified, but has an increasingly powerful impact on the cost-effectiveness of the organization.

One may define office automation as the application of technology to tasks which were formerly people-intensive. Another way to look at it is to say that office automation is a means of processing information in the fastest and most cost-effective manner. Both definitions are generalizations and both are correct as discussed by Johnson (1986).

United Telephone of Florida won the 1986 Office Automation Award from Administrative Management Magazine. All the company's senior executives were provided with terminals, but only those who use their terminals were allowed to keep them. To get a terminal, others had to fill out a request form, describing their needs and the type equipment they would like. They do usage studies and keep check on possible training problems.

Dick Brown, Vice President of Operations at United Telephone, discusses the decision to implement an OA system:

> "You can study it to death, and if you're timid about it you can find a hundred reasons why you shouldn't do it. When it really got all said and done, I compared the decision to one I made a number of years ago (when I was with another company). The question was, 'Should we convert all of our rotary telephones to touchtone?' That's a tough thing to prove in terms of dollars and cents. Do you really need buttons instead of a rotary dial. That was a big

decision 15 years ago. But, pretty soon you have to say it's the new technology. It's going to save people time. Although it's hard to quantify, it just makes sense to do it. I wouldn't waste my time with a rotary telephone nowadays. And I think 15 to 20 years from now we'll look back and say, 'Why did we perpetuate paper?'

Paper memos still tell me lots of information, but more and more I am dependent on my terminal for the information I need instantly. Once you get the confidence and take the time to learn how to use it, you reap the benefits of this technology. Management has got to have confidence that this is the wave of the future."

The marriage of computer and telecommunications technologies has spawned the capabilities of the managerial workstation. The marriage was made possible by the marked drop in the cost of processing power in recent years, advances in telecommunication technology, and the divestiture of the AT&T telephone monopoly with the accompanying deregulation that opened the way for other vendors to market telecommunications products (Siragusa, 1986).

By the year 2000 the so-called managerial or executive workstation will be on everyone's desk. It will replace the telephone, the personal computer, the terminals, the modem, electronic mail software, and convenience devices like the calculator, desk and appointment calendars, the Rolodex - even telephone message and memo pads. Extra fancy models may allow simultaneous communications in voice, text, graphics, image and video. They might even take dictation. In all probability, they will

function as total human resource support systems with access to information at ones fingertip through the utilization of expert systems and even simulated artificial intelligence. (Putnam, Bell and Zwieten, 1987).

Initially, automation was thought to be a clerical function. Productivity studies took the form of monitoring keystrokes, number of letters typed per day, etc. There is now a real thrust in many companies to automate the front office or senior manager ranks. Since this is the location of the larger salaries, it follows that some real productivity gains should be possible. One study has shown that 80 percent of the costs in a typical office are incurred by professional and managerial staff.

There is evidence of some resistance from the top management group. Progress appears to be going slow. CEO's spend most of their time on the phone or in face-to-face contact. Most of them do not use computers. They are usually between the ages of 45 and 65, were past the age of 35 when computers came into general office use about 10 years ago, and have no desire to learn how to use a computer-like device. Besides, their secretaries make their calls and keep their calendars, and they like it that way. Some analysts have said they expect the "techno dread" to subside as the under-30 generation, especially the ones who grew up using computers, attains executive rank in the next 20 years (Siragusa, 1986).

It is widely known and accepted that the typical employee will resist change to procedures or routines in the workplace that have become

comfortable over the years. This typical resistance can be magnified if it is coupled with the belief that automation is not cost-effective based on a limited or negative experience or exposure to its benefits.

Galitz (1980) presents two categories of users who must be involved in successful implementation strategies. The first includes the fairly young and well-educated who have been exposed to automation as part of their education. These people will know what technology offers and will demand its application. The second group--those educated before technology began infiltrating educational institutions--will have been exposed to technology only from a distance. These people are busy, untrained and non-technical. The sole criteria by which they judge technology will be its ability to help them perform jobs faster and easier than traditional methods did. These are the users to whom technology must be sold. This later group is characterized as: highly intelligent, not amenable to training, not code oriented, highly impatient, easily confused by "system error messages," low panic-threshold, demand a worthwhile payoff.

Whisler (1970) in a wide-ranging study conducted from an organization behaviorist's perspective confirmed some of the attitudinal and demographic findings but had an interesting, organizational interpretation of such results. He also found that younger managers had a more favorable attitude toward computers--except when compared to those older individuals at the top of the organization. These top managers felt "beyond the reach of the technology" and were consequently undisturbed by the change. One wonders whether this finding holds for

the contemporary environment. Whisler also found that line managers held negative attitudes toward computer systems because they felt uneasy about the influence conferred on DP staff specialists within the organization.

Involvement of all executives, managers and professionals will not be achieved in the near term in any organization. There is still a need for improvement in the use of these tools for this audience. In the coming years we should see advances in hardware, but it is not clear if the software solutions will be available. The acceptance of automation, especially at the executive level cannot be guaranteed unless such enhancements and a continuing educational program is assured.

The secret of executive success has much to do with leverage. In an earlier age, the solution was to get people, capital and equipment to work for you. This is still the answer, but the leverage is now applied in a different way. The productive executive must learn to leverage his work in managing information.

Today's executives are expected to manage with indirect information. Data has been captured and is waiting for retrieval, interpretation, comparison and reduction to a business decision. But with so much information, the executive must know what is important and how to convey just that part to management. There is a valid concern over the integrity of data for analysis and summarization.

Potential payoffs abound in the area of managerial productivity. According to Colin Mick, Director of Decision Information Services

Consulting Firm in Palo Alto, California and the author of several books, maximizing productivity through work station support requires a constant, consistent effort in four areas: seeking new tools and techniques for using work stations, maintaining close contact with users, remaining sensitive to their needs and providing a continuing education and support program.

For most managers, many situational leadership roles must be employed on a day-to-day basis. Others would argue that it does not matter how the top managers spend their time. Their thrust must be more external and politically oriented than internal and operational (Bradford, Cohen, 1984). Currently, many top managers seem to feel unable to "reach" the people who work for their organization--to know them well enough to put their various talents to the best use, and to relate to them as individuals in such a way that they are motivated to contribute what they can to the organization's progress and well-being. Feeling out of touch with what is going on is as much a problem for the employee as it is for the executive. The executive feels the pain in terms of productivity and profit; the employee feels a loss of effectiveness and a sense of detachment. (Levinson, 1981) Utilization of managerial workstation communication functions can significantly help.

PROBLEM

The focus of this research will be to determine the extent of penetration of managerial workstations into the management ranks and

whether age, education and exposure to automation do affect perceptions and subsequent productivity gains from workstation utilization.

Are the attitudes and beliefs of older managers the key factor in slowing progress in implementing change and reaping the benefits to productivity? Or, are companies failing in their implementation strategies? Do some managers feel that personal use of computers lowers their status to doing secretarial tasks? The results should add insight into just how workstations are being utilized.

SIGNIFICANCE

Companies are making significant investments in automation. Yet, very little, if any, research has been done on how successful the implementation has been. What is the result of sudden change in work procedures, communication patterns, perceptions of power relationships, boss/secretary interactions, and individual productivity?

Theories in best selling books such as IN SEARCH OF EXCELLENCE encourage managers who are leaders to stay in touch with not only the people but the product or service. Time management becomes paramount as is the necessity of having timely access to accurate data and information (Peters, 1982). Use of a managerial workstation with tailored applications can benefit individual productivity significantly.

Research in this area can provide valuable feedback both to companies who are in the initial stages of implementation as well as to

those in the planning stages who are trying to determine the optimum hardware/software configuration, ergonomics, etc.

By examining attitudes, the study will be able to suggest answers as to the validity of resistance to change. Keener insight is needed on the perception of benefits to this group of top managers since systems must be tailored to fit their job and information needs.

Even though the population sample may not contain an even spread of ages, it will be possible to test the theory that the older, less educated manager, who has less exposure to automation, will be the most resistant to change. In today's society the older managers occupy the majority of the top salaries and also have the greatest need for timely access to accurate information and communication networks.

SOCIAL CHANGE RELEVANCE

Today we are witnessing major transitions and transformations in organizational life. The macro environment in which organizations exist is unpredictable and turbulent. From one year to the next business leaders do not know what competition they will face, how technologies will change, what the federal monetary policy will do to interest rates, whether Wall Street will favor their stock, or how much the government will intervene in how they do business.

Social and economic changes in the American lifestyle are also putting pressure on organizations to alter more traditional work

patterns. One and a half million workers will be entering the paid labor force each year; new jobs are being created at a rate of 3 million per year. Technology is displacing employees, changing organization structures and making it necessary for countless others to switch occupations and be retrained for new careers. Even if there is a more conservative growth rate, there will be a labor shortage resulting in stronger competition for qualified employees and an increasing value on the aging worker.

The baby-boomers are now entrenched firmly in the work force. These employees differ in several ways from previous decades of workers in their values, expectations and education. By the year 2000, the average of the workforce will climb from 36 today to 39. The number of young workers age 16-24 will drop by almost 2 million, or 8 percent. (Johnston and Packer, 1987)

A changing and better-educated workforce expects more from both work and employers, and not simply in terms of material benefits and promotions. Durkheim's principle of the division of labor being the central principle of social organization and the chief source of cohesion in modern society requires scrutiny (Smith, 1973). Employees want more participation in making decisions about their work and are seriously questioning their commitment to a big business. Some of the major organizational trends resulting from changing work and social environments as reported by McDermott (1987) are as follows:

--"A direct movement towards a service economy is leading to a decrease in blue collar industrial jobs and a shift toward white-collar, service-oriented jobs, and a post industrial wasteland in many parts of the country with factories closing or relocating and a work force that is increasingly oriented toward knowledge and technology.

--An influx of technology into both factories and offices is resulting in constant changes in operations, changing job structures and skill requirements, and a shortage of workers and increased demand for people with specialized technical skills.

--Increased information processing is allowing quicker access to information, faster decision making, and power shifts to people possessing leading-edge information.

--Changes in organizational structures are taking place as the traditional bureaucracy - consisting of many layers - is being attacked on all fronts. Middle-management positions are eroding as well as blue collar jobs, resulting in flatter organizations and more highly skilled and complex production and service jobs among factory, office, and professional employees."

As espoused by Talcott Parsons, (1966) equilibrium theory fits in that organizations stabilize and are very resistant to change. Organizations are made up of people who basically resist change also. However, a critical process in changing how one does business with automation must occur rapidly or the organization will restabilize itself

and any productivity gains potentially possible due to the introduction of new capabilities will be lost. Understanding the cultural system and values of groups in organizations can mean the difference between success and failure when implementing technology or introducing new methods (Arensberg and Niehoff, 1971).

HYPOTHESES

1. The age of individuals in the sample will be related to hours of use of the workstation.

2. The perception of effectiveness will be related most closely to feelings of productivity, reliance on the workstation for daily effectiveness and the communication with other workers via the workstation.

3. The location of the workstation depends heavily on the manager's choosing or not choosing to have one.

4. People who work longer hours on the workstation tend to see more positive job changes.

5. Participation in the decision to acquire a workstation relates directly to the number of hours worked at the station per week.

6. Of all types of training available, company sponsored training is preferred above all others.

DEFINITION OF TERMS

Manager - A white-collar professional in a capacity with responsibility for human resource management and organizational goal accomplishment.

Perception - A consciousness, an intuitive cognition or awareness that an individual has toward another person or element of the environment, interpreted in the light of experience.

Personal Use - Individual hands-on use as opposed to having a secretary or another person do an action for you.

Productivity - Rate of production of products or outputs.

Resistance - The inherent capacity of a human being to withhold assent or to exert opposing or retarding force toward events deemed undesirable.

Managerial workstation - Small computer connected to a telephone line that can (1) receive messages when unattended; (2) can store data electronically; (3) can process data via computer programs; (4) can transmit messages to other workstations.

ASSUMPTIONS

1. Managers are an important leadershp resource and their situational leadership perogatives must be respected.

2. Managers are committed to being leaders or coaches and are continually striving for improvement.

3. An attitude survey is a valid and reliable methodology for collecting data for the study.

4. Managers are cost conscious and are eager to achieve a positive return on investment in computers and automated processes.

5. Insight gained from a study of this type can lead to more efficient and effective utilization of computers.

6. Insight gained from a study of this type may lead to more efficient and successful implementation strategies for computers and workstations within an organization.

7. Managers may prefer computer-based training over traditional group approaches.

8. Managers do not see the computer replacing the role of the secretary.

SCOPE AND LIMITATIONS

Since a person's attitude is determined by collective beliefs concerning a specific object or event, attitude generally can be measured by assessing belief.

Beliefs - Beliefs are the fundamental building blocks in the conceptual framework used for this study. On the basis of information rceived from outside sources, from direct observation, or by way of various inference processes, an individual learns or forms a number of beliefs concerning an object.

In other words, one associates the object with various attributes. In this manner one forms beliefs about oneself, about other people, behavior, events, about organizations, etc. The totality of an individual's beliefs serves as the informational base that ultimately determines one's attitudes, intentions and behaviors.

Attitudes - An attitude can be described as a learned predisposition to respond (behave) in a consistently favorable or unfavorable manner with respect to a given object. Subsequently, attitude is determined by an individual's belief the object has certain attributes and by one's evaluation of those attributes. Most individuals hold positive and negative beliefs about an object, and attitude is viewed as corresponding to the total evaluation associated with their beliefs. In terms of the relationship between beliefs and attitudes, the conceptual framework thus suggests that an individual's attitude toward some object is related to a set of his beliefs about the object, but not necessarily to any specific belief. Similarly, an individual's attitude toward performing a given behavior will lead to certain consequences and also to one's evaluation of those consequences.

Experiences - Direct experiences with a given object result in the formation of descriptive beliefs about the benefits from the object, which in this study are both focused on attitudes they are willing to express, and limited, to them. These inherent limitations must be added to limits imposed by sample bias, instrument unreliability, and non-response.

CHAPTER II

LITERATURE REVIEW

Introduction

The computer has affected organizations in many ways. As an extremely efficient information processing tool, the computer's impact on individuals, organizations and society has been widespread since the mid-twentieth century. In the workplace, the computer has made changes to individual jobs, to how jobs are organized into work groups, and to organizations themselves in terms of both structure and process. Certainly, the managers of organizations have felt these changes for some time, but until recently, managers have had little direct experience with computing machinery. Computers have largely been devices that make the work of managers' subordinates more efficient--in the factory or in the office. Now, managerial workstations on the desks of managers could make the managerial task more efficient and effective.

"Automation" of the office means support for the office worker with computer based information systems. Since the manager is a key

participant in office work, widespread attempts have been made to provide such support to him/her.

It is important to remember that this study focuses on the use of workstations by managers and business professionals -- not clerical workers or technical professionals. (Note: "Business professionals" are professional persons who are members of a professional organization. In this capacity they may support other professionals. "Technical professionals" are persons with technical backgrounds serving in some line capacity, i.e. engineers, R&D scientists, and the like. Business professionals may also have managerial responsibilities or may have had managerial duties in the past.) In what follows, both managers and businesss professionsls will be referred to an "managers." Applications for clerks and secretaries using word processing equipment have gained widespread acceptance. Use of computer aided design and graphics functions by engineering professionals is now considered status quo. Use by managers is much more problematic. (Norris, 1981; Kirchner, 1983; Young, 1983).

This review draws on several bodies of literature, as well as research on use, impact and satisfaction, and studies involving socio-technical systems theory. Studies relevant to the implementation of office automation have grown in number in recent years. Yet, almost no research has been done on the effect on managerial productivity due to the recency of the phenomenon.

The socio-technical systems literature has grown steadily since its inception over 30 years ago. Socio-technical systems studies have for the most part been situated in production settings, though recently some researchers have used socio-technical design concepts in office settings as well (Taylor, 1982; Cherns, 1976).

The office automation literature has tended to be highly descriptive and lacking in theories or concepts. There are a few notable exceptions. Socio-technical systems theory, on the other hand, provides the researcher with a more fully developed body of concepts, though these concepts have not evolved into a well-defined theory.

A fairly large number of models have been developed to characterize organizational technology and the associated variations in the organizational environment. Included in these models are those of Woodward (1965), Burns and Stalker (1961), Lawrence and Lorsch (1967), Bennis and Slater (1968), Perrow (1967), and Kilman (1983). Each defines a typology of organization based on the process by which goods and services are produced and the environmental constraints which are associated with that process.

However, these typologies do not appear to have been widely used in research on attitudes and behavior in organizaions. Jablin (1979) claims that the little empirical research that has been done is often simplistic and/or of limited generalizability. By way of

illustration, this small amount of technology-based research seems to have focused on a restricted sample of organizations. Pasmore, Francis, Haldeman, and Shani (1982) state, for example, that socio-technical analysis has been applied mainly to organizations using physical technologies, not white-collar or service industries. The developers of the various organizational models used them mainly to explain variance in organizational structure rather than variance in human behavior. Even if we assume that differences in technology in organizations are associated with differences in employee behavior, the nature of the causal relationships involved is not immediately clear.

Attitudes

The importance of understanding attitudes toward computers is stated as follows (Matthews and Wolf, 1979):

> The pervasiveness of computers today demands that we study societal attitudes toward it for at least two reasons: to better understand and correct the fallacious and irrational attitudes toward this integral component of modern life, and to better understand the rational attitudes against computers and their use so that the individual and society may be protected.

As computers become more pervasive throughout society, it is important to understand how individuals may be reacting to computers, i.e. how they feel toward computers in general and specifically how

they relate to them. The following studies reported various attitudinal findings concerning how individuals perceive computers.

Conducting one of the first major studies concerning attitudes toward computers, Lee (1970) interviewed three thousand persons over the age of eighteen. The basic beliefs that emerged from this study were (1) that the computer is a tool that can assist humanity, and (2) that the computer has superhuman thinking qualities and is a threat to man's unique significance in the world. Lee suggested, however, that these results were by no means definitive because of the complexity and ambiguity of the computer as a stimulus. As Lee (1970) stated, "...how individuals perceive it (the computer) and give meaning to it depends very much on their fundamental values, on their personality dynamics, and on their orientation toward life."

TIME Magazine, in coordination with the American Federation of Information Processing Societies, Inc (AFIPS) (Schiller and Gilchrist, 1971), conducted a telephone survey of the public's attitudes toward 15 computer uses. In addition, the survey indicated how people perceived how the computer had impacted the American economy and the individual. Again, the results were not definitive; but it appeared that most individuals were in favor of computer usage for such areas as the control of factory machinery, medical diagnosis and maintaining information files about private citizens. Respondents indicated that they believed the computer would create more leisure time.

A survey conducted in the United States and Germany five years later, Ahl (1976) used questions similar to those in the 1971 study and was thus able to make some comparisons. At that time, people were generally optimistic about the benefits that a computer can offer in such areas as education, law enforcement and health care. Even in the light of perceived undesirable effects, most individuals did not feel threatened by it.

Using the Cybernetics Attitude Scale that he created, Wagman (1983) examined the attitudes of 121 undergraduate students concerning the use of computers in ten areas of society. These ten areas included the computer in relation to society, values, cognition, counseling, education, medicine, politics, the criminal justice system, finance and banking, and mathematics and statistics; however, there was criticism for the use of computers in such areas as counseling and medicine. Gender differences for five subscales (i.e. society, values, cognition, education and criminal justice) were revealed, with males showing more favorable attitudes toward the use of computers in those sectors of society.

Kerber (1983), in surveying 203 undergraduates, found similar results to those of Wagman. He indicated that respondent attitudes were similar concerning three major computer uses: quantitative applications, decision-making applications, and record-keeping applications. Individuals maintained favorable attitudes toward record-keeping and quantitative computer applications; however, a negative response was indicated for the decision-making application.

He further determined that locus of control and interpersonal trust were unrelated to attitudes about the computer. However, he suggested that the nature of the computer application would probably be a strong factor in the value assigned to any decision regarding computer usage.

The research of Zoltan and Chapanis (1982) influenced the present study due to the nature of their research concerning attitudes toward computers as well as the professional status of the sample they chose to examine (i.e. CPA's lawyers, pharmacists and physicians). As in other studies, it was shown that these professional persons had both positive and negative attitudes toward computers, finding them both stimulating and desirable, as well as somewhat depersonalizing; the computer languages were depicted as being difficult and complex. Positive attitudes were indicative of those individuals who had previously been exposed to computers and who had access to a computer at their work place. As a result of a factor analysis, six major dimensions were perceived by professional persons as relating to computers: efficiency, dehumanization, the computer as a partner to man, the computer as a "slave" to man, enjoyment and difficulty. Finally, the study indicated that many of the professional persons surveyed had very little exposure to and/or experience with a computer, thus possibly causing their inaccurate perceptions, and negative attitudes toward this technology. It was suggested that a definite need existed for more and better education concerning the benefits and uses of computers.

It is predicted that everyone in society will eventually be a user of computers either directly or indirectly (Wilton, 1982). Therefore, learning about the process of implementing change and understanding better the attitudes and perceptions of the individual will become increasingly important (Walz and Benjamin, 1979).

Innovation Adoption

The theory of social change produces a typology of adopters of innovation that has been widely discussed and broadly confirmed in research. It stands out as an individual difference measure that may have great utility in theory of managerial utilization of electornic workstations. The five types are: innovators, early adopters, early majority, late majority and laggards. (Rogers and Schoemaker, 1971). There is a large body of research about the psychological differences present in this typology. Since early adopters are a key group to gaining acceptance of any innovation, their characteristics may apply to potential early managerial users of office automation. Rogers and Shoemaker (1971) find confirmation for the following hypotheses: (1) early adopters are younger, (2) early adopters are more educated, (3) early adopters are of higher status, (4) early adopters are upwardly mobile, (5) early adopters are less dogmatic, (6) early adopters are more favorable toward change in general, (7) early adopters are more intelligent, (8) early adopters are more favorable toward risk-taking, (9) early adopters are less fatalistic and (10) early adopters are higher in achievement motivation.

Stereotypes and Status

There is another adopter of innovation typology wherein only two stereotypes exist. On the one hand there is the "technitron" that believes technology can solve any problem, and on the other hand, there is the "luddite" who resists the use of new technolgoy (Springer, 1983). In loose conversation it is often suggested that these types can be predicted based upon professional background, job experience, and the like.

Finally, there has been much made of the status of using an electronic workstation. On the one hand, "making it electronically" has been described as being as important as country club membership and executive dining rooms. Another camp sees any tool as something a laborer, not manager, uses and, further, that the higher one climbs the organizational hierarchy "the less you should really know." In short, using a terminal is "not something to be done in public" (Falvey, 1983). Both the stereotyping and contradictory status theories are sorely unresearched.

Communication Patterns

Management information systems, automated office systems, and electronic mail systems are all forms of computer-based systems directed at assisting office workers at all organizational levels in accomplishing their work activities. As management information systems have become more accepted, a significant body of research and

subsequent knowledge concerning management information systems has developed. This is not true of automated office systems and electronic mail systems.

On a managerial level Olson and Lucas (1982) propose that automated office systems may allow an increase in a managers' span of control, may affect chosen methods for monitoring and controlling the work activities of subordinates, and may affect managers' perceptions of the degree of rationality, flexibility, and free space in the organization.

Montgomery and Benbasat (1983) considered the differential benefits of an electronic mail system with a focus on the distribution of various work activities performed by managers, professional/ technical workers, and clerical workers. Finding that managers spend 75% of their work day in oral communication and 22% in written communication, with professional/technical workers spending 16% and 37% respectively, Montgomery and Benbasat see a clear benefit resulting from the use of an electronic mail system at these levels.

User Requirements/Needs

Because computing technology is advancing so rapidly, there is a growing fear that this technology will be forced upon people and organizations with undue pressure to absorb these new systems into daily work activities. It is important to remember that the technology was developed in response to observed or expressed

shortcomings in the present methods of conducting these activities. However, not all workers recognize these needs or are able to identify the dimensions of these needs with sufficient clarify for technicians to design a system to meet the requirements. Additionally, due to the dynamic nature of organizations, today's needs may not exist tomorrow in anything like the form they possess today.

Coordination

The manager's coordination responsibilities may also be enhanced by automation. There is no empirical work to support this, but Reifschneider believes that "activity management" (i.e. a system designed to plan and monitor performance of tasks contributing to some overall activity) integrates well with the personal workstation approach to management. It seems reasonable to extend this concept to the coordination of subordinate activity in general. After all, information transfer alone achieves coordination in some contexts, and automation facilitates information transfer (Reifschneider, 1981). However, there has been some fear expressed on the part of those in the subordinate role that such "electronic coordination" produces a dehumanized organization in which the system becomes the task master (Zuboff, 1982).

Managerial Job Satisfaction

Empirical work on job satisfaction is in the exploratory stage. There have been no studies describing the impact of automation on job

satisfaction of managers. In a broad investigation of the impact of information systems on user job satisfation levels, Cheney and Dickson (1982) found that in about one-half of the projects studied satisfaction measures showed a post implementation increase.

It is assumed that as automation increases the internal motivation and job satisfaction of managers, utilization will be increased. Indeed, if automation fails to have a positive influence on the core job dimensions, organizations can expect negative outcomes such as lower quality work performance and higher absenteeism and turnover.

In other contexts, the notion that office systems should be designed to have positive effects on such dimensions has been used to avoid negative consequences (Mumford and Weir, 1979). Known as the sociotechnical approach to work design, the process is to diagnose jobs prior to implementing automation along the dimensions suggested by Hackman and Oldham or other (e.g. Herzberg, 1968) "job enrichment" schemes and then use the new system to create more positive effects on satisfation and motivation.

Characteristics of Interpersonal Relationships

Along with the tasks of management, the importance of interpersonal relationships for managers has been emphasized for decades. Exclusive focus on the task by management theorists marked the school of "Scientific Management." Since the Hawthorne studies

conducted at Western Electric (Rothliesburger and Dickson, 1939), it has been understood that the sociology of the workplace is as important to management as the structure of the task. Accepted models for leadership consistently cite relationships with others as a crucial consideration in determining appropriate managerial behavior (Blake and Mouton, 1978). Thus, we conclude that any impact of automation that facilitates the interpersonal process will help support its use by managers; inhibiting factors will create resistance.

That automation impacts relationships among co-workers is virtually unquestioned. The communications functions of office automation are the primary source of these changes. Ideas abound on this topic but careful research is meager.

Leduc (1979) found in an empirical study that communicating personal opinions and feelings electronically is difficult and usually avoided. Thus, to the degree that electronic communications supplant channels that do carry feeling messages, automation is likely to reduce the emotional components of social interaction at work. This effect transforms the quality of work life (Zuboff, 1982). Moreover, it will likely be some time before computer communications become personalized (Morgan 1981). While it would seem that expression of a concern for people requires an emotional content to communications, there is only slight evidence that interpersonal relationships are affected negatively by this communications restriction. Harkness (1977) found that remote supervision was "less sensitive."

Another rationale that implies negative effects from automation on interpersonal relationships comes out of need theories of human motivation. Maslow (1943) and McClelland (1967) have established a widely accepted concept of social needs in individuals. Since many individuals have unsatisfied social needs, a need for affilitation (McClelland, 1967) becomes an important factor in work motivation. It has been assumed that OA will reduce the amount of social interaction (Olson and Lucas, 1982); Zientara, 1980), and it is obvious that time spent at a workstation is not time spent with people, i.e. social interaction. Thus, the rationale goes, OA will reduce motivation to work by inhibiting the satisfaction of social needs in the work environment. If true, this has negative implications for OA utilization.

On the other hand, it is also obvious that electronic communication can increase the number of people "known" and thereby increase interaction with others, albeit through a new medium (Morgan, 1981). Moreover, the successful uses of OA in superior-subordinate communications (Leduc, 1979) and the benefit of enhancing long distance communication (Panko, 1981) argue that OA may have offsetting, positive effects on the satisfaction of social needs at work.

A third construct that is obviously impacted by OA is the work group. OA has the potential for changing the make-up of work groups (Stout, 1981) as well as affecting the degree of intergroup conflict and degree of perceived interdependence (Olson and Lucas, 1982).

Moreover, it appears that the "social inertia" found in work groups is itself a resistance factor to information system use (Keen, 1981).

While a number of reviews describe the potential impacts of OA on office sociology (Olson and White, 1979; Olson and Lucas, 1982; Olson, 1981; Kling, 1980), they are mainly speculative since litle empirical work has been reported.

Age and Automation Use

One of the demographic variables explored in the literature of OA should be mentioned separately. It is widely believed that age is in itself a barrier to utilization. The stereotypical reluctant user of automation is over fifty-five. A widely cited study (Poppel, 1982) concludes that not age, but tenure with the organization is strongly associated with low usage levels in managers. The logic is that older managers have a vested interest in the status quo and basic fears of obsolescence in the face of this new technology (Barnes, 1983). One must recognize that while there may be some validity to age as a predictor of utilization, little empirical work can be found to determine the degree to which it is valid.

Productivity

Whether office automation results translate into hard financial benefits is a key issue in the field. In fact, the need to define and justify non-quantifiable benefits has become a major stumbling block

to organizations considering adoption of the technology (Willmott 1982). The focus on financial justification for office automation has been heightened by claims that the improved productivity at an individual level that is created through word processing does not always produce overall, organization productivity gains (Driscoll, 1979). Since automation in most cases represents a major capital expenditure, measurable benefits should be planned and attained to justify expenditures for equipment, personnel and facilities (Maskovsky, 1982).

Most believe that office automation like any project, must be planned and operated to produce tangible savings to offset costs and produce a return on investment. Yet, such "bottom line payoff" may be difficult to quantify for benefits like the following:

1. Improved decision making applications like modeling simulation or other, more ad-hoc analyses.
2. On-line access to organizational data
3. Improved communications (Willmott, 1982).

Some have called for a broadening of the definition of productivity benefits to include: (1) better use of human resources, (2) better, faster decision making with more information used, (3) jobs with more involvement and creativity, (4) better products and services (5) better competitive posture, and (6) improved quality of work life (Guiliano, 1979).

Even under the narrowest definition of productivity gain (i.e. time savings) large improvements are reported. Manufacturers Hanover Trust recently surveyed its users and found that on average each saved 36 minutes per day. This translates into an estimated savings of seven million dollars annually (Verity, 1983).

The significance of such cost-benefit reasoning to managerial utilization is obvious. Unlike clerical and professional emloyees, managers have a direct responsibility for financial results. To the extent that OA is difficult to justify in these terms, its use may be restricted.

CHAPTER III

DESIGN, PROCEDURES AND METHODOLOGY

This chapter presents the research design and the methodology for testing the relationships hypothesized in the previous sections of this dissertation. An overview of the related data collection method is given as is the planned approach to data analysis. The data collection instrument is included in the Appendix.

Design of Study

The study is classified as a descriptive-survey design. Descriptive research aims at addressing what exists, rather than focusing on how or why a given phenomenon occurs. Most descriptive studies involve the analysis and interpretation of facts of some kind. Good and Scates (1954) characterize as descriptive all studies which purport to present facts concerning the nature and basis of a group of persons, a number of objects, a set of conditions or a class of events. Van Dalen (1962) describes a descriptive study as the

rudimentary grouping of things by comparing and contrasting specific likenesses and differences in individual behaviors.

Descriptive research is often further defined through the method of presentation. Descriptive-survey research is versatile and practical in that it identifies current conditions and points to the real facts relating to existing conditions. Mouly (1970) relates the major advantage of the survey being the ability to elicit more candid and objective replies, and depending on the topic, the ability to elicit more valid responses.

This planned descriptive-survey research design involves a method of assessing the behaviors and attitudes of top managers in companies and organizations who are users or potential users of managerial workstations in their daily activities.

Field study research, as with all research designs, has particular strengths and weaknesses. According to Kerlinger (1973), field studies have important strengths such as realism, significance, strength of variables, theory orientation and heuristic quality. The realism strengthens the external validity of the research results. The results could be generalizable to similar organizations at the very minimum. This generalizability would increase the significance of the research as predictions could reasonably be made based on the findings.

A field study approach does present several limitations. One is the ex post facto nature of the research with no assessment of the

behaviors or beliefs prior to the implementation of the managerial workstation. Hence, one cannot infer a causal relationship. As a result, the emphasis of this research is one of assessing the strength of the hypothesized relationships rather than the determination of causal relationships among the variables.

An alternative research design would have been to measure appropriate behaviors and/or beliefs prior to the implementation of the technology in the work situation and compare these results with the behaviors and/or beliefs found after a period of time following implementation of the capability. However, the current research deals with a wide range of variables and relationships and a field study design was deemed preferable. The current study is expected to suggest specific research areas within which the alternative design described above would be suited.

A second limitation of the field study research design is lack of measurement precision resulting from individual assessments of beliefs or opinions and the self-reporting of behaviors.

Description of Instrumentation

The instrument used in this study was a three-page questionnaire designed by the investigator to assess attitudes and beliefs on the effect of personal use of managerial workstations. The questionnaire consisted of several parts:

--Background information on each respondent included age, gender, years in present position, level of education and length of time the respondent had been using a computer. Three questions were included to provide information to determine the extent of the respondent's previous exposure to automation.

--Section Two was designed to determine the use being made of various state-of-the-art functions on a day-to-day basis.

--Section Three was the perceived effect of the workstation in the job situation. The focus was on what the impact is not what it should be.

--Section Four explored the perception of effectiveness of the implementation strategy employed by the organization.

--Section Five explored whether the respondent was personally involved in the decision to use a workstation.

--Managerial respondents were also asked to indicate the most effective mode(s) of training they had received.

Face validity of the instrument was secured through preliminary pilot test completion by several executives in organizations of different sizes not included in the study. The questions were designed in an uncomplicated and straightforward manner to facilitate timely completion. A checklist and 5-point Likert scale were utilized to allow for speedy data entry into a software system for analysis.

Selection of the Sample

The sample for the study was drawn from organizations and companies located in the five-counties within a 100 mile radius of Atlanta, Georgia. The sample selected consisted of 490 companies and organizations that are members of the Atlanta Chapter, Data Processing Management Organization. The name of the top level manager was secured by phone so that the survey letter could be addressed personally to insure response by top level managers. This group provided a representative cross section of public and private sector organizations as well as educational and financial institutions. Both large and small companies were included as well as companies with offices in several different geographical locations.

Collection of the Data

Mailing labels were generated on computer software with the name and address of each company. Each packet consisted of a cover letter assuring confidentiality and anonymity, the three-page questionnaire and a stamped, self-addressed envelope for the return of the response. Respondents also were sent a sheet on which to include their name and address if they wished a copy of the results.

A total of 490 questionnaires were sent by first-class mail requesting a response within two weeks from the date of the letter. Questionnaires were coded to allow follow-up if necessary to secure a response of 25-30%. Collection of data was terminated at the end of 6

weeks when 230 questionnaires were received. This represented a 47% return rate. Five questionnaires, received after the data base was loaded, were not included in the analysis. This left a total of 230 usable questionnaires. Due to the number of responses, a second mail-out was not initiated. A total of 162 respondents indicated they would like to receive a copy of the survey results.

Treatment of the Data

Responses were entered into a data base on the Data General computer. This allowed query manipulation to obtain summaries and averages. Graphics preparation also utilized available software to display differences among government, service, educational, financial, medical and manufacturing organizations.

Statistical Package for the Social Sciences (SPSS) software was utilized for statistical analysis, using chi-square, Cramer's V and correlation analysis to answer the research questions (Table 3.1).

Cramer's V is a measure of strength of association between two variables. It ranges from 0 when no relationship exists to +1 when the variables are perfectly related. It is derived from the chi-square value with adjustments for number of cases and number of rows and columns.

$$V = \left(\frac{(CHI)^{\frac{1}{2}}}{N \cdot \min(r-1, c-1)} \right)$$

$$CHI = X$$

Table 3.1

Variables Addressed	Related Hypotheses
Workstation Use	H1: Will the age of the respondent be related to the hours of use of the workstation?
	H4: Will more positive job changes be seen by people who work longer hours on the workstation?
Implementation	H3: Does the location of the workstation depend on the manager's choosing or not choosing to have one.
	H5: Does participation in the decision to acquire a workstation relate directly to the number of hours worked at the station per week?
Productivity	H2: Will the perception of effectiveness be related most closely to feelings of productivity, reliance on the workstation for daily effectiveness and the communication with other workers via the workstation?
Training	H6: Is company sponsored training the preferred type above all others?

CHAPTER IV

RESULTS

This chapter presents the results of the data analysis utilizing the Statistical Package for the Social Sciences (SPSS) and graphics software available on Data General hardware. A summary of the results is presented by major survey category followed by results of the analysis for each hypothesis.

Instrument Design by Variable

Table 4.1

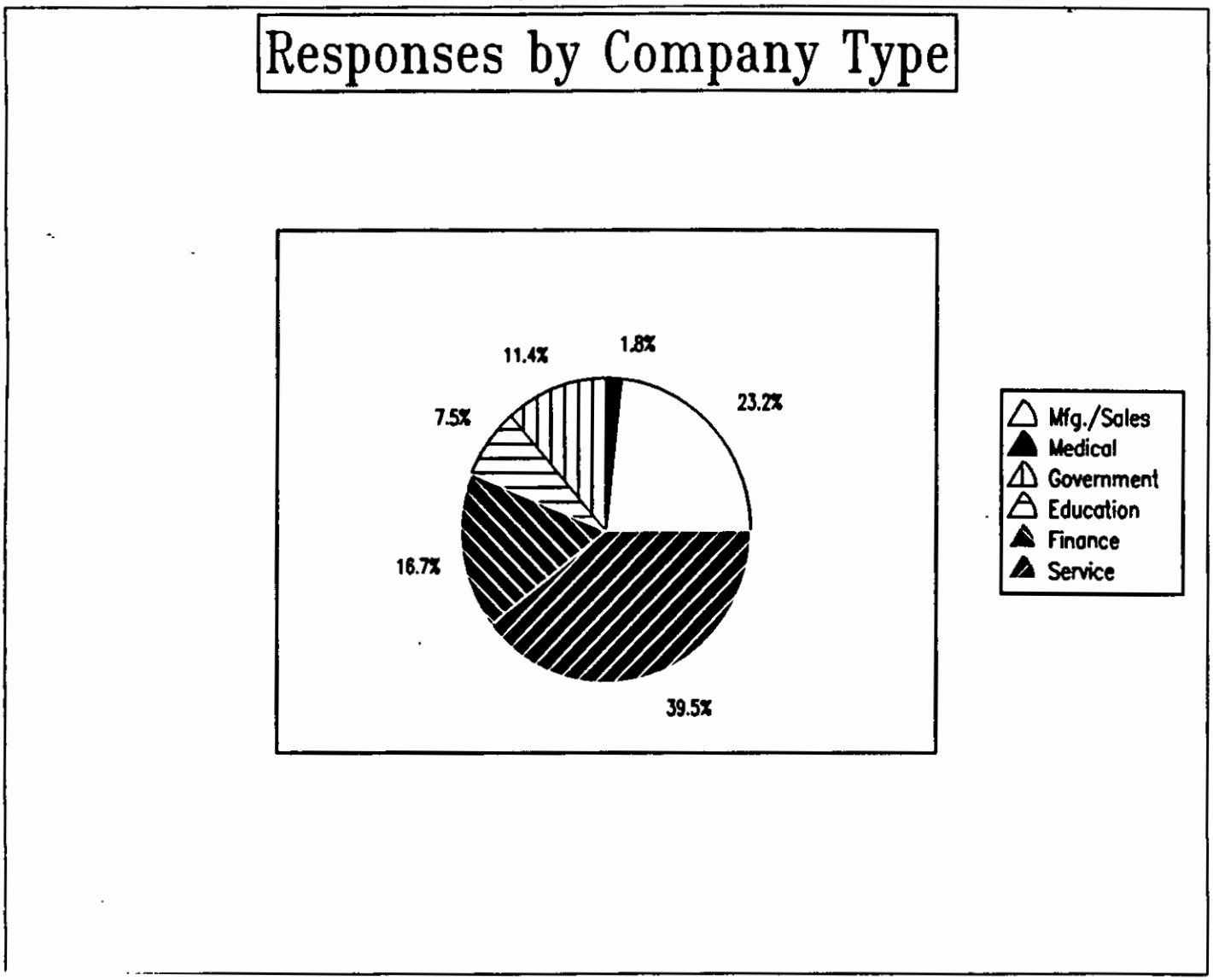
Relationship Between Research Variables and Questionnaire Items

Variables Addressed	Related Questions	Data Obtained
Background Information	1-7	Summaries and Percentages
Workstation Use	9, 10	Percentages
Productivity	11, 12	Summaries and Averages
Implementation	8, 14	Median Score and Cramer's V
Training	12, 13	Summaries

Background Information on Respondees

Figure 4.1 shows the spread of response by company type. The return in the Medical category, (4 responses), was not considered large enough to be representative of trends for this segment of the population.

Figure 4.1



Fifty-six respondees or 24% indicated that they did not presently utilize a workstation. They did not complete questions 8 through 13. Of those 56, 71% or 40 said in #14 that they "would like a workstation in the future". Of the 174 respondents who do personally use a workstation 85% said they "would like a workstation in the future" which indicates their satisfaction.

Twenty percent of the female respondees do not use a workstation, while 25% of the males do not use one.

The breakdown of the 56 by company type who are not presently using a workstation is as follows:

--Mfg/Sales - 11
--Medical - 0
--Government - 10
--Education - 8
--Financial - 11
--Service - 16

Table 4.2 gives the aggregate and the breakdown of data by company type for Tenure, Age, Sex, Education and Technology Exposure.

Table 4.2

BACKGROUND INFORMATION ON RESPONDENTS
(N = 230)*

	AGGREGATE	MFG/ SALES (N=53)	MED. (N=4)	GOVT. (N=26)	EDUC. (N=17)	FINANCE (N=38)	SERVICE (N=90)
TENURE							
Avg Position Tenure (Yrs)	5.13	4.90	1.75	5.88	4.94	4.76	5.18
AVERAGE AGE (Yrs)	40.8	40.1	50.8	44.5	40.3	41.3	39.5
SEX							
Percent Response							
Male	80.3%	84.9%	75.0%	92.3%	70.6%	76.3%	77.8%
Female	19.7%	15.1%	25.0%	7.7%	29.4%	23.7%	22.2%
EDUCATION							
High School	1.3%	0	0	0	0	2.6%	2.2%
Some College	24.1%	20.8%	25.0%	15.4%	23.5%	26.3%	27.8%
Bachelor's	25.9%	32.1%	25.0%	26.9%	5.9%	31.6%	23.3%
Some Graduate	17.5%	17.0%	25.0%	26.9%	0	10.5%	21.1%
Master's	28.5%	30.2%	25.0%	30.8%	52.9%	28.9%	22.2%
Doctorate	2.6%	0	0	0	17.6%	0	3.3%
TECHNOLOGY EXPOSURE							
Avg. Length Time Using Computer (Months)	35.8	36.9	24.5	36.8	49.1	34.5	35.3
Use PC at Home	48.5%	50.9%	100.0%	50.0%	52.9%	40.5%	46.7%

* Two respondees did not indicate company type so response was omitted.

Respondees had an average tenure of 5 years in their position, median education of a Bachelor's degree, and experience with a workstation of roughly three years. Approximately half (48.5%) also have some form of personal computer at home.

Productivity

Figure 4.2 shows the perceived effect of workstation use on daily activities and environment. Graphic is derived from average scores.

Figure 4.2

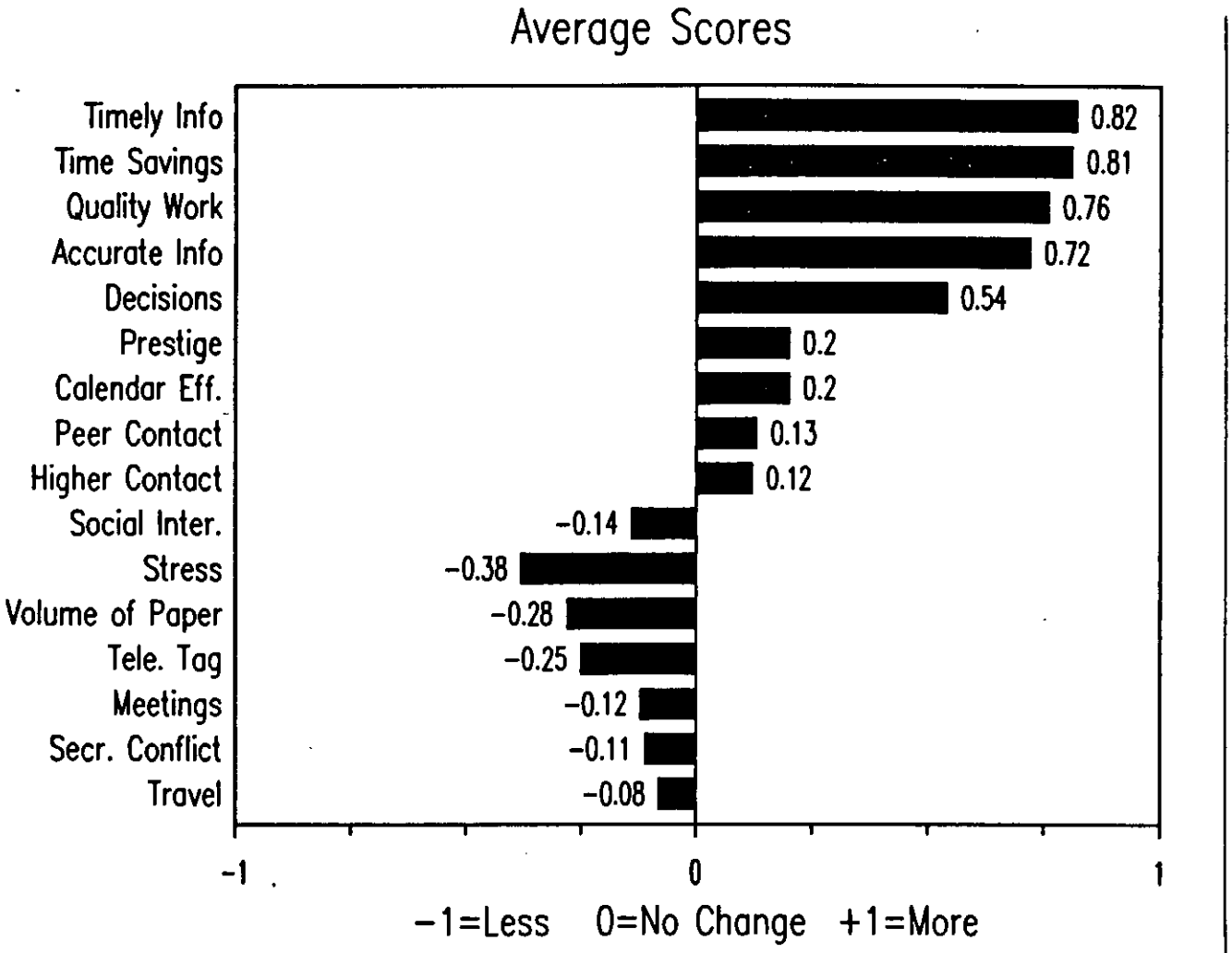
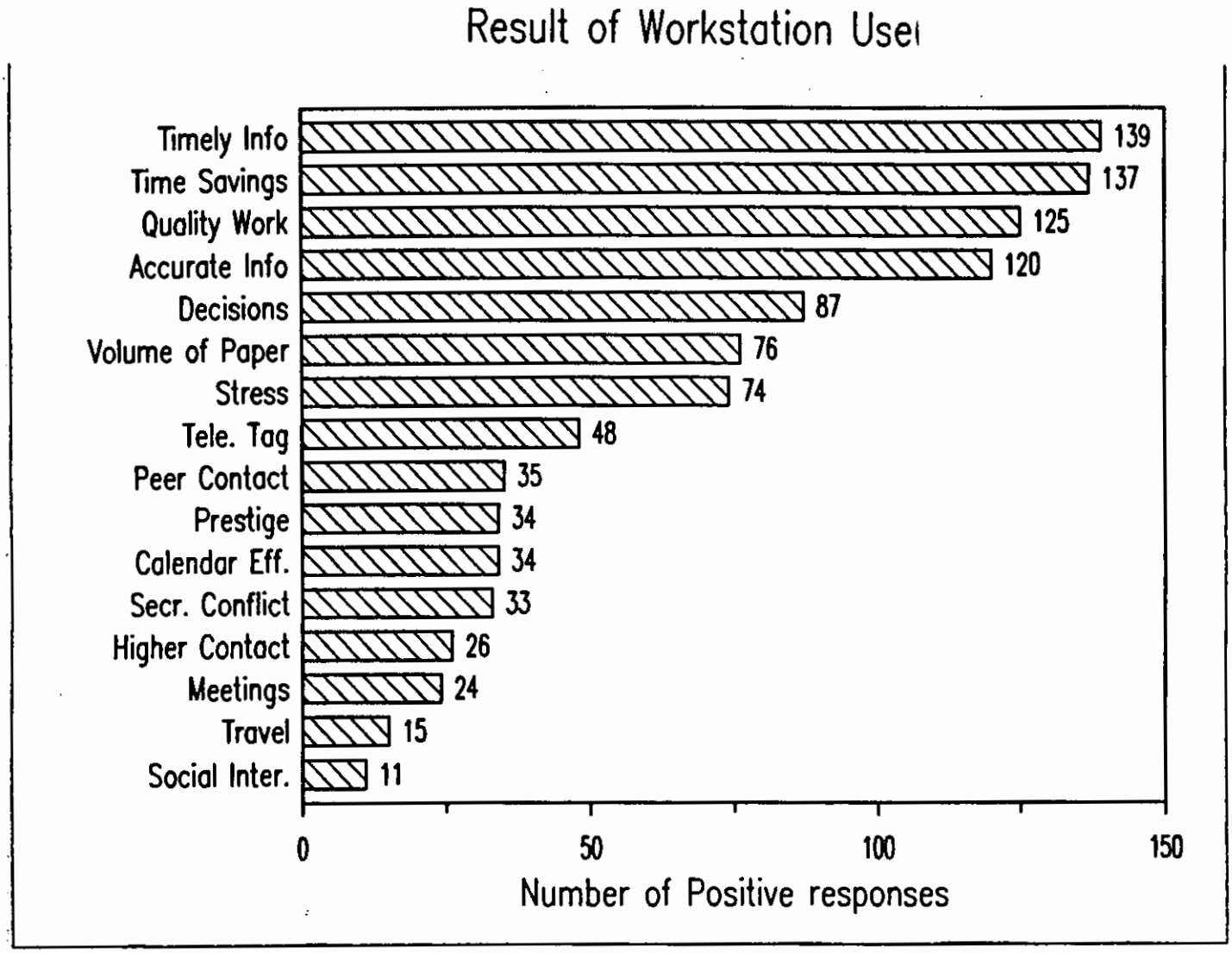


Figure 4.3 indicates the tally of positive responses for the workstation use.

Figure 4.3



HYPOTHESIS NO. 1

The age of respondents in the sample will be related to the hours of use of the workstation.

Workstation Use

Table 4.3 shows by company type percent of usage for the most popular state-of-the-art functions on managerial workstations.

Table 4.3

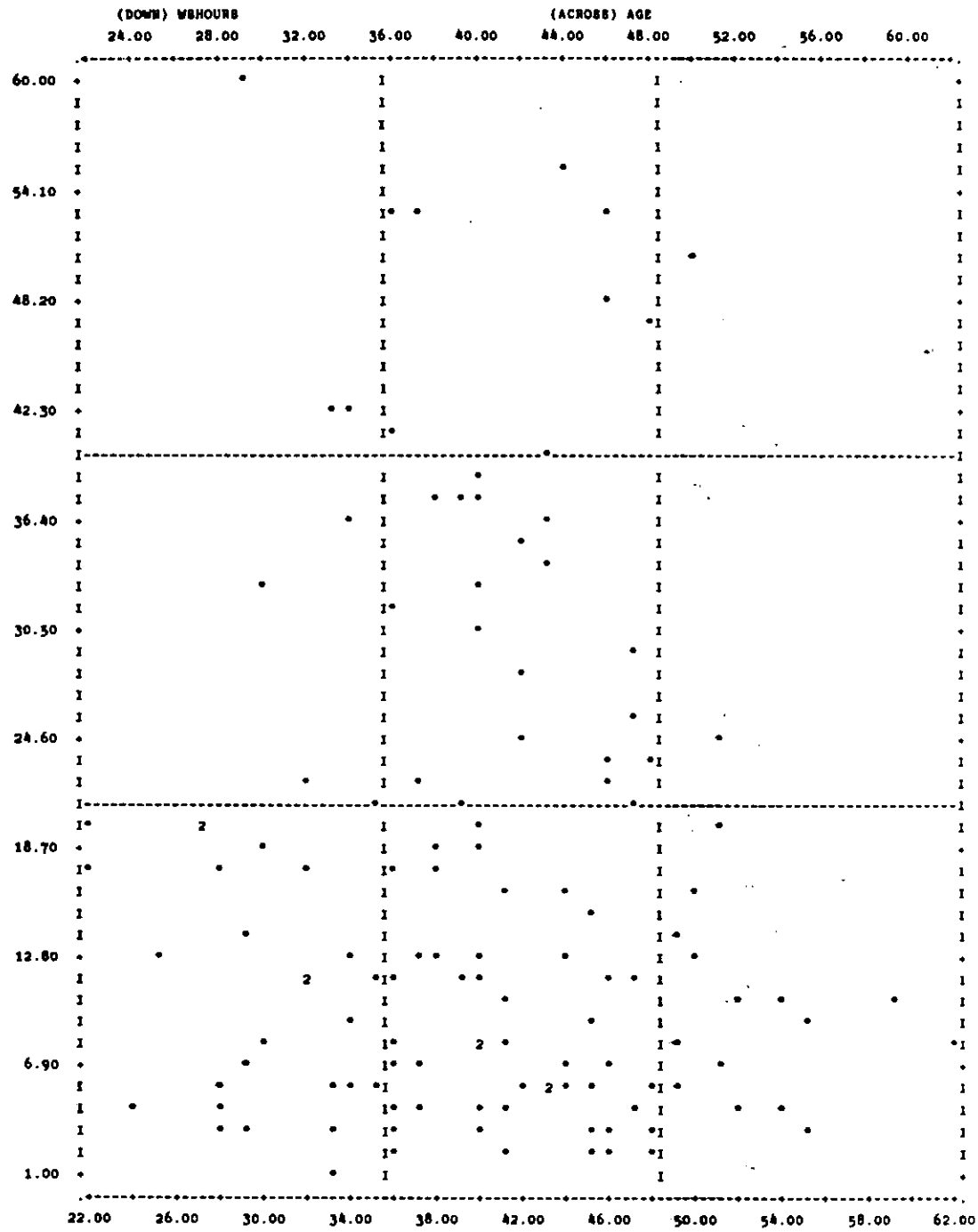
Workstation Usage

Function	Aggregate	Mfg/Sales	Gov't	Ed.	Fin.	Svc.
Electronic Mail/msgs	48.7	56.6	34.6	41.2	44.7	51.1
Electronic Filing	44.7	49.1	23.1	41.2	36.8	51.1
Word Processing	61.4	66.0	50.0	58.8	55.3	63.3
Decision Support	39.9	37.7	34.6	29.4	36.8	45.6
Graphics	28.1	28.3	26.9	23.5	31.6	27.8

Based on summary results by individual function, length of time a manager has been using the workstation relates to the utilization of various other capabilities. If use has been at least four years, electronic downloading from corporate data bases is likely to occur (62%, compared to 36% of those with less experience). Also, graphics would probably be utilized if over four years. The probability is 48%. For those using the workstation from one and one-half to four years, there is a 52.2% probability that one of their uses is for decision support. Over four years there is a 91% probability of using word processing functions. The strength of association as measured by Cramer's V Statistic is .29 (with Significance at .01) between length of workstation use and use of WP. Results of the analysis support the fact that managerial use tends to be electronic mail/messaging and that tends to remain a key function. Over four years there is a 44.6% probability that utilization of electronic external communication occurs, This compares to 23% for those under four years. Over four years there is a 66% probability that electronic filing is utilized.

Figure 4.4 is a scattergram of hours worked on workstation by age of respondent. There is a slight tendency toward an inverse relationship of age with hours of workstation use. (Correlation (R) = -.047) This tendency was not statistically significant (P = .30).

FIGURE A.4 - SCATTERGRAM - HOURS VERSUS AGE



For analysis the sample was divided into two groups (45 and over and below 45). The greatest use occurred in the younger group. Average hours of use for the younger group was 17.9 hours a week, while it was 15.0 for those in the older group. This did not include 5 "heavy users" who did not report their age. There appeared to be a tendency for younger managers to use the workstation more heavily, but it was not statistically significant.

Table 4.4

Hours Worked by Age

(Percentage Distribution)

	Age Group		
	22-40	41-44	45-62
Hours/Week	17.8	18.1	15.0

For the 22-44 age groups, the average hours were 17.9 per week. A few heavy users among the younger group tended to skew the average somewhat.

HYPOTHESIS NO. 2

The perception of effectiveness will be related most closely to feelings of productivity, reliance on the workstation for daily effectiveness and the communication with other workers via the workstation.

Implementation

Table 4.5 gives the Median and Cramer's V coefficient on strength of association for each item on the perception of effectiveness of the implementation.

Table 4.5

Relationship to Perception of Effectiveness

	Implementation Effectiveness	
	Median	Cramer's V
You can use the features effectively.	3.74	.362*
You have the documented procedures you need to use it efficiently.	3.29	.218*
You are pleased with the way it fits in your office.	3.64	.394*
You received enough training.	3.07	.151
You have the data available that you need to do your job.	3.51	.334*
You have been able to increase your personal productivity thru use.	3.98	.383*
You can use it to interface with individuals you need to communicate with to do your job.	3.46	.178
You receive the help needed from technical support groups.	3.17	.138
You can operate in a system-defect free manner.	3.22	.198**
You rely on the workstation in your day-to-day activities.	3.99	.267*

* Significant at the .01 Confidence Level

** Significant at the .05 Confidence Level

The assumption was made in this analysis that a strong relationship exists between whether job needs were met and the perception of effectiveness of the workstation in the day-to-day job situation. The result of chi-square analysis and Cramer's V on strength of association on whether job needs were met is as follows:

Table 4.6 - Effectiveness of Meeting Job Needs

	Cramer's V	
Pleased with fit in office	.394	Significant at .01
Increased personal productivity	.383	Significant at .01
You use features effectively	.362	Significant at .01
Data available that you need	.334	Significant at .01
Can rely on day-to-day	.267	Significant at .01
Have adequate documented procedures	.218	Significant at .01
Operates system defect free	.198	Significant at .05
Can communicate with individuals	.178	Not Sig. (P = .16)
You have enough training	.151	Not Sig. (P = .51)
You receive technical help	.138	Not Sig. (P = .69)

As stated in the hypothesis, feelings of productivity and reliance on the workstation for daily effectiveness were significant at the .01. Communication with other workers was not significant at the .05 as far as resulting in a perception of effectiveness. Communicating with other individuals was not a significant requirement for the feeling that the workstation met their job needs.

HYPOTHESIS NO. 3

The location of the workstation depends heavily on the manager's choosing or not choosing to have one.

Table 4.7

Workstation Location by Company Type

	Mfg/Sales	Medical	Gov't	Education	Finance	Service
On Your Desk	40.4	100	28	31.3	36.8	47.8
In your office	36.5		36	18.8	28.9	27.8
Secretary's Desk	9.6		16	6.3	21.1	13.3
Data Processing	3.8		4	31.3	5.3	5.6
Don't Use	99.64		16	12.5	7.9	5.6

Cramer's V showed a significant tendency to place the work station on the manager's desk if he/she had participated in the decision to have one. If they did not participate, the workstation was more likely to be placed on the secretary's desk or in the data processing shop. Sixty percent of respondents who said they participated in the decision reported that the workstations were placed on their desks, while only 35 percent of those who did not participate placed them there.

Table 4.8 is a summary of workstation location by sex. A chi-square analysis shows there is no significant difference in location based on sex (P = .943). The minor differences could be presumed to occur at random for the general population.

Table 4.8 - Workstation Location by Sex

	Aggregate	Male	Female
On your desk	96	78	18
	42.3	42.9	40.0
In your office	67	53	14
	29.5	29.1	31.1
On your secretary's desk	30	25	5
	13.2	83.3	16.7
In data processing	15	11	4
	6.6	6.0	8.9
Don't use computer	19	15	4
	8.4	8.2	8.9

HYPOTHESIS NO. 4

People who work longer hours on the workstation tend to see more positive job changes.

For chi-square analysis purposes, the population that reported their work station hours was taken out and split into three equal groups: (1) Low Use = 8 hours or less per week; (2) Median Use = 8 to 20 hours per week; (3) High Use = Over 20 hours per week. One hundred twenty or 80% of the respondees said no change had resulted in their job prestige as a result of using a workstation. This breakdown gave an option to investigate the theory that there could be a point of diminishing return for overuse per week.

Chi-square analysis showed the only statistically significant relationship was in communication with higher ups (significance was less than .01). Four percent said they had less contact with higher ups and 15% said they had more contact.

Of those in the Low Use group, only 5% reported better contact. In the 8-20 hours a week and high use groups more contact was reported by 20% of each category.

Twenty-one percent reported that the boss/secretary conflict was reduced; 71% said it stayed the same and 8% said it was worse.

Differences based on hours of workstation use were not statistically significant (p = .059).

Basically, 11% of those with fewer hours were able to report improved relationships, whereas 26% of medium and high users were able to report better relationships.

HYPOTHESIS NO. 5

Participation in the decision to acquire a workstation relates directly to the number of hours worked at the station per week.

Of the respondees utilizing workstations, 140 answered "yes" (out of 174) that they did participate in the decision to ahve a workstation while only 34 did not participate. Of the female respondees, 27 out of 36 answered "yes" while 113 of 138 males did so. There was a tendency toward less participation based on percentage of response by women in the respondee group. Man participated at an 82% rate while women participated at a 75% rate.

Eighty-one percent of all participants do word processing. This is higher for those who participated in the decision, (84%), than those who did not (71%), but not to a statistically significant degree (P = .083). For the decision support function, it is higher (56%) with those who did participate, than those (38%) who did not participate. (P = .057, Not statistically significant.)

Thirty percent of all participants reported they used external communication. If they didn't participate in the decision, they were only one-half as likely to use for external communication. (P = .026)

The conclusion is that there is a slight tendency for participants to utilize the workstation more in the aggregate than if they did not participate in the implementation decision. Average hours use for participants was 17.6 and for non-participants it is 17.2 average hours use per week. Chi-square analysis shows the differences to be statistically not significant (P = .356).

HYPOTHESIS NO. 6

Of all types of training available, company sponsored training is preferred above all others.

Training

Table 4.9 gives the results of preference based on what the managers have experienced.

Table 4.9

Training Preference

	No. Reported As Preference	No. Reported Having Received This Type
Self-Study	99	150
Local College	11	54
Computer Based	18	71
Vendor Sponsored	23	77
Company Sponsored/Tailored	42	96

The number exposed to a particular type of training was proportional to the percentage preferring that type training.

Self-study was received by 150 respondents. Ninety-six reported receiving company sponsored training. Seventy-seven had received vendor training; seventy-one reported receiving computer based; and 54 received local college.

CHAPTER V

SUMMARY, INTERPRETATIONS AND CONCLUSIONS

SUMMARY

A review of the literature concerning the impact of automation on managerial productivity suggested that there is a paucity of research in this area. This is probably due to managerial workstations being a relatively new phenomenon in the executive suite. The purpose of this study, therefore, was to attempt to determine the attitudes and behaviors of managers regarding the effect that personal use of workstations is having on their individual productivity. Areas explored included the extent to which state-of-the-art functions are being utilized, whether participation in decision-making had any effect, and the extent to which the manager felt he/she could rely on the workstation in daily activities.

INTERPRETATION OF FINDINGS

H1 - The age of respondents in the sample will be related to the hours of use of the workstation.

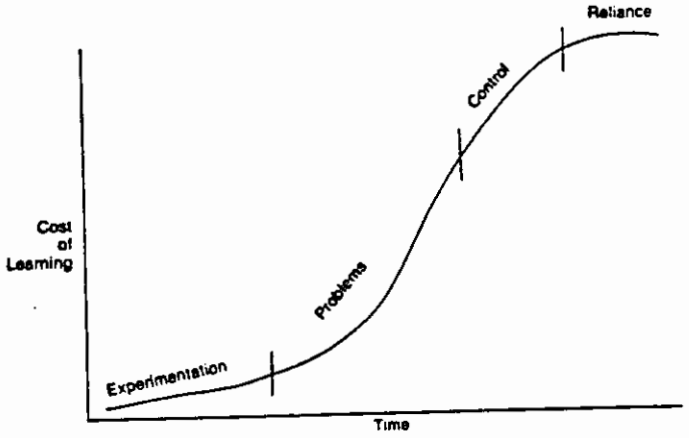
The hypothesis that age significantly affects the use of the workstation was not supported.

Use of a workstation is influenced not only by exposure to automation but the length of time the manager has been using the workstation in the daily job setting. Most people who confront a new system or technology will experience a decline in productivity while they are learning the system and adjusting their work habits. This is an immediate effect and of short duration. From here the productivity curve usually rises rapidly and dramatically - 10-fold improvements are not unheard of. Measurements taken at this 3-12 month interval, after system implementation, will usually tell a positive story. Over the long term, productivity will plateau and eventually start to decline again. Then, it is time for a system enhancement. (Allen 1986)

The workstation learning curve involves four distinct phases as pictured in Figure 5.1 (Perry, 1987)

Figure 5.1

Workstation Learning Curve



Initial experimentation is much like that of a "toy". This is quickly followed by the attempt to utilize it for actual day-to-day activities which can lead to stress as one deals with the new technology. Phase three is frequently characterized as an impediment to work accomplishment due to data controls by the central data processing unit. However, once the controls of phase three are in place, one can move into phase 4 which is a reliance on the results produced by the workstation. Then, the perception of benefits to productivity is tremendously enhanced.

Rather than the expected "fear of change", many managers do in fact suffer from a case of Cyberphobia - a fear of machines. For many people, machines, in general, are to be mistrusted. Machines break at the most inopportune times, and repair persons seem to discuss the problem in some indecipherable dialect and charge an exorbitant price for services. Coupled with this general fear of machines, upper management often suffers from a fear of "computers." This fear is partly the result of 20 or more years of a concentrated effort to remain machine-ignorant. Computer professionals surrounded the marvelous machines with an aura of mystery and the boss too often was kept in the dark. (Manning, 1987).

Oddly, machine problems are the easiest to deal with. Man/machine interface problems are second. And the most difficult problem is people. The reasoning behind this is simple. Machines may involve so-called high technology, but human beings are the highest technology known.

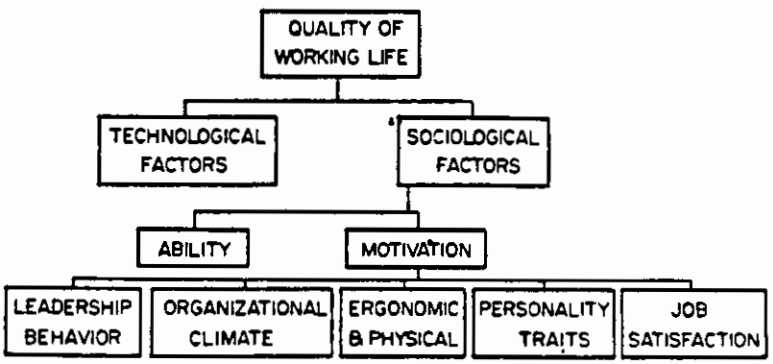
Therefore, understanding people and fixing their problems is the most difficult. (Murljacic, 1987)

Change often threatens one's self-esteem or image in the eyes of others. Some employees already have low self-images. A confrontation with computers threatens to confirm their worst fears of incompetence. This is especially true of people who believe that they are not technology-oriented. Many workers spend years developing skills that make them proficient at their jobs. Why change? Should they give up a high degree of security for new, strange activities that require learning new skills, adjusting to unfamiliar methods and establishing new working relationships. What happens to them if they cannot adjust to the new pressure? (Callahan and Fleenor 1987) Computer systems and changing access to information may well threaten the power structure or influence established procedures.

The dominant theme in recent quality of working life (QWL) research and theory is that an employee's subjective experience of satisfaction or dissatisfaction constitutes the QWL of the individual. Figure 5.2 shows the integration of technological and sociological factors in a QWL model.

Figure 5.2

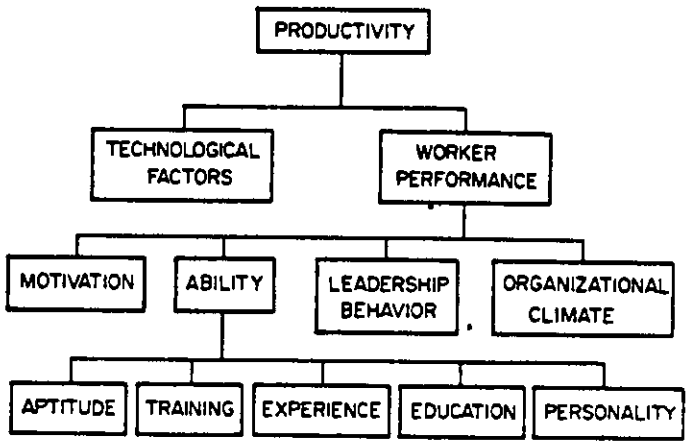
Quality of Working Life Model



There is a great deal of commonality between the factors of QWL and those of productivity shown in Figure 5.3. The most important point is the two factors -- motivation and ability. (Kaye and Sutton, 1985)

Figure 5.3

Productivity Model



Technology, to be acceptable, has to motivate people by providing things which are important to them such as job security, work interest and challenge, and fair remuneration.

While technology is viewed as powerful, pervasive, difficult to control and possibly malevolent there will always be resistance to it. It needs to be viewed as helpful and legitimate, and to be seen to be working in the interests of those who have to use it. (Mumford, 1983)

The office as environment is hot. The chair, the view, the walls. It is where you live when you are not at home. The office is in a renaissance - coming into its own as a place to work, live and show some spirit. This is a time when high tech and high style can go hand in hand. There's a brand-new ingredient: furniture (especially designed for

computer work) that's slick, compact and attuned to the needs of people The office is no longer just a desk and an industrial-strength chair, but a whole ecology. And the farther up the hierarchy one moves, the more the office must bespeak control, power and style. (Farmanfarmaian, 1987).

H2 - The perception of effectiveness will be related most closely to feelings of productivity, reliance on the workstation for daily effectiveness and the communication with other workers via the workstation.

This hypothesis was partially supported. Communication with other workers via the workstation did not prove to be quite as strong a determinant.

Traditional approaches of measuring the productivity impact due to the implementation of automation do not fit in the managerial environment. This is largely due to the unique situational nature of managerial day-to-day performance. The value-added benefit of permitting entirely new activities and ways of working, and of giving the company a competitive advantage are the real incentives and the real measurement of potential productivity savings.

Close computer monitoring of office work is proving to be an insidious threat to the quality of worklife. A four-month investigation among 23 firms of a major U.S company showed that constant supervision, automatic computer monitoring and elaborate productivity indices have made job related stress pervasive. (Foegen, 1987)

H3 - The location of the workstation depends heavily on the manager's choosing or not choosing to have one.

Results of the analysis fully support the positive effect of having the manager participate in the decision process regarding implementation. The people who work with the system will largely determine its success. The degree to which those whose jobs are affected by the new technology influence the design of the computer-mediated office may have a major impact on the overall effectiveness of the system. (Gainey and Baker, 1986)

H4 - People who work longer hours on the workstation tend to see more positive job changes.

There is a strong strength of relationship to support the hypothesis.

Tremendous progress has been made in the direction of ease of use of computer hardware, software and telecommunications technology. Personal computers and workstations pack much more power than the huge systems of just a few years ago. "Using a computer is like driving a car," the instructor explains, "and when you're familiar with one, you can operate them all without a manual." (Lander, 1988)

Still for most managers at the time of this research, time, involvement and a determined persistence is needed to master the several functions available at one's fingertip. As the research result

indicated, some of the easier functions to master involve electronic communication, often with higher levels in the organization, and usually involving more frequent interaction with geographically dispersed organizational units. As one becomes comfortable with the new productivity and self-esteem increases, the norm is to attempt to master more complicated functions that are available including decision-support access systems and graphics capability.

"The way the technology is used - and its impact on the lives of the workers - depends as much on management ideology as on the technology itself." (Gainey, et al, 1986) This supports the need for top managers to reap positive benefits from their personal involvement and interaction with workstations. Then, they will be in a better position to recognize the value-added socio-technical opportunities afforded by the implementation of technology and provide the needed leadership.

H5 - Participation in the decision to acquire a workstation relates directly to the number of hours worked at the station per week.

Findings support the hypothesis.

According to a Kepner-Tregoe study in 1986, some 64 percent of top executives of Fortune 500 companies never use a computer. Executives do not want to be bothered; they have underlings to do such menial work. Besides, they never learned to type. This ignorance keeps managers and executives from realizing when a subordinate has gone astray. Today's update to the phrase "garbage in, garbage out" may well be, "garbage in,

gospel out." Figures from a computer are often taken as the final word and many managers are not involved enough to know the difference. (Schwartz, 1988)

Managers with access to corporate information can react faster and better to changes in the marketplace and thus sharpen their corporation's competitive edge.

H6 - Of all types of training available, company sponsored training is preferred above all others.

Findings did not support the hypothesis. Self-study was the preferred method. It is possible that there were different interpretations and perspectives on self-study. For example, in many companies, the material that may be given to the manager for "self-study" may have been reduced to virtual cook-book form by a sub-department and in effect would qualify for company sponsored/tailored. This weakness in the questionnaire makes it impossible to judge the validity of the result except as reported.

Knowles (Lachmuth, 1988) describes adult learning as the pursuit of internal satisfaction. He contends that adults want to learn and to improve themselves because they feel that a gap exists between what they want to be and what they are. The desire for learning, therefore, springs from a feeling of inadequacy. In order for learning to occur the desire to learn must be established followed by a conscious effort to acquire knowledge and achieve a level of internal satisfaction.

Regardless of how adults learn, a truly effective system of adult education depends on which structure and conditions best facilitate the process of acquiring and modifying existing skills, knowledge or attitudes.

Knowles who has been in the training business since 1935, recommends that one start training on the computer at the point where the individual wants to learn. The interest, concerns and needs should be the driving force in the training. Trainers should first find out where learners are on the map, so to speak, before heading for a destination. For example, if the manager wants to learn how to draft a letter, why should he listen to a lecture on the history of computers? He feels that, provided enough interactive responsiveness can be built into software programs and documentation made user-friendly, technology will play a major role in facilitating training in the future.

As offices forge ahead hoping for increased productivity with the implementation of automation, a serious situation threatens that hope. The warnings have been sounded by sources whose activities deal with personnel and their skills. According to Dykeman (1988), "Eleven percent of our nation's managers, professionals, and technicians are functionally illiterate..." and are leading one of the most illiterate workforces in the world." Functional illiterates are people unable to read, write, calculate, or solve problems at the simplest levels.

IMPLICATIONS FOR FUTURE RESEARCH

Further research is needed in the area of training for this managerial population. Due to the many variations of hardware and software qualifying as a managerial workstation, the finding regarding the preference for self-study as the preferred approach to technical training may not be generalizable for a large segment of the population. The "self-study" may in fact be of in-house tailored documentation or it may possibly reflect the reluctance of this level to participate in formal training sessions which some might consider "embarrassing" to their position in the company.

Ideally a pre-test prior to automation implementation and a post-test test might provide more definitive data on the exact nature of change in behavior for this group. This was not possible for the sample selected. The U. S. Forest Service, one of the few organizations that has done before-and-after studies of its automation efforts, signed a $125 million contract with Data General Corporation in 1983 to automate and electronically link its 900 offices. Environmental-impact statements now take 39% less time, while timber sales contracts take 27% less time to draw up. The service has sliced 30% off the hours needed to do its work and has cut staff by 25%. "In 1985 alone we had savings of $125 million," says Charles R. Hartgraves, Associate Deputy Chief for Administration. He conservatively expects a 250% return on investment between 1983 and 1990. (Harris, 1987)

Further research is needed on the effect of automation on decision making as workstation implementation matures.

Change is the order of the day; either choose it or chase it. "Adapt or die" is the tag line that covers almost every business and organization. If there ever was a time when business-as-usual described the way businesses ran, that time has elapsed. Business-as-usual is today's prescription for going out of business. (Peters, 1987)

The industrial landscape in America is littered with the remains of once-successful companies that could not adapt their strategic vision to altered conditions of competition. Managers must recognize they have entered a period of competition that requires of them a technology-drivern strategy, a mastery of efficient production, and an unprecedented capacity for work force management. (Johnston and Packer, 1987)

The typical large business 20 years hence will have fewer than half the levels of management of its counterpart today, and no more than a third of the managers. It will bear little resemblance to the typical manufacturing company, circa 1950, which our textbooks still consider the norm. Instead, it is far more likely to resemble organizations such as the hospital, or the university, or the symphony orchestra. For like them, the typical business will be knowledge-based, an organization composed largely of specialists who direct and discipline their own performance through organized feedback from colleagues, customers, and headquarters. It will be an information-based organization where managerial workstations play an integral role. (Drucker, 1988)

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APPENDIX A

COVER LETTER FOR INSTRUMENT

Date:

mNAME/ADDRESSn

Dear mNAMEn

I am a doctoral candidate at Walden University, Minneapolis, Minnesota, and am currently in the process of fulfilling my research requirements. I am employed by the U. S. Forest Service in Atlanta with responsibilities for information systems in the 15 southeastern states.

HOW DO YOU FEEL ABOUT COMPUTERS? Are they helping you to be more effective every day? Many managers now have workstations on their desks. Very little research has been done, though, on how they are being used and what the effect is on productivity. Consequently, I am undertaking this Atlanta-area study.

A survey is enclosed that will take you not more than 10 minutes to complete. Please return it in the stamped, self-addressed envelope within two weeks. I know that you have a busy schedule, but your response is very important. Only you know the real effect!

Your response will be confidential and will be used only in summary data. It will in no way be identified with you individually or your Company.

Thank you in advance for your time, effort and interest. Technological change is inevitable, and the results can be helpful as we seek ways to facilitate a smooth implementation with minimum disruption to business operations. If you would like a copy of the study results, you only need to complete and return the attached form.

If you have any questions concerning my research effort, please do not hesitate to contact me at home (404) 587-5038 or at work (404) 347-4140.

Sincerely,

Katherine S. Allen
Supervisory Management Analyst

Enclosures

For data analysis purposes, it would be appreciated if you could postmark this back to me by October 31.

If you would like a summary of data obtained from the study, please complete the following and return it with your survey in the stamped, self-addressed envelope provided.

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

APPENDIX B

DATA COLLECTION INSTRUMENT

SURVEY

PERSONAL USE OF MANAGERIAL WORKSTATIONS

The following questions concern background information. Please check the appropriate blanks and provide written information as needed:

1. Job Title: _____

2. Length of time in present job. ___ (Yrs.)

3. Age ___ Sex: Male ___ Female ___

4. Check highest education attained:

H.S. Diploma ___	Some Graduate Work ___
Some College ___	Master's Degree ___
Bachelor's Degree ___	Doctoral Degree ___

5. Check the category closest to your company type:

Mfg/Sales ___	Education ___
Medical ___	Finance ___
Government ___	Service ___

A MANAGERIAL WORKSTATION is defined as a small computer (may be tied to a telephone line) that has these capabilities:

--The Workstation can receive messages when unattended
--The Workstation can store data electronically
--The Workstation can process data via computer programs.
--The Workstation can send messages to other facilities and/or workstations

(e.g. An APPLE computer or an IBM PCjr could be tied to a phone line.)

6. Using the above definition, what is the location of the nearest managerial workstation with respect to your desk at work:

___On your desk ___In your office ___On your Secretary's desk
___In Data Processing ___Don't use Computer at this time

7. Do you use a personal computer at home? ____ Yes ____ No

IF YOU ARE NOT PERSONALLY USING A WORKSTATION AT THIS TIME IN THE OFFICE, PLEASE SKIP TO QUESTION NO. 14.

8. Did you participate in the decision to have a workstation in your office? ___ Yes ___ No

9. How long have you been using a workstation? ___ (Months)

10. Check the type functions that you use on your workstation and the average number of hours use per week. (Check all that apply.)

Check Functions	Avg. Hrs.Use/Wk. (ok to use 1/2,1/4)	Description of Function
___Electronic Mail/Messages	___	Transmission from workstation to workstation.
___Electronic Filing Cabinet	___	Storage of info in retrievable form.
___Electronic In-basket	___	Holding info in storage until user retrieves.
___Electronic Calendar	___	Scheduling of appointments.
___Electronic Decisions	___	Use to comment on; approve managerial actions
___Electronic Conferencing	___	Dialog via messages between workstations.
___Electronic Bulletin Board	___	Storage of common info to scan at request
___Electronic Upload/Downld.	___	Movement of data to/from central facility.
___Electronic External Comm.	___	Communication outside the organization.
___Electronic Telephone Book and Dialing	___	Retrieval of phone numbers; auto dialing
___Word Processing	___	Text preparation.
___Decision Support	___	Tailored programs to do specialized tasks.
___Graphics	___	Business graphics for reports or presentation

11. What has been the result of using workstation functions? (Circle a 1, 2 or 3 for each item that applies to your use.)

	Less	No Change	More
Prestige/power/respect on the job	1	2	3
Job Stress/frustration	1	2	3
Role/relationship conflict with Secretary	1	2	3
Access to more timely information	1	2	3
Access to more accurate information	1	2	3
Telephone Tag	1	2	3
Calendar Scheduling Efficiency	1	2	3
Volume of Travel	1	2	3
Number of formal meetings	1	2	3
Decision-Making Responsiveness	1	2	3
Face-to-face social interaction	1	2	3
Contact with peers	1	2	3
Contact with higher org. levels	1	2	3
Quality of your individual work products	1	2	3
Time Savings	1	2	3
Volume of paper flow in office	1	2	3

12. Overall, how effective is the implementation of the workstation that you use? (Circle one response for each question.)

	Evaluation				
	Poor	Below Avg.	Avg.	Above Avg.	Out-standing
Workstation meets your job needs.	1	2	3	4	5
You can use the features effectively.	1	2	3	4	5
You have the documented procedures you need to use it efficiently.	1	2	3	4	5
You are pleased with the way it fits in your office.	1	2	3	4	5
You received enough training.	1	2	3	4	5
You have the data available that you need to do your job.	1	2	3	4	5
You have been able to increase your personal productivity thru use.	1	2	3	4	5
You can use it to interface with individuals you need to communicate with to do your job.	1	2	3	4	5
You receive the help needed from technical support groups.	1	2	3	4	5
You can operate in a system-defect free manner.	1	2	3	4	5
You rely on the workstation in your day-to-day activities.	1	2	3	4	5

13. Which method of training was most beneficial for you?
(If more than one applies, rank from 1 tO 5;most beneficial to least.)

___ Self-study of Technical Documentation
___ Local College or University
___ Computer Based Training (CBT)
___ Vendor sponsored sessions
___ Company-sponsored/tailored

14. Would you like to have a workstation on your desk in the future?
___ Yes ___ No

Any other comments may be included on the back of this sheet!

THANK YOU FOR YOUR HELP! PLEASE INDICATE IF YOU'D LIKE COPY OF RESULTS.

VITA

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Education: B.B.A., Georgia State University, 1971
M.P.A., Georgia State University, 1975
Ph.D., Walden University, 1988

Areas of Expertise:

Human resource development and management both in technical production environment; and in provision of complete range of management analysis and administrative support services.

Planning and coordinating organizational development and renewal projects, programs and meetings.

Planning implementation and training strategies and classroom instruction.

Extensive experience in implementation of office automation and third and fourth generation software.

Authored numerous decision papers, technical reports, informational newsletters and technical documentation.

Client relations and effective dealings with people at all levels in different professions ranging from vendors to members of academia.

Present position: Southern Region Information Manager
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American Society for Training and Development (ASTD)
Atlanta Council for Computer Education and Services (ACCESS)
World Futures Society