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The Impact of a Computer Based Messaging System
On An Organization

by

Kathleen E. Byrne,

B. Comm.,

CARLETON UNIVERSITY

A thesis submitted to the Faculty
of Graduate Studies and Research
in partial fulfillment of requirements
for the degree of Master of Science

Carleton University,

November 1983

The lack of a control group and pre-test data make it difficult to attribute behavioural changes solely to the adoption of a CBMS. The ability to separate out and account for confounding factors is difficult without the baseline measures that a control group and pre-test data provide. The design of data capture tools attempted to minimize these problems wherever possible.

Being an exploratory study, there were many variables of interest. A central goal of the investigation was to determine which, if any, of these variables were supported by empirical evidence. Using a large set of variables increased the complexity of the data analysis. This increase in complexity was offset by the benefit of having many measures taken on the same phenomenon. As a self-checking feature, this enabled the data analysis to verify findings on a given variable against those of a related variable.

Variables that describe aspects of CBMS provision are designated as factor variables. A factor level is a particular form of that factor¹. Having System A and System B service would be one level of the CBMS Service factor level.

Variables that describe an impact from CBMS adoption are designated as response variables. The study uses a mix of categorical and ordinal measures for response variables.

The data analysis sought to reveal the influence of each factor on CBMS usage, to reveal any interactions which might exist between variables, and to reveal the

ABSTRACT

This thesis presents the results of a field study conducted at an organization that introduced a sophisticated CBMS some two years ago. The study focussed on long-term changes in the nature of work, rather than on the introductory shock-waves that accompany technological change. Data was collected to investigate how varying degrees of CBMS provision affect an employee's use of the technology, quality of working life, and productivity. Group level variables were introduced to investigate how the adoption of a CBMS affects an organization's communication patterns and productivity. The study found that the volume of communications within the firm had increased, and that this supported an increased level of task activity. The CBMS was found to substitute for memoranda, but supplement the use of the telephone; more ideas and questions were communicated than before the CBMS was in use. In addition, many of the predictions of adverse effects associated with an anticipated decrease in face-to-face contact were not found in the organization.

Acknowledgements

Conducting this study has been an enormously rewarding experience, and I would like to express my appreciation to all those who supported the effort.

The shaping of an idea is one of the most difficult aspects of any work. Prof. David Thomas gave freely of his time to exchange ideas, and explore avenues of thought. Discussions of this kind helped to set the direction for much of the work; his help was always of great value. Knowing what is to be done must be followed by knowing how to carry out the tasks. Both Prof. Moses Kiggundu and Dr. Roland Thomas gave excellent advice on matters concerning methodology: Prof. Kiggundu in the area of Organizational Research, and Dr. Thomas in the area of Statistical Analysis. The supervision of Prof. Roger Kaye is largely responsible for this study being carried out and completed. His thoughtful reading of each draft, and his time spent questioning approaches and ideas kept the study moving forward to its final conclusion. The opportunity to work with this group provided a major component of the learning experience.

The support given by the group at the study site made carrying out the field work a great pleasure. Angela Thomson provided many insights into the workings of the company, and helped a great deal in compiling the questionnaire.

A special thanks goes to my family and friends who provided both intellectual and emotional support throughout this time. My parents always provided an atmosphere of support, and it was this that enabled me to pursue this study in the first place. Donna Jowett acted as a reader for initial drafts; her comments improved both the quality of expression, and the quality of thought, that went into the work. In addition, Donna kept in touch even when the Thesis was taking up large amounts of my time. She provided the escape that everyone needs occasionally, so that I could return to my work with fresh enthusiasm.

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Putting together a paper of this size and complexity would not have been possible without the help of Tricia Maslov in New York. Many details concerning the lay-out of the final document were noticed and pursued, to give the paper a polish that I could not have achieved. The spirit of enthusiasm that was brought to the final effort made finishing off the thesis an even greater pleasure.

THE IMPACT OF A COMPUTER BASED MESSAGING SYSTEM ON AN ORGANIZATION

TABLE OF CONTENTS

CHAPTER ONE: Computer Based Messaging Systems in the Office	1
1.1 Computer Based Message Systems	2
1.2 Communication as an Office Task	5
1.3 Organizational Development	7
1.4 Impact of a CBMS on the Messaging Process	11
1.5 Quality of Working Life	12
1.6 Productivity	14
1.7 Scope and Purpose of the Thesis	16
1.8 Thesis Layout	17
CHAPTER TWO: The Study Approach and Research Methodology	22
2.1 Study Approach	22
2.2 Study Site and Corporate Characteristics	24
2.3 Research Methodology	26
2.3.1 Factor Variables	28
2.3.1.1 Factor Levels	29
2.3.1.1.1 Technology Provision	29
2.3.1.1.2 Organizational Position	30
2.3.1.1.3 Communication Requirement	31
2.3.2 Response Variables	33
2.3.2.1 Measurement of Response Variables	34
2.3.3 Data Analysis	36
2.3.4 Data Collection Methods	37
2.3.4.1 Interviews	39
2.3.4.2 Questionnaire Design	46
2.3.4.3 Archival Records	48

CHAPTER THREE: Results and Observations of the Study 53

3.1	Archival Results	53
3.2	Questionnaire Results	57
3.2.1	Organizational Groups	58
3.2.2	Technological Groups	58
3.2.3	Communication Groups	59
3.2.4	Factor Level Identification	61
3.2.5	CBMS As a Messaging Tool	62
3.2.6	Factor Variable Influence on CBMS Usage Patterns	65
3.2.6	Impact on the Individual	71
3.2.6.1	Factor Variable Influence on Individual Productivity	74
3.2.7	Organizational Impact	82
3.2.7.1	Factor Variable Influence on Organizational Variables	82
3.3	Interview Results	85
3.3.1	Technology Profile	85
3.3.2	Organizational Profile	85
3.3.3	Communication Profile	86
3.3.4	CBMS Usage	87
3.3.5	Job Satisfaction	90
3.3.6	Individual Productivity	90
3.3.7	Individual Efficiency	93
3.3.8	Individual Effectiveness	93
3.3.9	Organizational Efficiency	96
3.3.10	Organizational Effectiveness	97

CHAPTER FOUR: Conclusions: Impact on the Organization 98

4.1	CBMS Usage Patterns	98
4.2	Individual Productivity	106
4.3	Organizational Productivity	111
4.4	Quality of Working Life	115
4.5	Comparison of Study Findings with Previous Research	117
4.6	The Evolution of a Communication System	119
4.6.1	Impact on communication for the Individual	119
4.6.2	Impact on Communication in the Organization	121

BIBLIOGRAPHY	126
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TABLES

1 Archival Results	56
2 Results of ANOVA Investigating Volume of CBMS Usage	70
3 Results of Crosstabulations Investigating Job Skills and Location	78
4 Crosstabulations Investigating Job Interruptions and Use of Messages	79
5 Crosstabulations Investigating Job Pace and Hours	80
6 Crosstabulations Investigating Job Feedback and Influence	81
7 Crosstabulations Investigating Organizational Perceptions	84

FIGURES

1 Relationship Between Office Activities and Technology	21
2 Characteristics of each Data Collection Instrument	52
3 Impact On Communication For The Individual	124
4 Impact on Communication In The Organization	125

APPENDICES

APPENDIX A: Survey Questionnaire	133
APPENDIX B: Interview Score Sheets	147
APPENDIX C: Interview Request Letter	166
APPENDIX D: Questionnaire Covering Letters	169
APPENDIX E: Voice Statistics	172
APPENDIX F: SPSS File Definition	189
APPENDIX G: Archival and Survey Questionnaire Statistics	195
APPENDIX H: Crosstabulation Results from Questionnaire Data	222

CHAPTER ONE

Computer Based Messaging Systems in the Office

Computers have traditionally been used for the purpose of storage and computation. The advent of time-sharing and the resulting proliferation of terminal distribution into the office area of the user provided the breeding ground for a new use of the technology: communication. This is a capability which is required in many office activities, and traditional methods have often represented a bottleneck in office procedures. The technological development providing this capability is known as a Computer Based Messaging System (CBMS).

This new application can be used in ways that effectively alter the way office employees work⁹. A CBMS is considered a form of intellectual support because it is presented to the office worker without prescribed uses¹. The worker is then free to use the tool in any appropriate manner. The end-user now acts as the application designer, a crucial aspect in technological change, making the impact of CBMS adoption particularly difficult to predict. Early studies are beginning to show how the CBMS is being used as an office tool^{2,3,4}. With these results in mind predictions have arisen dealing with aspects of productivity, both organizational and individual, and the quality of working life. This thesis will focus on the ways in which CBMS is used in an organization, the reasons for the types of use, the effect it has on productivity and quality of working life, and the organizational characteristics which influence its acceptability and utility.

The application of technology to white-collar jobs is done in hopes of improving the productivity of white-collar workers. The ultimate goal is to improve the productivity of the organization itself; a very difficult concept to define, let alone measure. By using a field study this investigation can shed some light on the impact of a CBMS on the areas of organizational productivity, individual productivity and quality of working life.

This chapter will outline the key characteristics of the technology and the environment into which it is being placed. Understanding the range of functions encompassed by a CBMS is a prerequisite to understanding how an office worker might utilize the tool. At the same time it is necessary to understand the needs of office workers for such a tool.

1.1 Computer Based Messaging Systems

A Computer Based Messaging System is composed of hardware and software for creating, exchanging and storing messages. A typical configuration would include an input/output terminal, telephone lines, magnetic disc and the controlling device for housing software. The software organizes message storage, performs message routing and provides user interface dialogue for message creation, editing, reception and related operations.

A typical CBMS provides the user with facilities to compose, send, forward, reply to, and file electronic messages. A text oriented system revolves around

typewritten messages manipulated on computer terminals. A voice oriented system revolves around push button telephones with voice recordings. The combination system is a hybrid of these two, and it assumes a variety of configurations. A system is classified as 'combination' when there are hooks into both systems which allow exchange of information. Future systems will add capabilities to handle other forms of data such as images and video.

A CBMS can be further described by the method used for message storing and forwarding. Many systems use the "mailbox" concept where each user is assigned an area in which to store messages. When the user wishes to receive messages that area is scanned for newly received messages. If an old message is to be saved it is also stored in this area. The storage area is usually in a central location which the user can access using any piece of communication equipment, such as a terminal or telephone, regardless of the geographic location of that piece of equipment. Other systems transmit and store messages according to a specific hardware location. In this case to send a message requires knowledge of the geographic location of the intended recipient.

An important feature of a CBMS is that access to this message area provides access to a community of office workers. If there is free and easy access then the worker is able to participate in office communication from any location at any time. Hindrances such as the unavailability of secretarial staff to type memoranda are removed from the communication task.

The facility should be secure, providing restrictions on access to message files, user identity codes with passwords to prevent unauthorized mail reading or sending, and data encryption for sensitive messages.

The system may be "active" and alert the user to the arrival of a message if the user is currently to be found by the system. A "passive" system will simply wait for the user to access a particular file. Once a user has read a message, the action taken could be any of the following: discard the message, forward the message to another user, reply to the message, or file the message.

The user interface to the messaging facility should initially stress simplicity since it will be employed by a large number of people with no technological background. A more sophisticated and powerful interface is usually desirable for later use as the person becomes familiar with the system capabilities and command patterns.

Automatic features in a sophisticated user interface aid in message creation and manipulation. Useful in this respect are features for:

- o generation of a variety of memo, form and letter formats
- o generation of address, distribution list and subject heading information when response is made to a specific memo, or a received memo is forwarded to another user

- o pagination and numbering, hyphenation, justification, and point numbering although this is more suited to long messages or small documents
- o filing and retrieval by various means of access: subject, date, recipient, author, key words, etc.

To assist with group discussions or dissemination of administrative information, users can be organized into a variety of groups or mailing lists. Users are assigned an identity code which can then be allocated to a group code. A message sent to the group is received by each user identified in that group. A message sent to the user is received only by that person.

Message tracking is viewed ambivalently by office workers. It is possible for the CBMS to monitor the messages sent by a user. The person sending messages can then discover if and when a particular message was received by the recipient. Conversely, the recipient can find out when the message received had been sent. Some office workers view this capability as a threat, while others view it as a vital time saving feature.

1.2 Communication as an Office Task

To study the impact of a CBMS in an organization a descriptive model was adopted. This model provided the basis from which it was possible to begin identifying expected areas of altered behaviour from CBMS adoption. These

operational changes could lead to improved productivity and quality of working life. Once the changes were identified they were translated into hypotheses for further investigation.

A simplistic model of the office is presented in order to examine the communication process in organizations. The following structure is intended to provide sufficient information on this system to support hypothesis formulation without becoming submerged in unnecessary details of a psycho-social nature. The model takes what is essentially one continuous process and breaks it into several discrete processes. These processes are examined for common tasks, the tasks for common activities.

This model is taken from Bair⁵ and Klein⁹. The office is perceived as a procedure oriented environment where workers are assigned tasks to carry out those procedures. The job description for an office worker specifies the tasks and degree of discretion allowed that worker in carrying out those tasks.

Some typical office tasks would include data handling, report preparation, correspondence preparation, and decision-making. An examination of the tasks found in office work reveals a set of underlying activities common to many tasks. Activities are the common denominators of office tasks. Differentiation between tasks is in the form of variations in the sequence and content of the activities followed in their completion. See Figure 1 on page 21 for a description of the model.

- o reduced slack time caused by delay in information receipt, and length of decision cycle.

These changes will initially be noticed in altered methods used for carrying out activities. The impact then filters up and is reflected in a revision of the tasks and processes followed in carrying out the organizational mission. As these tasks and processes are altered the impact on quality of working life and productivity will be felt.

The message facility can be used to replace paper or voice based communications which are one directional or don't require an instantaneous response. It can also be used to operate discussion groups. A number of people can be designated as participants of the discussion, while an outer group of users can be designated observers, free to receive but not send messages in the group. The discussion then takes place with additional support of automatic generation of minutes of these discussions

1.5 Quality of Working Life

When one considers that roughly half our adult waking life is spent at work it is easy to see that the quality of working life is an important determinant in the quality of an individual's life. The employee brings a set of skills and expertise to the organization intended to further organizational goals. In return certain needs of the individual are satisfied. Material needs and desires are provided

The role of the communication process will be markedly different in different environments. In addition, the term "organizational productivity" will also have different meanings. This study looks at a single organization with its own unique structure. As a consequence the results are perhaps not wholly generalizable. To help overcome this difficulty an organizational model can be constructed so that, to the extent that other organizations share similar characteristics, the results may be applicable.

It must be recognized that any change in tasks and processes will take place in a previously stable system: the organization. The packaging of tasks and processes is determined by organizational ideology as well as technological form. The organizational ideology will affect how workers are allowed to use the CBMS. On the other hand a CBMS can lead to changes in ideology. The communication process, a central component of the organization, may take on a form that supports a different and more effective managerial style.

An organizations' ideology is responsible for giving shape to its managerial style. The organizational development resulting from CBMS adoption is influenced by the ideology followed. The nature of this ideology is largely dictated by the nature of the organization's environment.

In a fairly stable environment jobs tend to be organized in a traditional hierarchical fashion with messages handled through the superior-subordinate

channels. The time horizons can be short and still provide adequate reaction time.

Conversely, a rapidly changing environment leads to a flatter organizational structure providing more points of contact with the environment. The communication pattern tends toward an all-to-all formation passing environmental clues to all groups for interpretation. It is a communication network built on interpersonal style rather than superior-subordinate roles. When facing an unstable environment the organization pushes decision-making down to provide the necessary fast response time.

The ideology characteristic of an organization provides the necessary mechanisms to aid in adapting to the environment. It is the ideology of an organization that determines the shaping of organizational goals, prescribes appropriate relationships between its members, determines the control mechanisms over individual behaviours, gives definition to valued or vilified characteristics in its members, and shows members how to treat one another (cooperation vs. competition; honesty vs. dishonesty; closeness vs. distance).

Harrison's framework¹⁰ postulates four organizational ideologies:

- o power orientation: attempts to dominate its environment; within the organization those able to dominate succeed.

- o role orientation: competition and conflict are replaced or regulated with rules, predictability and respectability are the valued behaviours. This orientation requires a highly stable environment.
- o task oriented: achievement of the organizational goal is given highest priority; influence is gained through competence in performing the work at hand.
- o person oriented: the organization exists to support each member in their pursuit of individual goals, authority is gained through example and helpfulness.

Each study site can be classified as one of these four. The results are then of greatest interest to those who are concerned with organizations of this same type. Where possible, the effect of the organizational ideology is identified enabling others to determine how organizations with differing ideologies might react.

The study site entered for this investigation was a task oriented organization. This orientation gave rise to a climate of team work where cooperation was highly regarded, competitiveness discouraged. The channels of communication tended to form around centers of expertise; the channels were informal and ever-changing. The impact that this orientation had on the adoption of CBMS

can be seen in the benefits and drawbacks identified in the system. The utility of the tool was evaluated for this setting. How a CBMS would be used in an organization with a different orientation is discussed in an examination of how the orientations produce differences in organizational communication patterns.

1.4 Impact of a CBMS on the Messaging Process

The use of a CBMS is expected to bring operational benefits to the organization. Several ways that a CBMS can support office activities have been cited in Bair's work⁵:

- o a decrease in time spent on shadow functions: unforeseen and time-consuming activities associated with performing a task which do not in themselves contribute directly to task completion. An often cited example is telephone tag, the process of exchanging messages for the sole purpose of establishing contact. Interruptions carry with them many shadow functions resulting from their disruptive nature.
- o a decrease in media transformations since a message can be composed, distributed, forwarded, etc. in the same CBMS. The series of media transformations associated with correspondence preparation using secretarial support is eliminated.
- o time savings in correspondence processing from use of automatic heading generation, mailing lists, and follow-up features.

- o reduced slack time caused by delay in information receipt, and length of decision cycle.

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through monetary compensation, and regardless of the intentions of an organization, social systems exist. The main ingredient of these social systems is communication. Some employees in some organizations find needs for closeness, acceptance, recognition and support are met. Some do not. Nevertheless, the extent to which a CBMS alters or interferes with the social systems present will bear on quality of working life. Some employees in some organizations gain self-esteem by performing jobs they perceive as being interesting and important. If a CBMS alters that job by making the work more or less rewarding or by changing the impediments the employee encounters the quality of that employee's working life changes correspondingly.

The implementation of a CBMS involves a far-reaching intervention into the task structure of an organization. As such it acts as both a catalyst and a cause of changes in the working relationships between people and between people and their jobs. A detrimental change would result from a perceived increase in task complexity due to poor training in what, for some, is a new and difficult skill. For others, any decrease in face-to-face contact is viewed as a decline in quality of working life since this represents a dehumanizing of the work place. Positive changes may also result from increased flexibility in work group arrangements, improved access to people, improved access to information, or a decrease in fragmentation of the day from interruptions. Before any conclusions can be drawn of the impact of a CBMS on quality of working life the underlying, perceived changes in the nature of office work need investigation.

1.6 Productivity

Communication is central to all office tasks. This is especially true when examining the processes found in the work of middle and upper level employees. Aside from being a high cost group, these are the people chiefly responsible for the workings of the organization, for carrying out the organizational mission. An increase in the efficiency or effectiveness of these workers can quickly be translated into a benefit to the organization.

"Efficiency is performing a given task as well as possible in relation to some predefined performance criterion. Effectiveness involves identifying what should be done and ensuring that the chosen criterion is the relevant one."¹¹

The dual concepts of efficiency and effectiveness are referred to as productivity. A decrease in the time required to accomplish various communication tasks is an example of increased efficiency. This efficiency is supplemented by an increase in effectiveness, understood as a qualitative improvement in a worker's performance of an organizational task. Together they equal productivity. Improving an individual's ability to detect and resolve problems is an example of individual productivity being strengthened. From the organizational perspective an increase in effectiveness would result from such things as an improved ability to anticipate and respond to market forces, resulting in an improved market position.

Workers at the middle and upper levels of the organization are expected to use and benefit most from a CBMS because Office work at these levels consists largely of semi-structured tasks: tasks with a structured component suitable for automation and an unstructured component requiring intellectual processes for completion¹¹. In the case of communication, the structured activities of message composition, receiving and distribution are now being automated through the use of a CBMS. It is the unstructured component that introduces the element of surprise. The technology does not impose a structure onto the communication process. How and why the tool is used remains the decision of the individual, making each office worker an application designer. Furthermore, freedom from the details of manipulating a cumbersome communication system allows the user to increase concentration on analytic tasks. The impact of a CBMS will be felt in areas other than simple communication tasks as the user shifts time and effort into these.

It has been predicted^{4,5,6,7,8} and it is currently assumed that the way the CBMS is used will bring about identifiable changes in office task performance. These anticipated changes are presumed to have an influence over an individual's productivity by streamlining the activities in their job. As the basis for predictions concerning the impact of a CBMS these changes warrant investigation.

1.7 Scope and Purpose of the Thesis

"Intuition is a notoriously misleading basis for prediction ..."¹²

This study is aimed at uncovering low-level behavioural changes brought about through long-term CBMS usage. The results will provide empirical generalizations in support of higher-level theories concerning the impact of a CBMS on such things as productivity and job satisfaction.

The investigation takes the form of a field study. The goal is to make a preliminary identification of long-term changes in this organization resulting from CBMS adoption. The outcome is a set of hypotheses formulated as an explanation of these changes.

The research question is: what are the changes in day-to-day operations in the office that have taken place from CBMS adoption? The investigation looked for changes in the areas of messaging activities, quality of working life, individual productivity, and organizational productivity. These changes were then used to formulate hypotheses concerning the expected impact on productivity and quality of working life of a CBMS. The hypotheses rest on actual changes as observed in this field study of an organization, as opposed to assumed changes.

Because the research question deals with long term changes in the organization,

a study site offering a mature CBMS was required. Using the organizational models outlined above, the results are given in terms applicable to a larger number of organizations to the extent that they share these characteristics.

A study site was selected which promised to be a rich source of data. This site offered several advantages: a sophisticated CBMS is employed widely throughout the company; the system has been in use long enough for introductory shock waves to have worn off (the system was adopted in mid-1981); and top level management is committed to carrying out such research in their organization.

1.8 Thesis Layout

The approach adopted for this research and the resulting methodology are given in Chapter 2. This includes the variables used, their measurement, data collection tools used and their administration; and the data analysis techniques followed. Chapter 3 presents a preliminary discussion of the findings by each data collection instrument. This allows the identification of emerging trends. Chapter 4 presents the conclusions drawn from data analysis which draws on the work of Chapter 3 and further analysis linking variables within and between data collection instruments. These conclusions are given in the form of proposed hypotheses. The appendices contain copies of the data collection instruments, non-aggregated data results and the data analysis programs, and can be found beginning on page 133.

Footnotes

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OFFICE ACTIVITIESOFFICE TECHNOLOGIES

	<u>Messaging</u>	<u>Capture Storage and Retrieval of Information</u>	<u>Document Preparation</u>	<u>Information Processing</u>
Acknowledge	x		x	
Act			x	
Allocate		x		
Analyze		x		x
Approve			x	
Broadcast	x	x		
Calculate		x		x
Categorize		x		x
Check		x		x
Code		x		x
Decide		x		x
Depict	x		x	
Document			x	
Edit		x	x	
Enter		x	x	
Expedite	x			
Explain	x	x	x	
File		x		
Format		x	x	
Initiate	x			
Learn	x			
Locate		x		
Prepare		x	x	x
Present	x		x	
Prioritize		x		x
Proceedings		x	x	
Process				x
Protect	x	x		
Receive	x	x		
Standardize		x		x
Transact	x	x		x

Figure 1.

Relationship Between Office Activities and Technology

CHAPTER TWO

The Study Approach and Research Methodology

This chapter describes the procedure followed in carrying out the study, beginning with discussion of the general approach taken to investigate the research question. This approach gave rise to a methodology characterized by certain variables, variable measurement strategies, and data analysis techniques. The details of this methodology close the chapter.

2.1 Study Approach

The study approach was to observe the behaviour of office workers at the study site in order to generate and refine hypotheses. A critical, assumption testing methodology was required. The role of the investigator was to observe a naturally occurring phenomenon: the alterations in office work occurring after long-term use of a CBMS. The goal was to identify what changes occurred from use of the CBMS, and wherever possible extend this to answer how those changes came about.

The identification process was aimed at providing an explanation for the uniqueness found in the study site organization. An explanation was constructed in such a way as to be applicable to as wide a range of organizations as possible; the identification of what changes took place in this organizational setting was supplemented by observations of how the setting may have influenced these changes. The explanation takes the form of a set of hypotheses supported by empirical evidence gathered from the study site.

The field work began with a period of direct observation. The investigator was provided with a desk and the assistance of a staff member in the organization. This provided access to the day-to-day workings of the organization, and a vantage point from which to view how others experienced these workings. During this period the investigator was able to identify the power centers and actors, the decision-making style, and the social climate in the company.

In addition, it was possible to identify novel situations and apparently idiosyncratic behaviour stemming from CBMS usage. This was accomplished by comparing the activities of a number of organizational members, some heavy CBMS users, others not; also by comparing activities at the study site and those normally found in an organization without a CBMS. In this way the study is comparative, and the resulting set of hypotheses provides an explanation for the source of any observed differences in behaviour.

These observations then became the basis for formulating a set of proposed variables and hypotheses for further investigation. Interviews, archival records and a questionnaire were used to gather data from a larger segment of the organization in order to verify the appropriateness of these variables and hypotheses.

The observation period also provided guidance to the formulation of a research methodology. The feasibility of various experimental designs and data collection methods were tested during informal, unstructured interviews with middle and

upper level personnel. The methodology adopted was chosen to work within the constraints found in the study site.

2.2 Study Site and Corporate Characteristics

The study site selected offered several advantages in that a sophisticated CBMS was employed widely throughout the company, and had been for some two years. The introductory shock waves had subsided so that long-term effects of CBMS usage could be observed. Another advantage was the commitment on the part of top management to carrying out this research in their organization, a commitment reflected in the access given to organizational support resources.

The company is engaged in an expanding, high-technology industry characterized by fierce competition. Market positions have not yet been secured because the market is constantly shifting; growing into areas where technological breakthroughs have occurred, and shrinking back from areas where promised technological breakthroughs do not materialize.

The company currently employs 4,000 people, roughly 2,000 of whom are white collar employees at corporate headquarters. It was these 2,000 employees that formed the study group. This group includes a large number of highly skilled engineers engaged in research and development. The number of employees engaged in marketing is also quite high. The marketing personnel need to be well versed in technical matters, as do the human resource personnel whose responsibility it is to anticipate and fill the need for employees with specific technical skills.

There is also a large support staff, and professional group that do not have technological skills. They perform administrative, and other functions that enable the company to perform in its market. These employees generally do not have formal training that involves technology.

The company has undergone tremendous growth during the last 5 of its 10 year history. Sales have increased rapidly each year since 1977 in its strongest product line. The past three years have been transitional, having passed from the entrepreneurial to the corporate solidarity phase.

A corresponding growth in the work force occurred, so that the average employee has been with the company for two years. There is an atmosphere of comradery, and social events are frequent and well attended.

This is a task-oriented company where job title means virtually nothing. The gaining and wielding of power hinges on the ability to complete tasks. Power is obtained and held on the basis of competence demonstrated in carrying out a job. Decision-making is largely done by consensus. A flat-structure is in existence with decision-making pushed down to the middle-management level. To a very large extent employees are expected to initiate, and carry out, their own tasks.

The company maintains a world wide sales and service force, with some 40 satellite offices, and has production facilities in several other countries.

This environment made the adoption of CBMS usage highly desirable. With their decision-making style and the rapidly changing state of their environment it is vitally important they be able to exchange timely information among themselves.

The CBMS consists of three services; two that are text-based, and one that is voice-based. There are no hook-ins between the systems, they are not integrated. System A is text-based and is used by roughly 1,500 people throughout the world. System B is text-based and is primarily used by the research and development group at the corporate office. The voice system is in its very early stages of introduction, being piloted among top management and marketing employees.

2.3 Research Methodology

The field study employed a post-test quasi-experimental design,⁷ supplemented by some pre-test data captured from study site personnel recollections. CBMS provision is the treatment whose impact is being tested. Because data collection was performed after the CBMS had been in use for quite some time, only post-test data was readily available. By asking the respondents to remember the situation before the CBMS was in existence some pre-test data was gathered. A quasi-experimental design was used because the subjects (study site personnel) were not randomly assigned to receive the test (CBMS facilities for use in their jobs).

The lack of a control group and pre-test data make it difficult to attribute behavioural changes solely to the adoption of a CBMS. The ability to separate out and account for confounding factors is difficult without the baseline measures that a control group and pre-test data provide. The design of data capture tools attempted to minimize these problems wherever possible.

Being an exploratory study, there were many variables of interest. A central goal of the investigation was to determine which, if any, of these variables were supported by empirical evidence. Using a large set of variables increased the complexity of the data analysis. This increase in complexity was offset by the benefit of having many measures taken on the same phenomenon. As a self-checking feature, this enabled the data analysis to verify findings on a given variable against those of a related variable.

Variables that describe aspects of CBMS provision are designated as factor variables. A factor level is a particular form of that factor¹. Having System A and System B service would be one level of the CBMS Service factor level.

Variables that describe an impact from CBMS adoption are designated as response variables. The study uses a mix of categorical and ordinal measures for response variables.

The data analysis sought to reveal the influence of each factor on CBMS usage, to reveal any interactions which might exist between variables, and to reveal the

influence of each factor on the impact of CBMS adoption.

2.3.1 Factor Variables

The CBMS will have an impact on workers and the organization only if it is used. It is supposed that the impact of the CBMS will be greater for those who regularly use the service, and who depend on communications heavily to carry out their job. The identified factors are each expected to have a different effect on the usage of the CBMS, either in a quantitative or qualitative manner.

Factors identified segregate the study site respondents according to the amount of technological support they receive, the organizational position they hold, and the type of communication requirements that are associated with that position. The amount of technology provided for the communication task is expected to influence the quantity of CBMS usage. The type of job a person holds is expected to have both a quantitative and qualitative influence over CBMS usage.

Technology Provision dealt with the level of hardware and software support given to the subject in performing messaging activities. This variable was used to show what effect providing increasing levels of technological support has on CBMS usage.

Organizational Position reflects the different communication patterns that result from job level and job function. This dimension is closely linked to the communication requirement variable, and is used to investigate the possibility

that CBMS usage is more appropriate, or beneficial, for some organizational units than others. The use of job function and level was adopted because job titles are not meaningful in this organization. It was observed that most people did not have a useful job title, and that function and level provide an accurate description of the organizational role played by the respondent.

The Communication Requirement dealt with the nature of messaging activities in a job. The trigger, content, and impact of messages will differ among tasks, and a CBMS will bring about different qualitative changes to different communication tasks.

The last two dimensions, organizational position and communication requirements, provide for the extension of the results of this study to employees with similar requirements and positions in similar organizations.

2.3.1.1 Factor Levels

Various dimensions of each factor were set out in measurable form. These measures are used to create groups of office workers who share some set of attributes.

2.3.1.1.1 Technology Provision

This variable was measured by the variety of CBMS services available and the proximity of communication devices. A person with a membership on all three mail services and with a private terminal was expected to use the CBMS more

frequently than a person with membership on only one service who must share a terminal with ten other users.

The accessibility of hardware to an employee was measured jointly by its proximity and size of its ownership group. The communication devices are telephones, terminals, and printers. Software support was measured by the number of different services on which the employee is a user. A covariate variable of this dimension is the date that the person joined a particular CBMS, thus measuring the length of time that service has been available to them. Responses from Section I, Questions numbered 1 through 8, created this measure in the questionnaire. The introductory question established this information in the interview.

2.3.1.1.2 Organizational Position

An employee's organizational position was measured jointly by perceived job level and job function. The study site organization did not rely on formal job titles and descriptions. The measure for this dimension was tailored to capture the data as it is perceived by the organizational members. Together the job level and function provide more information on the respondents job responsibilities than a job title would in this particular organization. Responses to Section I, questions numbered 8 and 9 measure this in the questionnaire. Interviewees were asked to describe their perceived organization chart and role during the interview.

2.3.1.1.3 Communication Requirement

The communication requirement measures identify employees who depend heavily on the communication process and the source of that dependence.

Time spent by the employee on communication tasks, along with the degree to which the employee depends on other people for job related information jointly measure the employees dependence on the communication process.

The source of dependence on communications is determined by measuring generic job characteristics that carry with them specific communication requirements. A task or process that provides a support service, guards an information resource, requires exchange of tasks, monitors the internal activities, or monitors the external environment carries with it unique forms of communications. The triggers and content of messages will be quite different. Contents of communications for exchange of tasks do not resemble those for monitoring the external environment.

The characteristics of various types of jobs gave rise to the identification of aspects of the resulting work that require messaging activities:^{3,4,6}

Support Service: A job that entails the provision of services to other work units will involve the exchange of service requests, notification of request status, and performance feedback.

Information Resource Guardianship: A job that entails the safeguarding of a resource must be able to receive and respond to requests for the use of that resource. There is also a requirement to obtain information relevant to the maintenance of the resource.

Task Specialization: A job that performs a subset of the activities needed to complete a task or process requires reporting task status, monitoring the task status of other units, and the exchange of tasks.

Maintaining Internal Control: A job that ensures the smooth and proper functioning of an organizational process will use the communication system to secure progress information, send expediting directives, and exchange other controlling information.

External Representation: A job that entails movement in the environment as an organizational representative requires information related to internal activities. Feeding new environmental information back to the appropriate organizational groups is a complementary function of this job. The requirement is for access to a large number and variety of other work units.

The Communication Requirement factor was measured in the questionnaire by estimations of time spent on activities in the above categories. Responses to questions in Section III of the questionnaire created these measures.

Because of the complexity in measurement, greater reliance will be placed on the interview to investigate this factor. Each interviewee was asked to describe the nature of communication activities undertaken. This allowed the interviewer to identify the dominant communication requirement. This allowed investigation of how the CBMS is beneficial in different communication categories.

2.3.2 Response Variables

Several aspects of CBMS usage are expected to give rise to broader changes in work activities, tasks, and processes. The most obvious is the time saving nature of a CBMS brought about from a reduced number of required preparation tasks. The released time can then be used to increase quantity and/or quality of work performed. A second aspect stems from the expected strengthening of communication links resulting from improved access between organizational members and work units. Organizational functioning and coordination is expected to improve as the exchange of information increases in volume and timeliness. A third aspect concerns the improved functioning of employees when fragmentation of their work day is reduced. Concentration can be increased as interruptions from incoming messages are reduced.

Response variables were generated for these and other aspects of CBMS adoption from observations made at the study site, and from existing hypotheses concerning the impact of a CBMS as described in Chapter 1. Variables were drawn from four areas: system usage patterns, individual productivity,

organizational productivity, and quality of working life. The presentation of results in Chapter 3 provides a description of these response variables.

A large part of this investigation dealt with system usage patterns. The response variables concerned changes in usage of other communication technologies, such as the telephone, and reasons for selecting the CBMS as the medium for communication.

The impact on productivity, both individual and organizational was also of considerable interest. The provision of a CBMS does not come without its costs. The benefits need to be identified and measured if any cost/benefit analysis is to be done in support of this investment. Productivity improvements in the white collar work force are thought to be a primary benefit.

The impact of a CBMS on quality of working life is of interest to all employees, regardless of organizational position. Upper management has a dual interest since not only is the quality of their own working life affected, but that of their subordinates. This may, in turn, affect organizational performance.

2.3.2.1 Measurement of Response Variables

The system usage patterns were examined in both the questionnaire and the interview. Responses to Section II and Section III of the questionnaire gave measures on the extent a CBMS will alter the messaging behaviour on other

communication technologies, and the reasons for selecting a CBMS for a message exchange. The interview responses to queries on usage patterns provided additional insight.

Individual productivity changes were measured in terms of efficiency and effectiveness. Both types of improvement are expected to arise from the time-saving capabilities of a CBMS. A given messaging activity can be performed in a shorter length of time. The time saved can be spent in some combination of three ways: waste the time, increase volume of tasks completed, or increase quality of task performance. The interview was used to capture this information. Responses to questions found in Section V of the questionnaire supplemented the interview data.

When the released time is used to perform a greater volume of tasks, it is possible that these new tasks will vary from those undertaken in the job prior to CBMS adoption. The result would be an increase in the variety of tasks completed, and perhaps an expansion of the employee's job skills. Section V and VI of the questionnaire deal with these changes. Many of the comments gained during the interviews dealt with this aspect of individual productivity.

Organizational productivity was examined in terms of efficiency and effectiveness. The chief source of information on this variable was from responses during the interview asking the employees themselves how they saw the CBMS improving organizational productivity. Some very crude measures

aimed at the efficiency aspect of productivity were included in the questionnaire, dealing with the pace of activities, found in Section V.

Changes in the quality of working life revolved around the issues of work related stress, isolation from a reduction in face-to-face contact, de-skilling of jobs from automation, and job satisfaction. These were measured in Section V and Section VI of the questionnaire. The interview situation provided a rich source of data for this variable, that supplemented these interview responses.

2.3.3 Data Analysis

The results of data collection efforts were first examined on a variable by variable basis using descriptive statistics. The purpose of this preliminary examination was to identify trends worth further investigation. This identification was done through the examination of variation in responses. If the data values for a variable are all equal, then there is no variation to explore.

For the factor variables, the examination identified the factor levels; groups of respondents who differ from other respondents on technology provision, organizational position, and communication requirements.

For the response variables, the examination revealed those areas where further investigation, using the factor variables, was warranted.

In some cases the nature of the response variable, and the distribution of its data

values were such that conclusions could be drawn concerning CBMS impact with no further analysis being done. Alternatively, some hypotheses and variables proposed were not supported by the results. Where further investigation was required, more sophisticated data analysis techniques were employed.

The data from the questionnaire arises largely from categorical variables, especially in the case of the factor variables. When all the variables being explored were categorical, contingency table analysis was employed. When the response variable was continuous, and the factor variables were largely categorical, then Analysis of Variance was used. When the response and factor variables were both treated as continuous measures, regression techniques were used.

2.3.4 Data Collection Methods

The period of direction observation provided sufficient information to formulate a preliminary set of variables and hypotheses. Data from a larger segment of the organization was used to verify these, and also sought to uncover any further hypotheses. The role of the data collection process was a combination of verification and exploration of hypotheses, making a mix of measurement tools appropriate.

Three data collection instruments were selected: interview, questionnaire, and archival records. The questionnaire stressed the verification aspect of data collection; it concentrated on hypotheses drawn from the system usage area.

Archival records were used to provide background information on the users behaviour as recorded by the CBMS. The interview process was constructed to stress the exploratory role of data collection; it concentrated on hypotheses drawn from the quality of working life and the productivity areas.

In selecting a data collection method attributes of the various instruments available were examined². The attributes considered were:

- o difficulty of use; level of complexity in the design and scoring for the measure
- o freedom from bias; that there be no systematic tendency for the measure to be influenced by, or reflect anything other than the variable they are supposed to measure
- o replicability; degree to which there is agreement between two measures of the same thing, or the same measure taken at two points in time
- o statistical validity; degree to which the measure is significantly related to a different measure when both are measures of the same variable, or one measure is supposed to lead to the other
- o face validity; degree to which the measure appears to measure the variable in question.

- o member acceptability; degree to which the instrument requires cooperation from organizational members for the measures to be taken
- o flexibility; degree to which the content of the instrument can be altered in response to early data collection results.
- o richness of data; degree to which the data collected contains information on feelings, actual events, and causal sequences of behaviour
- o sample size and selection; degree of ease in determining these
- o variables or dimensions to be measured; degree to which the instrument can measure the dimensions of the organization that are of interest.

Using the above as criteria the instruments were selected. The archival records provide objective usage information useful for making comparisons between the various sample groups created by the other two instruments. A custom-fixed-response questionnaire was designed, as was a structured open-ended interview. Figure 2, found on page 52, illustrates how these instruments rate on the selection attributes.

2.3.4.1 Interviews

Many of the variables of interest deal with perceptions that the CBMS user has

towards his job and the organization. The most direct way of exploring these perceptions was to engage the user in a dialogue. A range of different kinds of information was sought through the interview process: how the person used the CBMS in carrying out the job, what impact the person believed it had on the job, what impact the person perceived it has had on the organization.

Stress was placed on uncovering the interviewees definition of the situation. To do so, the discussion should follow the structure that the employee gives to the situation letting the employee define the events of relevance. These requirements suggested an unstructured interview technique be used. The term unstructured here infers that the interviewer provides minimal guidance to the respondent in the form of posing questions or prompting for answers. There would not be, for instance, a predetermined set of questions. While a very high degree of data richness can be attained using this method, unstructured interviews have associated with them certain problems: they lack replicability, are complex in their scoring; and carry a high potential for interviewer bias. The potential for bias arises from the possibility that the interviewer may subtly influence the respondent in his answers, lead the discussion by asking favored questions, or arbitrarily decide what to record.

These problems made an unstructured interview technique unsuitable and the alternative technique of structured open-ended interviews was selected. In this technique a predetermined set of questions is drawn up, but no corresponding alternative responses are specified. The respondent is unconstrained in

answering the prompts from the interviewer, thereby preserving the opportunity for respondent generated questions. While less adaptive, it is easier to score, more replicable, and less subject to scorer bias.

The interview began with an explanation being given to the employee on the source and purpose of the study. The stated purpose was to examine the impact that a CBMS could have on jobs and organizations. This acted as an introduction to the first set of questions dealing with the person's organizational position. The person was asked for a general description of his role in the organization, disregarding for the moment any technology that may be used for communications.

If the ensuing description did not provide information on the employees position in an organization chart the person was asked how many people reported to him, how many people he reported to, how many others also reported to his superior(s).

The whole description gained by this point in the interview provided valuable background for later discussion of issues surrounding personal power, productivity, and job satisfaction. After receiving the perceptions of the employee regarding the job function filled, the interviewer understood that persons orientation, an understanding that was strengthened by the next area of discussion.

The employee was asked to consider the role that communication played in the job. In describing this communication requirement the person was asked to include all messaging modes, not strictly those messages handled by the CBMS. At the completion of this discussion the interviewer had an understanding of the organizational climate as perceived by the employee.

- The CBMS was then brought directly into the discussion. The employee was asked to recall the period of time when he was first introduced to the service and asked to describe the initial uses made of the CBMS. With this description in mind the employee was asked to recall the reaction he had to CBMS introduction: were initial expectations met; did the new tool have any effect on job satisfaction; was there a period of experimentation; what form did training take? Following this the employee was asked if the CBMS was used by the organization in job monitoring or to provide job feedback.

The time frame was then advanced and questions on current usage were posed. The employee was asked to describe the current uses made of the CBMS. The response to this question showed the change in usage patterns over time. The previously given response dealing with initial CBMS usage provided comparison data. The employee was asked if the CBMS had played any part in perceived job satisfaction, and whether or not the CBMS was now used in the organization for job monitoring or feedback.

The line of questioning then shifted to productivity as the employee was asked

to consider the impact the CBMS might have made on his job. The respondent was asked if there had been an increase in the volume of communication or the number of people with whom he came into contact. These two areas of impact deal with individual efficiency as does the subsequent question of whether time spent on shadow functions associated with communications had been altered.

This question provided a bridge to the next set of inquiries dealing with individual effectiveness. The employee was asked if the CBMS had saved them time; if the response was "yes" the next question was "what did you do with this extra time"? The employee was then asked if the CBMS had affected his job performance.

To lead up to the issues of organizational productivity the employee was asked if he had difficulty composing messages or understanding messages carried over the CBMS. The question of communication skills was explored.

The employee was next asked to think of the organization as a whole, not just the portion viewed for his job. The question was: has there been a noticeable impact on the organizational flows of communication and performance from the CBMS? If not already mentioned the person was asked if business travel had been altered.

Once again the time frame was advanced. The employee was asked to identify any extensions to the service he thought would be useful.

To close the interview the employee was asked to describe drawbacks of the CBMS. The issue of "junk mail" and difficulties in accessing the system were explicitly raised. Finally the employee was asked about his attitude and expectations towards Voice based mail systems. The differences between an active and a passive system was described and the person was asked for a reaction. (See Chapter 1 for an explanation of the terms "active" and "passive"). Could the person suggest what the voice based system would replace?

The employee was then thanked and asked if there were any other thoughts he would like to give on the subject.

To minimize interviewer bias a scoring scheme was completed immediately after each interview, thereby creating for each respondent a set of values for the standard questions plus any additional points raised by that particular respondent. The scoring scheme mimicked the structure of the interview as outlined above.

Data values were recorded under several categories. Organizational profile provided information on the job level and function of the respondent. A communication profile was constructed to describe the role messaging plays in the person's job. The technology profile describes what facilities the user has for messaging. System introduction responses provide pre-test data to construct impact measures. Current system usage data shows how the CBMS is used in messaging activities. Scores under individual efficiency and individual

effectiveness are used to construct individual productivity measures. Organizational volumes and flows were recorded, as perceived by the respondent, to measure organizational productivity. In addition to recording these values each respondent brought a different perspective and experience to the interview. The differing uses and attitudes were of great interest and were recorded as additional questions and answers.

The interview notes and summary score sheets were used to create a response set for each interview. This response set created values for the identified factors and response variables, as well as recording unsolicited measures. The sheets for each interview can be found in Appendix B, pages 147 through 165.

The interviews were conducted over a two week period in March 1983. The names of 50 users were selected from the system statistical report. An attempt was made to get a mix of heavy and light users, and to get a variety of organizational types. A preliminary schedule was drawn up with each of the fifty slotted into two different one hour interview times. Each potential interviewee was sent a letter of introduction shown in Appendix C, pages 166 through 168. In this letter a request was made that the person agree to be interviewed and suggested the interview occur in one of the two time slots listed. Each person was then contacted, either by phone or CBMS, to finalize the time and place of the interview.

Some 25, (50%), of the group that received letters agreed to be interviewed, and

a time and place was established. Quite a few of those receiving letters were away from the office during this time and could not be reached. Others were away on vacation. As was to be expected some cancellations of these preliminary appointments were made, and in all 18, (36% of total solicited), interviews took place.

2.3.4.2 Questionnaire Design

The questionnaire provided the opportunity to gather data from a large segment of the organization. Two considerations were balanced during the design phase of the questionnaire. While trying to gain data rich in the feelings and perceptions of the employee, the questions themselves had to be clear and concise. Furthermore, the number of questions could not become overwhelming. A questionnaire operates by solitary completion of the questions by the employee. Any ambiguity in the questions will result in annoyance and lead to a non-response or the employee arbitrarily choosing a, possibly inaccurate, interpretation.

The questionnaire itself was revised several times. At each stage of its development the questionnaire was submitted to concerned parties within the organization for review. In doing so, feedback was gained uncovering problems or concerns that were used to revise the questionnaire.

A more formalized pre-test was held when the questionnaire was in a final draft form. A group of employees who, up until that point, knew nothing of the study

were given the questionnaire to complete. They were asked to record how long they had spent completing the form. After collecting the completed test questionnaires, each respondent was briefly interviewed to check that the participant had understood the intent of each question, and that their responses were interpreted correctly. There were questions that were difficult to answer because the scaling was inappropriate, and questions that were ambiguous. These problems were often solved by replacing certain phrases with those in common use at the study site. The language of the organization was incorporated into the questions to ensure that proper interpretation was given to the question.

The questionnaire was segregated into six sections. The first section gathered measurements on the degree of technology provision, and organizational characteristics. Section II sought information on the relationship between the CBMS and traditional modes of communication. Section III gathered information on usage made of each CBMS service by the respondent, including the reason that service is used. Section IV measured the time spent on various dimensions of communication requirement categories. Section V dealt with the impact on the individual, while Section VI dealt with questions surrounding the working life of the respondent.

The structure of the questions and scales adopted in Section IV, V, and VI were influenced by an examination of existing questionnaires^{2,3,4}. The questions and scales in the first three sections were largely constructed during the period of direct observations.

A covering letter from an upper level employee requesting each questionnaire recipient to cooperate in this study was included in the delivered package. The organizational benefits behind the study were explicitly raised. A more detailed letter of explanation followed the covering letter, written by the investigator. Both these letters can be found in Appendix D, pages 169 through 171.

Once the final adjustments were made the questionnaire was submitted to production services where it was typeset and printed. The blank questionnaire was distributed through the internal mail system to each white collar employees. The respondents completed the form and returned it to the investigator also through the internal mail system.

There were 1500 questionnaires given to the mail department with instructions to deliver them to all office workers. The return of questionnaires began quite quickly after this delivery. The first week brought roughly 300 back, and in the next two additional weeks, 130 more were received. Of these returned questionnaires, 11 had been improperly completed, or major portions had been left blank. In all, 419 questionnaires were used in the data analysis. The response rate was roughly 30%.

2.3.4.3 Archival Records

System A generates usage reports on a monthly basis. In this case a month was designated as beginning on the fifteenth day of the previous month and finishing on the fourteenth day of the identifying month. This data provides objective

information on how the users utilize this part of the CBMS. While the statistics are limited in richness of data they are very high in freedom from bias, face validity, statistical validity, and sampling ease. This data provides a yardstick against which to measure the results of the other data collection tools.

The statistics collected were the number of sessions, number of messages sent, number of messages received, and connect time for a given month. The number of sessions for a particular user was incremented each time that persons account was entered. The number of messages sent is incremented for every message sent out by that account. In the case of broadcast messages, a single message sent to 10 people counts as 10 messages. The number of messages received is similar, being incremented for each message entering that persons "mail box". Connect time was measured in hours and fractions of hours, and reflected the amount of time that month the user's account was open on the computer system.

Sampling was relatively simple, compared to the other two methods, because no user cooperation was involved. Random numbers were generated from standard mathematical tables and the corresponding entry in the population being sampled from was selected.

A comparison group was formed by randomly selecting people from the total of System A users. Other groups were formed to represent each of: questionnaire respondents; interview participants; and voice mail users. Comparisons between these groups and the comparison group allow for the detection of the degree and nature of any sampling bias.

The questionnaire group was formed through a random sampling of questionnaires drawn from the set of questionnaires that had a name attached. The interview group included each person interviewed, and the voice group was formed by voice users who also used system A.

Data for each group was recorded for the months August 15, 1982 through February 15, 1983, a total of six months. Each set of observations was then analyzed.

The archival and questionnaire values were entered into a computer resident file using data entry programs, and the interview results were hand coded onto paper-based records. The analysis and synthesis of the data is presented in the next two chapters.

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Footnotes

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- 6 Alex Bavelas, J. MacGregor, F. Safeyeni. Informational Analysis Of "Office" Functions And Exploration Of A Methodology For Emperical Research, Department of Communications, Ottawa, 1981.
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SELECTION ATTRIBUTES	DATA	COLLECTION	INSTRUMENTS
	Archival	Questionnaire	Interview
Difficulty of use	Low	Moderate	Moderate
Replicability	High	High to Moderate	Moderate
Statistical Validity	High	High to Moderate	High to Moderate
Face Validity	High	High to Moderate	High to Moderate
Freedom from Bias	High	High to Moderate	Moderate
Member Acceptability	High	Moderate	Moderate
Flexibility	Low	Low	High
Richness of Data	Low	Moderate	High
Sampling Ease	High	Moderate	Moderate
Ability to Measure Dimensions	Low	Moderate	High

Figure 2. Characteristics of each data collection instrument.

CHAPTER THREE

Results and Observations of the Study

This chapter presents the data captured from the archival records, the questionnaire, and the interviews. Building on the analysis presented in the preceding two chapters, the relationships existing between factors and response variables are explored. By sifting through the data it was possible to identify the low-level behavioural changes that followed CBMS adoption.

3.1 Archival Results

The archival records provide data on four groups from the study site: comparison, questionnaire, interview and voice. The observations taken on the comparison group provide a picture of CBMS usage patterns in the study group (on System A) as a whole. Comparisons between the groups were made to determine if the interview sample and the questionnaire sample are representative. Where any significant differences were detected, an examination of the respective means and variances provided insight into the proper interpretation of data gathered from the group in question.

Illustration 1, found on page 196, presents the results for the Control group. Graph A shows the number of sessions by month. The figures suggest that the majority of users at the study site access the system twice a day. In month 5 there were 5 fewer working days due to a company wide holiday, and the average shows 10 fewer accesses for that month.

Graph B in Illustration 1 shows the average length of time spent connected to the system, by month. Considerable variation is found from month to month, with months 1,2, and 6 showing connect times of 15 to 16 minutes per day. A twice dialy access frequency would mean roughly 7.5 minutes per session.

Graph C gives average number of messages sent and Graph D gives average received. The number of messages received is generally higher than sent. The broadcast message counting algorithm would account for this discrepancy. As an example, when a public relations announcement is sent through the system, each announcement received is counted as a message received for that user. Likewise, the number of copies sent is counted as messages sent for the originator. The sender is left with a very high message sent count, and would show as an outlier. Message exchange rates suggest that the norm is to send 1 or 2 messages a day, and receive 2 to 3.

The other three groups were smaller than the comparison group, and several outliers were discarded from these groups. In a smaller group, outliers tend to have a more disturbing impact on the average. These outliers were the result of the broadcast message counting algorithm.

Illustration 2, found on page 197, shows the results for the questionnaire group. The figures in Graph A showing sessions by month indicate that the questionnaire group is similar to the comparison group in terms of its access behaviour. The connect times, shown in Graph B, also are similar to those of the comparison

group. The message exchange behaviour of the questionnaire group shows people broadcasting messages, or people who are simple more active and interacting with some group not included in the sample, than is found in the comparison group. This accounts for the higher sending figures.

The results for the interview group are given in Illustration 3, found on page 198, and indicate that this group contains users with higher activity levels than is found in the rest of the user group. The results of Graph A showing sessions per month indicate that the interview group, composed largely of professional and upper management personnel, was less affected by the holiday spirit than those of the comparison group. The effective number of working days for this group in month 5 was probably 20 rather than 15. This is a small group and outliers were particularly obvious in the message exchange averages. Nevertheless, the results indicate a higher level of exchange than in the comparison group.

Illustration 4, found on page 199, provides the data gathered on the voice group behaviour. This group is also dominated by professionals and top management personnel, which is reflected in the relatively higher usage rates shown by the voice group. Graph A giving sessions per month shows behaviour similar to that found in the comparison group, but Graph B showing message exchange indicates a higher level of usage.

The mean values of the questionnaire, interview, and voice groups were compared to those of the comparison group using a two-sided t-test. Table 1,

found below, shows the actual values for each group. The interview and voice groups appear to have larger mean values than the comparison group, but the difference uncovered by the t-test may be due to differing variances rather than means.

<u>Variable</u>	<u>Sample Group</u>	<u>Size Of Group</u>	<u>Average Value</u>	<u>Std. Dev.</u>	<u>Variance</u>
<u>Sessions</u>					
Number of	Comparison	218	38.6	32.7	1068.3
Accesses in	Questionnaire	162	35.6	24.5	598.1
a Month	Interview	100	39.6	22.3	497.7
	Voice	195	37.5	24.3	592.3
<u>Connect Time</u>					
Length of Time	Comparison	217	4.3	6.1	37.6
for the Month	Questionnaire	161	3.7	5.0	24.9
in Hours	Interview	100	4.7	4.7	22.3
	Voice	195	4.3	4.4	19.6
<u>Messages Sent</u>					
Number of	Comparison	218	33.1	56.3	3165.5
Messages Sent	Questionnaire	162	42.3	87.7	7690.5
	Interview	100	64.5	219.1	48008.4
	Voice	195	69.6	277.5	77014.4
<u>Messages Received</u>					
Number of	Comparison	218	45.9	52.7	2772.4
Messages	Questionnaire	162	42.7	120.4	14492.0
Received	Interview	100	49.6	54.8	2999.5
	Voice	195	48.7	40.8	1622.8

TABLE 1 ARCHIVAL RESULTS

3.2 Questionnaire Results

Questionnaire variables are first examined in isolation from one another. Descriptive statistics are used, giving information on the distribution of observations made on each variable. From the examination of these distributions there emerged a picture of how the variables may be related. The next step was to investigate these possible relationships using analysis techniques that draw on two or more variables simultaneously. Those variables showing variation in their responses are examined further using Crosstabulation Analysis and Analysis of Variance.

Through the use of Crosstabulation Analysis and Analysis of Variance (ANOVA), the beginnings of a result set are drawn out. Although many tests were conducted to investigate the possible relationship existing between variables, only those which revealed further information will be discussed. The descriptive statistics can be found in Illustrations 5 through 25, pages 200 through 221, in Appendix G. The Crosstabulation Analysis results are located in Appendix H, pages 222 through 256. The results of the ANOVA test are located in Table 2, page 70.

A convention of attaching the questionnaire section number as a prefix to question numbers has been adopted. Thus, question 5 of section 6 is referred to as SV15. This is to aid in the reading of the discussion on results.

3.2.1 Organizational Groups

The questionnaire group is largely composed of employees who joined the company after 1979. Illustration 5, found on page 200, Graph A shows the distribution of employment start dates. Illustration 6, found on page 201, shows the distribution of organizational levels by functions. The questionnaire group is dominated by professionals in the technology function. This is a distribution which is in keeping with that found in the organization itself.

3.2.2 Technological Groups

Virtually all respondents indicated that they had a telephone on their desk for their own exclusive use. Illustration 7, found on page 202, shows the availability of terminals and printers, as well as the distribution of CBMS memberships. A substantial group, comprising roughly 60% of the respondents, indicated that they had a terminal on their desk for their own exclusive use. A third of the respondents indicated that they had a terminal in their work area to which they had shared access.

Printers were less accessible, usually shared among a group of 10 or more people. The printers that were on a respondents desk for their own use would largely be the printers of the word processing configuration, and 40 respondents had this situation.

The distribution of users in each of the CBMS services was somewhat uneven. The smallest group contained one person having only Voice-based mail. Those respondents with no CBMS at all numbered 32. Those respondents with voice-

based mail and at least one of the text-based systems numbered 27. The group with System A only was roughly equal in size to the group having only System B, 106 and 119 respectively. The group with both System A and System B was the largest at roughly 161 respondents.

3.2.3 Communication Groups

The responses to questions found in Section IV, and the first question of Section V, reflect the type of activities found in jobs of the respondents. How the respondents spend their time, and what type of tasks they are involved in gives an indication of their communication requirements.

Illustration 8, found on page 203, gives the distribution for time spent communicating, time spent working with a terminal, and the degree to which the respondent depends of others for information needed to perform the job. The distribution for time spent on communication is fairly evenly spread over the response scale. This indicates the questionnaire group contains respondents with a variety of communication requirements. Graph C of Illustration 8 shows that the majority of respondents have some degree of dependence on others for job related information. The degree of the dependence differs, indicating that there are different communication requirements among the respondents.

The time spent using a terminal is expected to influence CBMS usage. When the job requires use of a terminal an employee may feel more inclined to use the terminal based CBMS. The nature of the tasks and skill found in the organization

explains the large number of respondents who spend over 50% of their time using a terminal.

Illustration 9, found on page 204, contains the responses to Section IV questions 6 through 9. These responses indicate that more time is spent obtaining information than is spent on providing information (SIV8 and SIV9). This is in keeping with the very small amount of time spent in the exchange of work (SIV7). The degree to which the respondents job provides a service to other employees is indicated in question 6. While 20% indicated they spent less than 10% of their time providing support to others, there is a fairly even spread throughout the remaining time categories. This indicates that the provision of a support service is present to some extent in the majority of jobs. The responses obtained for these four questions are in keeping with what was learned about the organization during the direct observation period. There are very few formal mechanisms in place for project reporting and review. With the decision making pushed down to lower levels, the work units tend to be small groups with an understood mandate that they work toward. Co-ordination within a work unit is left up to the informal exchange of information.

Illustration 10, found on page 205, contains the distributions for Section IV questions one through three. These responses indicate little time is spent on reviewing or reporting of task status, and the majority of respondents remain internal to the firm.

3.2.4 Factor Level Identification

Factor levels were specified for type of CBMS provided, amount of hardware supplied, and organizational role of the respondent. The levels group respondents according to trends found in distributions from related variables.

The technology levels were identified by the type and number of CBMS services received, and the type of hardware provided. Under the CBMS service variable there are four levels: those with no CBMS service; those with System A; those with System B; and those with both System A and System B. The hardware variable showed respondents being in one of two levels: those that had a terminal on their desk for their own use, and those who did not.

The organizational variable had three levels: secretarial/clerical employees; professionals involved in technology; and professional/managerial employees in functions other than technology.

These factor levels are used to investigate variation found in response variables. If the response variable is given by a categorical measure, then Crosstabulation Analysis is used. The technique works off matrix tables constructed from two or more variables. These tables are referred to as crosstabulation tables, and give the joint frequency distribution of observations taken on the sample. Cell frequencies, in a crosstabulation table, are calculated as they would be expected to occur if no relationship existed between the variables. These expected cell frequencies are compared to the actual cell frequencies. The Chi-square

statistic represents the degree of discrepancy between the expected and actual cell frequencies. A large Chi-square value implies a systematic relationship of some sort exists between the variables. A significance figure is given along with the value of the Chi-square statistic, and represents the probability of obtaining a Chi-square value that high when, in fact, the variables are actually independent.

If the response variable is given in a continuous measure, then an ANOVA is conducted. This test investigates differences between factor level means. The F statistic calculated represents the ratio of variation explained by the factor to unexplained variation in the observations. When the F value is sufficiently large the conclusion is drawn that the factor variable somehow explains the pattern in the observations. This test assumes that the variance of each factor group is equal, and therefore differences detected can be attributed to differences in the group means. A significance figure is given with the F value that represents the probability of obtaining an F value that high when, in fact, the variables are actually independent.

These techniques are used in the future sections dealing with factor level influence over response variables.

3.2.5 CBMS As a Messaging Tool

In comparing the measures taken on CBMS system satisfaction, given in Illustration 11 found on page 206, it can be seen that System B is judged to be

the better of the two text-based systems. System B users indicated a higher degree of satisfaction with the features of the system, wanting few, if any, improvements to be made.

Respondents indicated that System B was accessed more often than System A, having hourly access the most often selected frequency. The responses to System A access are in keeping with those recorded by the archival records, with twice a day the most commonly selected frequency.

The volume of usage on System B was indicated to be higher than on System A, especially for the number of messages received. Illustration 12, found on page 207, shows that activity on System B is the highest of all the CBMS services. The regular contact group on System B is almost double that on System A.

Characteristics of System B and its users, discussed in Section 3.2.5.1, can provide an explanation for these differences.

The responses for the two text-based systems on reasons for use point out some interesting differences between them. The difficulty of reaching other people by phone, and the length of time required by paper-based communications were each given as important reasons for CBMS usage in both systems, as can be seen by looking at Illustrations 13 page 208 (Graph A), and Illustration 14 page 209 (Graph A).

System B, which is used by an internal, geographically isolated group, gave reduction of interruptions to work as an important reason for use, while System A users did not indicate this was an important reason for its use. Illustration 13, Graphs B and C show the difference in response distributions for the two systems.

Broadcasting of messages was considered more important to System B users than System A users, as shown in Illustration 14 Graph B. This is an attitude that is reflected in the higher reported messages received on System B.

Users of System A noted overcoming of time differences as an important reason for use much more often than System B users. Illustration 14 Graph C shows the distribution of responses for this reason of CBMS use. System A has world-wide coverage, and is used to communicate with field offices.

The responses taken from Section II of the questionnaire deal with the impact that CBMS usage has had on other modes of communication, providing an indication of how a CBMS is used in conjunction with the telephone, paper-based mail, meetings, and conversations. The results, as shown in Illustration 15 found on page 210, indicate that while a text-based CBMS will be used instead of the internal mail system, it is used in addition to the telephone and face-to-face meetings. This is a finding that comes up again in the interview results. There are indications that a CBMS will substitute for paper-based communication, and complement voice-based.

The results obtained on the Voice system reflect its immaturity as a CBMS in the organization. There were 27 respondents who indicated having Voice mail membership. Of this group over half gave no response to questions dealing with reasons for use, and impact of the Voice mail system on other modes of communication. The majority indicated they were occasional users, exchanging less than 1 message per week. The voice system has not yet come to be part of the normal day-to-day operations in the office. There were some indications though that the strongest reasons for using the Voice based system involve the difficulty of reaching others by telephone, to reduce interruptions to work, and because paper-based mail is too time consuming. The Voice System results are shown in Appendix E, pages 172 through 189.

3.2.5.1 Factor Variable Influence on CBMS Usage Patterns

To investigate the level of use in terms of access frequency, volume of messages sent, and volume of messages received, it was necessary to construct a common measure of CBMS usage from figures taken from System A and System B.

The figures for messages sent and messages received were summed and then transferred to a common variable representing usage in total. If the respondent was active on both System A and on System B, the usage figure was the sum of usage figures for the two systems.

To construct a common measure of access frequency the service access measure from Section III was transferred to a common variable. Where the respondent

was active on both systems, the frequency which represented the higher level of activity was taken.

The findings from Crosstabulation Analyses using type of CBMS service (i.e. System A only, System B only, both System A and B, no CBMS) revealed several interesting characteristics for each group.

Those respondents who have only System B are largely professionals involved in a technological function. In fact, the technology professionals are pretty well restricted to this CBMS service group. There are few technology professionals on System A.

The users of System A are the professionals and management personnel outside the technology function, plus the secretarial and clerical people. Many who have both System A and System B service come from this professional/managerial group. Illustration 26 on page 223 shows the crosstabulation of CBMS service with organizational group.

In terms of access frequency, System B only users registered the highest level of activity, with an average of hourly access frequency. The group of users having both System A and System B varies between hourly and twice daily access. The group having only System A registers a twice daily access frequency.

The users with both System A and System B service tend to be most active on System A. Illustrations 27 and 28, pages 224 and 225 respectively, show these results.

Service satisfaction responses show clearly that System B is judged the better of the two. Users who have both services consistently rate System B above System A. Illustrations 29 and 30, pages 226 and 227 respectively, show this result.

Differences between the service groups were also found for the impact CBMS adoption had on telephone use. The respondents who indicated that CBMS usage replaced telephone usage were System B users making hourly access. The respondents indicating the telephone was used less often had System B (perhaps along with System A) and make hourly to twice daily access.

The results indicate that System B is more of a telephone substitute than is System A. In conjunction with these results, it is also interesting to see that responses to telephone interruptions indicate these decrease as the CBMS is substituted for the telephone. Reasons for these differences are discussed below.

There are fundamental differences between the group of respondents on System B and the group on System A.

The group of professionals in technology, who use only System B, is dominated by respondents from a single department. This department is a fairly homogeneous group of computer professionals who make heavy use of the host system that operates System B. An examination of this group showed they spend between 40% and 80% of their time using the terminal in their jobs. While using the host

system, mail is delivered directly to the terminal by way of a message received signal that the user may respond to. This feature of System B illustrates how closely connected the mail service is to the working day of its users. System B users register a high level of satisfaction with that service.

These circumstances help to explain the different usage patterns between System A and System B. One of the chief differences lies in the pattern of telephone use. System B users have reduced their use of the telephone, and are interrupted less often by telephone calls than System A users. This result is discussed further in the section dealing with Individual Productivity.

These results are discussed further in Section 3.2.6.1 dealing with Individual Productivity.

Table 2 on page 70 shows the values obtained from a series of ANOVA's designed to investigate the impact of the factors on CBMS usage. Because the variance measure differs between the factor groups (e.g. 556.44 for System A only compared to 3092.82 for System B only) the F statistic does not represent differences attributable only to the mean values. The F statistic also shows differences due to unequal variances. Where the variance differs dramatically between groups the ANOVA results give only a rough indication of the possible influence of factor variables. The results of the ANOVA are interpreted accordingly.

The results indicate that:

- o activity on System B appears somewhat higher than that on System A;
- o users with their own terminal are somewhat more active than those with less immediate access to a terminal;
- o usage levels above the clerical level show a similar volume; and
- o that volume is higher for those making hourly access than all other access groups.

Illustrations 32A through 32D, pages 229 to 232, show a series of crosstabulations using three variables: frequency of CBMS access with type of CBMS service with impact of a text based CBMS on telephone usage.

Of the 11 respondents indicating the telephone had been replaced by the CBMS, 7 used System B only. These same users were able to reduce use of the telephone more often than System A users.

Illustrations 33A through 33D, pages 233 to 236, show results of similar crosstabulations using a Section V variable concerning interruptions from telephone use, with CBMS service and with CBMS impact on the telephone. These show System B users who have reduced their use of the telephone are interrupted less often by telephone calls than their counterparts on System B. What is not measured is the number of interruptions a System B user has from System B itself.

Usage Of CBMS		Me.	Std. Dev.	Variance
BY				
I	CBMS Service			
	0 No CBMS	0	0	0
	1 System A Only	23.33	23.59	556.44
	2 System B Only	49.71	55.61	3092.82
	3 Both System A and B	57.54	87.01	7571.02
	F = 11.81			
	Significance = 0.000			
BY				
II	Hardware Group			
	0 Share Terminal	20.75	29.78	888.86
	1 Terminal on Desk	55.83	77.11	5945.31
	F = 30.26			
	Significance = 0.000			
BY				
III	Organizational Group			
	0 Secretarial/Clerical	23.24	29.92	895.3
	1 Professionals and Up			
	Not in Technology	89.40	80.64	6503.6
	2 Professionals in Technology	38.89	50.07	2507.3
	F = 3.721			
	Significance = 0.0251			
BY				
IV	Organization Position			
	1 Executive	154.17	218.92	47924.2
	2 Middle Management	61.71	90.81	8245.6
	3 Professional	35.43	44.38	1969.7
	4 Secretarial	38.86	36.78	1353.1
	5 Clerical	12.30	17.61	310.1
	F = 9.64			
	Significance = 0.000			
BY				
V	Organizational Function			
	1 Technology	42.30	51.98	2702.3
	2 Administration	42.27	57.08	3258.1
	3 Marketing	56.84	85.24	7266.1
	4 Human Resources	21.11	18.17	330.1
	5 Finance	28.00	27.72	768.1
	6 Support Services	29.28	40.68	1655.2
	7 Other	53.77	128.13	16418.5
	F = 1.309			
	Significance = 0.2517			
BY				
VI	Frequency of Access			
	1 Hourly	78.19	67.59	4568.03
	2 Twice Daily	33.92	23.95	573.52
	3 Daily	33.37	83.32	6942.90
	4 Twice Weekly	28.27	33.00	1089.32
	5 Weekly	36.56	35.08	1230.78
	6 Occasionally	38.58	96.97	9403.69
	F = 9.077			
	Significance = 0.0000			

TABLE 2 RESULTS OF ANOVA INVESTIGATING VOLUME OF CBMS USAGE

3.2.6 Impact on the Individual

The questions found in Section V of the questionnaire deal with perceptions that the respondents have concerning their job characteristics, and performance. The distributions for these variables are given in Illustrations 16 through 25 on pages 212 through 221. The legend for these Illustrations can be found on page 211.

Illustration 16, found on page 212, shows the distributions for questions 2, 7 and 8 of Section V, that deal with perceptions on the role technology has played in developing the respondents skills. While most agree that outsiders are impressed by the technology used in the company, the responses on job expansion show almost a bi-modal distribution. There appear to be three groups on the question of whether a different organization would provide the same degree of technological support. The largest group of respondents indicated that they did not know what other organizations would provide. Aside from this group the respondents indicating this to be mostly accurate is only slightly larger than the group indicating it to be mostly inaccurate.

The majority of respondents had jobs which entailed some movement within their office building, as shown in Graph A of Illustration 17, page 213. The number of respondents whose jobs take them away from their office building was roughly equal to that whose jobs do not entail such travel. The distribution of Graph C in Illustration 17 shows the high degree of personal interaction that characterizes the vast majority of jobs in this organization.

The responses to questions 3, 9, and 10 of Section V are given in Illustration 18, page 214. In all these distributions there is some indication of a bi-modal distribution, in each case slightly heavier on the accuracy responses than on the inaccurate. Together they show that many of the respondents deal with many interruptions to their work, and that not all of the messages they receive are of direct use, but many may be considered as a form of interruption. These responses are investigated further using Crosstabulation Analysis at the end of this section.

The distributions for questions 16, 15, and 11 of Section V are given in Illustration 19, page 215. The responses to question 16 indicate that the pace of job activities is increasing in the organization. The level of activity is not considered to be uncomfortable. This is to be expected in an organization which is task oriented such as the study site. The amount of overtime is not thought to be decreasing, and coupled with the responses to question 6 of Section V (Illustration 20) dealing with working hours, indications are that for a sizable group overtime, to some degree, may be part of the working lives of respondents.

Graph A of Illustration 20, found on page 216, shows that a large group does work outside normal hours indicating that overtime is not irregular. The occurrence of overtime does not, however, appear to be all that frequent; the most frequent response in the group indicating an accurate reaction, gave it as only slightly accurate. This is investigated further using Crosstabulation Analysis at the end of this section.

Graphs B and C of Illustration 20 show that both the volume and variety of tasks being performed by the majority of respondents has increased. This finding will be used in Chapter 4 during the discussion on Individual Productivity.

The majority of respondents show a high degree of confidence in what they are doing, as indicated by the distribution for question 17 of Section V, shown in Illustration 21, found on page 217. Close to 65 percent of the respondents felt they could give an accurate description of their job. This indicates a knowledge of their duties and responsibilities. That they also see their job as being important to the company, as shown in the distribution of Graph B, indicates they understand the role and purpose of their job in the overall company plan. This understanding does not imply that they have a great deal of influence over the direction of the company plan, as indicated to the responses for question 23 of Section V. There is a bi-modal distribution indicating that some are better able to contribute to the direction of the organizational plan than others.

The respondents generally agree that their jobs have become more of a challenge, and that the degree of autonomy allowed them in their work has increased. Illustration 22 on page 218 shows that the distributions for question 20 and 21 of Section V are similar. That there has been an increase in job feedback is not nearly as apparent. Graph C of Illustration 22 shows a fairly even spread between those who have found job feedback to be increasing, and those who have not.

3.2.6.1 Factor Variable Influence on Individual Productivity

Tables 3 through 6, pages 78 through 81, summarize the findings of the Crosstabulation Analysis for the variables submitted to further investigation. Variables with bi-modal distributions, or some other form of dispersion in observations, were selected to determine if the separation of responses could be explained by the factor variables. High Chi-square values with a corresponding zero significance value identify which of the factor variables have contributed to the variation in the responses. The supporting crosstabulation are found in Appendix H, pages 222 through 256.

The expansion of job skills variable (SV2) is dominated by responses that indicate some degree of accuracy in the statement. Those respondents indicating this to be an inaccurate statement for the work experience, do not share common attributes in the factor variables. Where job skill expansion was not found there were no underlying similarities in the factor variables.

The question on whether a different organization would provide the same technology was dominated by respondents who did not really know what other organizations were providing. A crosstabulation using CBMS service, reveals the attitude differences between those provided full CBMS support and those given no CBMS support. Those provided with both System A and System B were likely to indicate other organizations would not provide similar technology. Those who did not have any CBMS were more likely to indicate that other organizations would provide the same level of technological support. The responses suggest

3.2.7 Organizational Impact

Questions taken from Section VI of the questionnaire revolve around the respondent's perception of the organizational climate and performance, as well as the relationship between the organization and the individual respondent.

Illustration 23 on page 219 shows some indication that the ability to influence events within the organization has increased for some of the respondents. Few respondents indicated that they always had the ability to influence events. A much larger group indicates they are enjoying an increase in this ability. In most cases, the respondent indicated an increasing awareness of internal events.

The distributions found in Illustration 24 on page 220 indicate a generally high level of satisfaction with the quality of social contacts in their work, and a feeling that the company has performed well, most were aware of the achievements made by the organization, and what goals the company was pursuing. Illustration 25 on page 221 shows that most respondents felt their job have expanded their work skills, and that most respondents felt satisfied with their own job performance. A positive attitude was also found towards their fellow employees, with a majority of respondents indicating that others in the company are competent in their jobs, and that their fellow employees contribute to the organization.

3.2.7.1 Factor Variable Influence On Organizational Variables

The results of the Crosstabulation Analysis conducted on selected organizational response variables are given in Table 7, page 84. Variables with a bi-modal

Interruptions from visits by other people appears to be a characteristic of organizational position. The professionals indicate this is not a common occurrence, while executives indicate they are frequently interrupted by visits during their working day. Middle management and secretarial/clerical workers indicate this to be a common occurrence. Illustration 39 on page 250 shows the crosstabulation for this investigation.

Receiving messages that are not of direct interest to the respondent seems to be connected to the service used. System A users tended to indicate that some messages do not have a direct bearing on their job, peaking at "slightly accurate". Illustration 40 on page 251 shows roughly 30% of those with no CBMS service indicated the messages they receive are of use to them. System A is used to circulate administrative and organizational information, which may explain these results.

The responses indicating that the pace of job activities is too fast showed no connection to the CBMS, hardware, or organizational variables. This distribution is explained by something other than these variables, that was not measured by the questionnaire.

The response distributions for the variable dealing with decrease in overtime was somewhat influenced by the organizational function. The technology function dominated the group indicating this was not accurate for their jobs. The other functional areas were fairly evenly distributed across the other categories.

The crosstabulation in Illustration 42 on page 253 indicates the secretarial/clerical respondents do not work outside normal working hours to the same extent as the respondents in other levels.

The perception of making a contribution to organizational direction was somewhat related to organizational position. Middle management and executives indicated they were able to provide direction. Many of the professionals indicated not being involved in organizational directing. Illustration 42 shows roughly 30% of the professionals indicated this was an inaccurate statement for their job.

The responses indicating an increase in feedback had occurred are not explained by the factor variables. Some other phenomenon is responsible for this variation.

		<u>Chi-Square</u>	<u>Significance</u>
SV2.	My job skills were expanded during the past year by the kind of technology I use for communication.		
A.	CBMS Service	19.15	.3800
B.	Hardware Group	9.78	.1300
C.	Organizational Group	13.95	.3000

Results of crosstabulations using SV2 with the three factor variables.

SV7.	My job activities in a different organization would be provided with the same kind of communications technology.		
A.	CBMS Service	28.09	.0600
B.	Hardware Group	16.22	.0100
C.	Organizational Group	21.68	.0400

Results of crosstabulations using SV7 with the three factor variables.

SV5.	My job activities often take me away from the building my desk is in.		
A.	CBMS Service	71.89	.0000
B.	Hardware Group	22.80	.0009
C.	Organizational Group	70.06	.0000

Results of crosstabulations using SV5 with the three factor variables.

TABLE 3 RESULTS OF CROSSTABULATIONS INVESTIGATING JOB CHANGES

	<u>Chi-Square</u>	<u>Significance</u>
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SV9. My job activities are frequently interrupted by telephone calls.

A.	CBMS Service	94.03	.0000
B.	Hardware Group	30.30	.0000
C.	Organizational Group	56.66	.0000
D.	Organizational Position	64.75	.0000
E.	Organizational Function	54.93	.0226

Results of crosstabulations using SV9 with the three factor variables.

SV10. My job activities are frequently interrupted by visits from other people

A.	CBMS Service	26.72	.0843
B.	Hardware Group	3.23	.7791
C.	Organization Group	49.24	.0000
D.	Organizational Position	78.31	.0000
E.	Organizational Function	41.60	.2389

Results of crosstabulations using SV10 with the three factor variables.

SV3. Many messages that I receive are of no use to me in performing my job.

A.	CBMS Service	53.32	.0000
B.	Hardware Group	6.31	.3898
C.	Organizational Group	28.04	.0055

Results of crosstabulations using SV3 with the three factor variables.

TABLE 4 CROSSTABULATIONS INVESTIGATING JOB INTERRUPTIONS AND USE OF MESSAGES

		<u>Chi-Square</u>	<u>Significance</u>
SV11. I find the pace of my job activities too fast.			
A.	CBMS Service	17.95	.4587
B.	Hardware Group	7.11	.3111
C.	Organizational Group	26.06	.0105

Results of crosstabulations using SV11 with the three factor variables.

SV15. The amount of overtime required for my job activities is decreasing.			
A.	CBMS Service	26.16	.0961
B.	Hardware Group	12.14	.0589
C.	Organizational Group	34.18	.0006

Results of crosstabulations using SV15 with the three factor variables.

SV6. My job activities are often performed at time other than between 9 AM and 5 PM Monday to Friday.			
A.	CBMS Service	55.22	.0000
B.	Hardware Group	22.40	.0010
C.	Organizational Group	52.83	.0000

Results of crosstabulations using SV6 with the three factor variables.

TABLE 5 CROSSTABULATIONS INVESTIGATING JOB PACE AND HOURS

		<u>Chi-Square</u>	<u>Significance</u>
SV23.	My work involves providing direction to the organizational plan.		
A.	CBMS Service	39.20	.0026
B.	Hardware Group	1.88	.9300
C.	Organizational Group	71.11	.0000

Results of crosstabulations using SV23 with the three factor variables.

SV22.	There has been an increase in the amount of feedback I receive on my job performance.		
A.	CBMS Service	29.27	.0451
B.	Hardware Group	7.976	.2399
C.	Organizational Group	15.63	.2076

Results of crosstabulations using SV22 with the three factor variables.

TABLE 6 CROSSTABULATION INVESTIGATING JOB FEEDBACK AND INFLUENCE

3.2.7 Organizational Impact

Questions taken from Section VI of the questionnaire revolve around the respondent's perception of the organizational climate and performance, as well as the relationship between the organization and the individual respondent.

Illustration 23 on page 219 shows some indication that the ability to influence events within the organization has increased for some of the respondents. Few respondents indicated that they always had the ability to influence events. A much larger group indicates they are enjoying an increase in this ability. In most cases, the respondent indicated an increasing awareness of internal events.

The distributions found in Illustration 24 on page 220 indicate a generally high level of satisfaction with the quality of social contacts in their work, and a feeling that the company has performed well, most were aware of the achievements made by the organization, and what goals the company was pursuing. Illustration 25 on page 221 shows that most respondents felt their job have expanded their work skills, and that most respondents felt satisfied with their own job performance. A positive attitude was also found towards their fellow employees, with a majority of respondents indicating that others in the company are competent in their jobs, and that their fellow employees contribute to the organization.

3.2.7.1 Factor Variable Influence On Organizational Variables

The results of the Crosstabulation Analysis conducted on selected organizational response variables are given in Table 7, page 84. Variables with a bi-modal

distribution were investigated. The Chi-square values and their corresponding significance values indicate where the factor variables have had some influence over the distribution. When the significance is zero, there is an indication that the factor variable can somehow explain the variation in responses.

Increasing ability to influence organizational events is slightly related to CBMS provision in that those who had no CBMS were more likely to indicate no increase in this ability than those who had some form of CBMS. System B users appear to have less influence than those with System A.

The organizational position has a much stronger bearing on ability to influence events, than CBMS provision does, as can be seen in Illustrations 43 and 44, pages 254 and 255 respectively. Middle management and executives tend to indicate this ability has increased.

Illustration 45 on page 256 indicates that middle management perceives this to be a recent increase, while professionals indicate not having had a great deal of influence. Over 60% of the professionals indicated this to be an inaccurate description for their job. Middle management was less skewed to the inaccurate side, while executives have always been able to influence events. Respondents in the secretarial/clerical group largely indicated not being able to influence organizational events in the past.

The perception that others do not contribute to the organization is connected to something other than CBMS, hardware or organizational position.

		<u>Chi-Square</u>	<u>Significance</u>
SV13.	I am increasingly able to influence events within the company.		
A.	CBMS Service	29.89	.0385
B.	Hardware Group	8.44	.2017
C.	Organizational Group	43.50	.0000

Results of crosstabulations using SV13 with the three factor variables.

SV17.	I have always been able to influence the events occurring with the company.		
A.	CBMS Service	27.09	.0773
B.	Hardware Group	9.35	.1549
C.	Organizational Group	42.015	.0000

Results of crosstabulations using SV17 with the three factor variables.

SV11.	There are many employees at the company who do not contribute to the progress of the company.		
A.	CBMS Service	20.86	.2870
B.	Hardware Group	5.059	.5362
C.	Organizational Group	10.60	.5633

Results of crosstabulations using SV11 with the three factor variables.

TABLE 7 CROSSTABULATIONS INVESTIGATING ORGANIZATIONAL PERCEPTIONS

3.3 Interview Results

The results from the interviews are drawn from an analysis of the interview notes and score sheets. Scores considered are: technological, organizational, CBMS usage patterns, and productivity. The scores were constructed from the interview notes and summary page prepared for each person interviewed. The individual score sheets can be found in Appendix B, pages 147 through 165.

3.3.1 Technology Profile

All persons interviewed had an account on System A. The only variation in CBMS service was in their System B and Voice system status. Of the 18 interviewed:

- o 8 had accounts on System A alone, and had a terminal on their desk;
- o 4 had System A, System B, and the Voice system, along with a terminal on their desk;
- o 3 had System A and were sharing a terminal;
- o 2 had System A, the Voice System, and their own terminal; and
- o 1 person had System A, System B, and their own terminal.

3.3.2 Organizational Profile

The interview group was dominated by personnel above the secretarial/clerical level. The group was composed of:

- o 4 upper level managers;
- o 6 upper level professionals, the majority of whom were involved in technological jobs;

- o 3 middle level managers;
- o 2 middle level professionals;
- o 1 lower level manager;
- o 1 lower level professional; and
- o 1 secretary.

These rankings were determined through the job descriptions and organization charts each interviewee had described for their position.

An upper level manager would have several groups or individuals to manage, and would be active in directing the organization. An upper level professional would have a high degree of responsibility for carrying out some process, with far fewer managerial tasks involved. A middle manager would have several groups or individuals to supervise, usually participated in this group in some technical capacity, and would report to an upper level position. A middle level professional would have few managerial tasks, and would report to an upper level position. A lower level manager would have several groups or individuals to supervise and would report to a middle manager. A lower level professional would be responsible for some set of tasks, the scope of which could be considered limited. These definitions were used to reflect the particular nature of the study site.

3.3.3 Communication Profile

The interview situation provided an opportunity to explore in detail the various communication characteristics of a job. This exploration allowed the

2

interviewer to identify the dominate characteristic, or characteristics, that were present in the interviewee's job. This identification was useful later in the interview, when examining the impact the CBMS had on job performance.

The most frequently cited characteristics were specialization in a task, and providing a support service. Maintaining internal control and providing external direction were frequent among the upper level personnel. Only one of those interviewed had a job dominated by information resource guardian responsibilities.

3.3.4 CBMS Usage

The majority of those interviewed were neutral on the question of their satisfaction with the CBMS. Most had been using the system since its introduction a year and a half ago. They were quite blase about having a CBMS, regarding it as a communication tool the way the telephone is a communication tool. They probably would have reacted with the same neutrality if they had been asked how satisfied they were with the features of their telephone, or memo system. The CBMS has come to be accepted as a commonplace communication tool.

The few exceptions found to this are of interest. In one case, the person interviewed was not very satisfied with the system largely because the group of subordinates, with whom contact was most critical and frequent, was not part of the CBMS. The usefulness of the CBMS was greatly hampered, although System

A was used roughly twice a day to contact peers and superiors. One other interviewee expressed dissatisfaction with the CBMS stemming from disappointment at initial high expectations not being met. It had been hoped that the CBMS would facilitate the gathering of information, a central component of this job. This did not come about because submitting the information was really a "favour" on the part of the sender, and as face-to-face contact decreased, the response to this request for a "favour" decreased.

In two cases a high level of satisfaction was expressed. Both cases involved employees who felt that job skills had been increased, and the job had expanded. Both were lower level employees whose jobs were upgraded as a result of CBMS availability. In one case, many of the most tedious aspects of the job were automated by the CBMS. This freed time for other, challenging, tasks. In the other case, the job had taken on added dimensions as new tasks were substituted for tasks delegated to subordinates.

Two of those interviewed indicated that recent hardware provision had increased their satisfaction. Both had gone from sharing a terminal with a group of people, to having a terminal for their own use.

Although mode chosen to send a message was not one of the areas that was covered in the interview design, it was a factor that four of those interviewed brought out. All indicated a strong tendency to gear the method of sending a message (telephone, memo, letter, System A, System B, Voice) according to their

knowledge of the habits of the message recipient. This explains several phenomenon, such as the heavy flow of CBMS messages upward when upper level personnel are frequent CBMS users. It was also noted that if a customer could be reached on the CBMS it would be used for this external contact. In fact major customers were given access to the CBMS in much the same way as an 800 number is used. If the customer was comfortable with that arrangement, then it was the preferred method of maintaining contact.

One area specifically covered during the interview was the impact CBMS usage had on the other modes of communication. The use of memo's had not gained a strong tradition in this young and growing company. Nor did memo's become part of the tradition as the company moved from the entrepreneurial to corporate solidity phase. The CBMS was strongly regarded as a clear substitute to the internal mail system. It was not so clear that the CBMS was regarded as a substitute for telephone calls. Only when the content of the message was of a particular nature would the CBMS be used. Messages that were of a one-way nature, or did not require immediate feedback were candidates for the CBMS. Messages that carried any kind of detail were candidates for the CBMS. The messages sent by CBMS tend to be:

- o schedule requests, change and other status notifications;
- o questions not requiring immediate answers; or
- o ideas on subjects of interest.

While not an exhaustive list these tend to dominate the messages sent and received.

The use of the telephone had not been greatly diminished the way that the use of memo's had. Face-to-face meetings were used extensively by six of those interviewed.

3.3.5 Job Satisfaction

The CBMS was not generally regarded as a source of increased, or decreased job satisfaction. Nine of those interviewed did not see that there was any connection between the two. Five indicated that if there were a link it would be through some improvement in their job performance that was seen as being a result of CBMS availability.

Four respondents indicated a definite improvement in their job satisfaction as a result of:

- o automation of tedious tasks;
- o expanded job skills;
- o increased range of contacts in the organization;
- o increased responsiveness of fellow employees;
- o reduction in stress as fear of "missing" something was eliminated; and
- o increased knowledge of company events.

3.3.6 Individual Productivity

All those interviewed indicated that a time savings had been gained as a result of CBMS usage. The amount of time saved tended to increase as the level of CBMS usage increased.

The most frequently cited source of time saved was from the elimination of "telephone tag". The necessity of accessing the message recipient, at just the time that person is beside his telephone, was removed. Lifting this barrier to communication resulted in a decrease in the time required to deliver a message. The several attempts to establish contact frequently required with telephone calls, was reduced to a single, virtually guaranteed successful, attempt. Twelve of those interviewed mentioned this factor in a fairly off-hand manner, indicating that this was too obvious to even mention. Since there was no prompting done on the part of the interviewer, it can perhaps be assumed that the remaining six interviewee's did consider this to be too obvious to mention.

Elimination of communication overhead was given as a second source of time savings. When the CBMS message was replacing a memo, the following requirements were removed:

- o dictation;
- o proofreading and the correction cycle;
- o conveying of secretarial instructions;
- o copying;
- o filing; and
- o tracking.

When the CBMS was replacing a telephone call the conversation overhead was removed. This surprising factor was mentioned several times, especially by upper level personnel. The CBMS message was regarded as carrying more

information per message unit than a telephone call. The interaction with a secretary in many cases was eliminated, an interaction that can be time-consuming and wasteful to the caller.

At the same time, all those interviewed indicated having no trouble understanding messages received. The terseness of messages did not impede understanding.

The elimination of "slack time" was frequently given as a time saving source. Seven of those interviewed mentioned this factor as resulting from:

- o the increased timeliness of the information;
- o availability of message status information (unread, or read at a specific time) eliminating needless re-issuance of a message, or not allowing the recipient enough time to act on the message; and
- o being able to move about the office building while expecting a message.

Timeliness of information was improved largely from the elimination of both telephone tag, and physical delivery systems.

Three interviewees indicated that the elimination of interruptions in their work, to deal with matters that do not require immediate attention, resulted in a time saving. This benefit appears again as an aspect of improved quality in message exchanges, discussed further under Individual Efficiency.

Other sources of time savings mentioned by those interviewed include:

- o time saved from distribution list capabilities;
- o time saved from automated filing and retrieval of correspondence; and
- o time saved attempting contact across time zones.

3.3.7 Individual Efficiency

Fourteen of those interviewed stated that the time saved, as a result of CBMS adoption, had been used to increase the volume of communications completed in their job. Ten of these people indicated that the number of people they were in communication with was now larger as a result of CBMS adoption. Nine people stated that the time savings had enabled them to complete an increased volume of tasks.

The volume of communications has grown as an increased number of ideas and questions, that otherwise would have been "lost", are communicated. Additionally, many tasks require messaging activities. An increase in the volume of tasks would, in many cases, generate an increase in volume of communications.

3.3.8 Individual Effectiveness

The ability to communicate an idea as it arises was cited as a benefit by eight people during the interviews. Doing so resulted in them letting fewer questions

go unanswered, ideas left unspoken. They felt that communicating these thoughts as they were "fresh" in their mind resulted in an improved quality of expression.

In the same way, these eight people valued the ability to conduct electronic mail sessions in dealing with their communications. Their concentration on the message was much higher during one of these sessions, than if they had been interrupted with the message. The increased concentration on incoming messages was thought to produce an increased quality of response. Fewer "off the cuff" decisions, or comments, were made.

How a CBMS will improve the effectiveness of a particular worker depends, to a great extent, on the nature of the communication requirements of the job. The impact on effectiveness will be examined by communication category.

Support Service: There are many groups in the company that exist to provide other groups with a support service. These groups need to market themselves, internally, to potential users. The CBMS helps them in several ways to "sell" themselves. The increased awareness of current company activities helps them to gear their service to current needs. The increased access to other organizational groups allows more effective advertising of their services. As the number of contacts grows, so does the market.

Information Resource Guardian: Only one person interviewed had a job that was dominated by this characteristic. The CBMS did not aid in the performance of this job. The responsibilities of the job require gathering, synthesizing, and

distributing of information. The gathering of the information was done via requests to geographically remote areas. This request traditionally met with little response, and this response worsened as the person-to-person contact fell after CBMS use was adopted. Furthermore, the other aspects of the job involving synthesis and distribution of information were not amenable to automated support.

Task Specialization: Increased timeliness of information being circulated was a source of improvement in this category. An important result of this was the ability to spot problems at an earlier stage. The ability to broadcast change notifications helped in the coordination of group members working on connected areas. The automatic recording of messages enabled the reconstruction of decisions, and also allowed the tracing of approval sources. The approval and correction cycle time was shortened. Being able to identify and directly contact the desired person helped to speed activities. These benefits, resulting from effective use of the CBMS, provide an increase in effectiveness in these jobs.

Maintaining Internal Control: Increased timeliness of information, and the automated follow-up capabilities of the CBMS provided these workers with an effective tool for internal control. Being able to detect and respond to problems earlier, keep informed on many projects simultaneously (regardless of geographic location), ability to automate portions of the follow-up through distribution lists, and passing on of additional information resulted in improved job performance.

External Representative: Contributions to effectiveness were said to result from increased access to relevant personnel when outside the company, awareness of company events enabling better representation of company needs and abilities; and movement in the environment as a member of a team enabling stronger negotiations with customers and vendors.

3.3.9 Organizational Efficiency

Seventeen of those interviewed stated that the volume of communications flowing through the organization had increased. This was partly due to the growth in the size of the work force. Several of those interviewed felt that the recent growth of the company could not have been supported had it not been for the CBMS. The need for a communication system that could handle a high volume of communications was critical. The CBMS met that need.

On the question of travel, seven of those interviewed regarded their travel time as more productive because much of the advance leg-work of coordination and information exchange had already been done. Travel itself was not reduced by the CBMS. In fact many felt that travel had increased from the increased awareness of company events. As a worker, especially an upper level employee, begins to participate in more information loops, the opportunity for travel grows. At the same time, the ability to remain involved in projects while away from headquarters was improved.

3.3.10 Organizational Effectiveness

The most frequently cited source of increase organizational effectiveness was the team spirit that the CBMS evoked. There are three aspects of the CBMS which contribute to the spirit of the organization. The first, as stated by eight of those interviewed, was the responsiveness of other employees that resulted from the notification feature of the CBMS. The recipient of a message could not hide behind a secretarial, or paper-based mail system screen. The sender knew if and when the message had been read. The second aspect, as stated by four of those interviewed, was the boost to morale that full access to company news provided. The third aspect, noted by two of those interviewed, was that employees were better company representatives when they were fully informed, and identified with the organization.

Sharing of information was seen as a way of reducing duplication of effort by two people interviewed. When everyone was aware of the current and past accomplishments of other organizational members, the repetition of tasks can be avoided.

Being able to behave as a unified force in the environment was thought to enable the organization to capitalize on opportunities as they arose.

CHAPTER FOUR

Conclusions: Impact On The Organization

This chapter presents the hypotheses constructed to explain the low-level behavioural changes identified in Chapter 3. Each of the areas of impact identified in Chapter 1 are discussed: CBMS usage patterns; individual productivity; organizational productivity; and quality of working life. To construct these hypotheses, results from the period of direct observation, questionnaire, and interviews are brought to bear. The chapter closes with the presentation of a model combining several of the hypotheses into an explanation of how the CBMS brought about change in the study site organization. This model can be tested by further research in this field.

4.1 CBMS Usage Patterns

Hypothesis 1

A CBMS will be used to avoid the difficulties of telephone contact, and to avoid the time delays associated with paper-based mail.

The questionnaire and interview responses show that these are two strong reasons for using a CBMS. The elimination of "telephone tag" was cited by a majority of those interviewed as being a chief benefit from CBMS use. The delays in paper-based message systems stem from time taken in preparation, distribution, and storing the communications. A CBMS provides automatic features to aid in each of these functions.

Hypothesis 2

A CBMS will largely replace the internal memo as a communication tool.

The results from the questionnaire, interviews, and period of direct observation support this hypothesis. The questionnaire responses of Section III show quite clearly the tendency to use a CBMS message in place of a memo. Comments made during the interview revealed that the ability to avoid memo circulation was viewed as a major time-saving feature of the CBMS. While observing the activity in the company, the investigator noted the lack of memoranda in circulation. Comments made by secretarial and professional staff indicated the handling of internal mail was kept to a minimum. The employees paid very little attention to their internal mail slots, which did not appear to contain very much material.

Hypothesis 3

A CBMS will replace telephone calls that are one-directional in nature.

This hypothesis is supported by results from the questionnaire and interview.

The questionnaire responses to Section III show the telephone is still used extensively in the organization. There is, however, a connection between the CBMS and telephone use. The "still used extensively" category was chosen over the "had no impact" category as being most descriptive of the impact CBMS adoption had on telephone use. The CBMS is not a substitute for telephone calls

in the way that it is a substitute for memoranda. An important reason for using the CBMS is to overcome the difficulty of reaching other people on the telephone. This suggests that the CBMS is used to deliver messages that will be discussed further in a telephone conversation. These are messages that are one-directional; they do not require instantaneous feedback.

The interviews provided more complete information on the impact of CBMS adoption on telephone use. Comments on how the CBMS was used describe the process of placing telephone calls, failing to reach the person in question, and then placing a CBMS message on the system. These messages contained questions, comments or meeting arrangements that would be discussed further at a later point in time. At that time both parties to the communication would begin discussion with the background information already established.

Hypothesis 4

A CBMS provides a "time-independent" communication tool used to overcome time-zone and work shift differences.

The responses from the questionnaire and interviews support this hypothesis.

The questionnaire responses show that when the CBMS has the capability to overcome time-zone differences, as System A does, it will be an important reason for use in an organization that has employees in a number of different geographic locations.

During the interview it was noted that the CBMS was of great benefit to the organization because it provided a means of communicating with areas having no work day overlap. In some cases there was no "message window" since there was a twelve hour time difference. Telephone use was ineffectual in reaching these locations. To add to the difficulties, the postal system was entirely unreliable. In this situation, the CBMS was the only messaging facility that was operational.

When people work at different times, either due to shift work or differing work habits, the CBMS can provide the "message window" for their communication needs.

Hypothesis 5

A CBMS will be used to reduce telephone use when the CBMS has a high access frequency, and can notify the message recipient of pending messages.

This hypothesis is supported by the questionnaire responses.

Telephone use has been affected differently on System A than on System B. The users of System B are able to deliver a message immediately to the intended recipient because System B is "active". If the recipient is using the host system then delivery can take place immediately; System B notifies the recipient that a message has arrived. If the recipient is not on the host system it is quite likely that message delivery will still take place within the hour, since access frequency on System B is hourly.

System A users face a longer time delay for delivery of their messages. Several hours to a whole day may pass before the recipient accesses the CBMS to retrieve pending messages. System A message delivery is entirely dependent on recipient behaviour.

The questionnaire results show System B users were much more aware of the capability a CBMS has to reduce interruptions caused by telephone communications. In addition, System B users dominate the group of questionnaire respondents who indicate telephone use had been reduced because of CBMS adoption.

When looking at reduction of interruptions in the working day, it would be interesting to look at System B as the source of the interruptions. The degree to which System B was a source of interruptions was not measured in this study, and is a candidate for further research.

Hypothesis 6

A CBMS will be selected over other messaging tools when the communication is largely structured in nature. Consequently, the CBMS will replace face-to-face discussions that do not require an immediate response, but the CBMS will not greatly affect the use of meetings.

This hypothesis is supported by findings in the questionnaire and the interviews.

features, lack of ~~conversation~~ overhead, ease of preparation, and ease of distribution all support the messaging activity to the extent that, in terms of an output to input ratio, there is a decrease in input (time taken to complete messaging activity) to output (message).

Hypothesis 11

A CBMS can increase the volume of communications performed by its users.

This hypothesis is supported by results of the interview. A majority of those interviewed indicated that the volume of communications they performed in their job had increased. This increase was not matched by an increase in time and effort spent on the messaging activity.

The content of the new communications stemmed partly from an increase in their own ideas and questions now being circulated over the CBMS. These are messages that previously were not communicated. Another source of increased messaging volume was from the increased activity level in the organization. There were more topics and events requiring a response.

Hypothesis 12

A CBMS can increase the efficiency in job performance of its users.

This hypothesis is supported by questionnaire and interview results.

The impact of the CBMS on other modes of communication shows that the use of face-to-face discussion has been reduced only slightly by CBMS provision. Scheduled meetings have not been affected at all. These forms of communication contain a large degree of unstructured communication activity. Memoranda, on the other hand, are highly structured in nature and have been largely replaced by the CBMS. Telephone calls that are structured in nature are now conducted using the CBMS.

The results of the interview also support this hypothesis. A frequently cited use of the CBMS was for meeting arrangements. These are messages which have very few individualized components. They normally contain a suggested time, place, and perhaps agenda. When describing how the CBMS had supported their work, a majority of those interviewed stated that ideas and questions, which otherwise would have been lost, were now being sent over the CBMS. These are one-directional communications that the telephone and internal memorandum system failed to capture. These are structured communications, not requiring immediate feedback. The CBMS is selected over the other messaging instruments because the CBMS does not have the inherent access difficulties, and unacceptable time delays that are associated with these other modes. These difficulties act as an effective barrier to communication for messages that are not absolutely required to carry out the job.

Hypothesis 7

A CBMS will be selected over other messaging tools when the message recipient is known to be a frequent CBMS user.

During the interviews it was noted that the sender would gear the communication mode to the habits of the recipient. If a person was known to use the CBMS, then the CBMS was chosen for communicating with that person. This helps to explain why a critical mass is necessary before the CBMS will come to be an accepted part of the communication package. There is almost a self-fulfilling prophecy in this pattern of CBMS usage. As more people begin frequent use, there are more people identified as CBMS users, so that volume of messages exchanged on the CBMS tends to increase geometrically during the introduction phase.

This characteristic of selecting the message medium also helps to explain the increased flow of communications to upper level personnel. This finding is discussed under Organizational Productivity.

Hypothesis 8

A CBMS message contains a higher concentration of information than messages of other communication mediums.

The interviews provide evidence in support of this hypothesis. Lack of conversation overhead was viewed by many as an advantage in using the CBMS. Being able to "get to the point" of the message meant the messaging activity could be completed in a shorter time span. This holds true for both the sender and receiver of the message. Long, verbose messages were regarded as a nuisance.

The terse nature of CBMS messages did not result in poorly expressed ideas. All those interviewed said they had no trouble understanding messages received. There was also virtually no evidence to suggest that lack of conversation overhead lead to a deterioration of business relationships.

Hypothesis 9

The messages circulated through the CBMS are of interest to the recipients.

This hypothesis is supported by evidence from the questionnaire and the interviews. The questionnaire showed that the messages received over the CBMS are generally considered to be of interest. System A, which carries administrative messages, was shown to have some degree of "junk mail". When this was brought up in the interviews, virtually all responded by saying that having these messages was not a nuisance. The messages were valued because they kept the recipient informed on matters that affect the organization as a whole. They did not want these messages to be eliminated.

4.2 Individual Productivity

Hypothesis 10

A CBMS can increase efficiency in communication for its users.

This hypothesis is supported by interview findings. The CBMS allowed the user to complete the messaging activity in a shorter amount of time. The automatic

features, lack of conversation overhead, ease of preparation, and ease of distribution all support the messaging activity to the extent that, in terms of an output to input ratio, there is a decrease in input (time taken to complete messaging activity) to output (message).

Hypothesis 11

A CBMS can increase the volume of communications performed by its users.

This hypothesis is supported by results of the interview. A majority of those interviewed indicated that the volume of communications they performed in their job had increased. This increase was not matched by an increase in time and effort spent on the messaging activity.

The content of the new communications stemmed partly from an increase in their own ideas and questions now being circulated over the CBMS. These are messages that previously were not communicated. Another source of increased messaging volume was from the increased activity level in the organization. There were more topics and events requiring a response.

Hypothesis 12

A CBMS can increase the efficiency in job performance of its users.

This hypothesis is supported by questionnaire and interview results.

The questionnaire indicated that the level of activity had increased in the organization. The pace of the job had increased, and both the volume and variety of tasks performed had increased. These increases were not matched by an increase in time spent on work. Most respondents usually worked a seven to eight hour day, Monday through Friday.

The interviews provided a great deal of evidence to support this hypothesis. The volume of communications has increased, which represents an increase in tasks performed. The time saved from CBMS support was also used to increase the volume of other types of tasks completed. This represents an improvement in efficiency: the output is tasks completed and the input is time spent on work.

Hypothesis 13

A CBMS can increase the circulation of creative thought
by its users.

This hypothesis is supported by findings in the interviews.

The use of a CBMS allowed its users to communicate many of their ideas and questions that would otherwise have been lost. This was viewed as a major benefit of CBMS use, and the source of qualitative improvements in the users job performance.

The CBMS enabled its users to give form to these thoughts in the context from which they arose. Because the thoughts were communicated as they occurred, the quality of expression was thought to be quite high.

25

The increased flow of ideas and questions was matched by an increased flow of responses to this new information. The responses were made while the message recipient was focusing on the thought being conveyed. Not only has the CBMS improved the ability to express ideas, it has improved the ability to "hear" ideas.

Hypothesis 14

A CBMS can increase the face-to-face contact of its users.

The results of the questionnaire and the interview support this hypothesis.

The questionnaire results show that face-to-face discussion, meetings and telephone calls are still used extensively. The interviews provided information on how and why they are being used in conjunction with the CBMS. It was noted that the CBMS supported the contact of other people, and in circulating preliminary ideas on a subject. The increased circulation of information brought about an increase in face-to-face contact as people joined in on the activities and ideas they were exposed to by the CBMS. Responses to new messages brought people into contact who otherwise would have remained apart. The users were able to participate in a larger number of projects, each of which have some degree of face-to-face contact required.

Hypothesis 15

A CBMS can increase the amount of travel, and improve the quality of tasks completed at the destination site.

This hypothesis is supported by interview results.

Comments made by upper level personnel during the interview indicated that travel had increased as a result of CBMS adoption. Being exposed to the events and activities of the peers in other locations meant that they participated in projects across geographic locations. These projects would eventually require some face-to-face contact, and this required travel time. The travel time was thought to be more effective as schedule, agenda, and background information was circulated before the meeting took place.

Hypothesis 16

A CBMS can improve the quality of responses to messages by its users.

This hypothesis is supported by findings from the interview. The users interviewed indicated that they reserved time during the working day to read and respond to their CBMS messages. From usage statistics generated on System A it was seen that the peak access time was 9:00 AM, the start of the working day. The ability to read each message and then respond was thought to improve their concentration on the message and the response they made. The benefit of this was an improvement in the quality of their response because they were better able to remember the context in which the message arose, remember other events that affect that context, and think out the alternative responses they might make. This concentration is missing when the message is received while the person is involved in an activity of a different project.

Many of those interviewed, especially in the upper level positions, felt they had reduced the number of decisions made in an off-hand manner; decisions that usually come back to haunt them at a later point in time because they were not able to consider possible outcomes and alternative approaches.

Hypothesis 17

A CBMS can improve the effectiveness of job performance for its users.

This hypothesis is supported by findings in the interviews.

The majority of those interviewed provided examples of how the CBMS had supported them in their job performance. Much of this support dealt with increased access to other people allowing the user to expand the job. Improved decision-making was also given as a way the CBMS had improved job performance. The CBMS provided the user with a tool needed to: identify what activities should be pursued in keeping with organizational requirements; identify potential problems; respond quickly and effectively to problems; identify potential problems at an earlier stage, allowing them to avert many of them; and improve the decisions made.

4.3 Organizational Productivity

Hypothesis 18

A CBMS can increase the volume of communications within an organization.

The interview responses indicate that there has been an increase in the volume of communications carried out in the organization. The CBMS has provided a vehicle for dissemination of organizational news that partially accounts for this increase. The majority of individuals indicated the CBMS had increased their volume of communications, and that they had noticed a similar increase throughout the organization.

Hypothesis 19

A CBMS can increase the flow of communications to upper level personnel.

This hypothesis is supported by the interview results.

The volume of communications was noted to have increased in all directions, but the increase in volume of exchange between organizational levels received special comment.

The active and direct participation of upper level personnel meant that messages conveyed to them on the CBMS were highly likely to be received by them. It also happened that upper level personnel actively encouraged lower level personnel to make use of the CBMS to reach them.

The benefits deriving from this increased level of contact are discussed in Hypothesis 22.

Hypothesis 20

A CBMS can foster an atmosphere of cooperation and thereby improve the flow of communications between work units.

This hypothesis is supported by the interview responses.

A frequently cited benefit of using the CBMS was the spirit of cooperation it fostered. When a message was sent, its status was automatically tracked. A recipient could not ignore messages with the excuse being that it was not received. This factor encouraged communication between work units.

Many of those interviewed indicated a widening circle of contact as CBMS use increased. This increase in contact group size resulted from being exposed to an increased number of ideas and question being circulated. There were more opportunities to participate in a message exchange as the number of messages received grew. Many of those interviewed indicated that the number of information loops in which they participated had grown.

Hypothesis 21

A CBMS can increase the number of other individuals with whom an office worker interacts, and thereby increase the pace of activities in the organization.

This hypothesis is supported by interview responses indicating that with CBMS use access to others was improved, and the volume of communications in circulation provided an increase in stimuli. Being able to directly contact the person of interest allowed an individual to establish contact more easily with people not known to them previously. This, and the increased exposure to organizational communications, meant people were able to join in more information loops. As these loops formed, new projects were initiated from the sharing of knowledge. People with compatible, or complementary skills could identify each other and join into new activities.

Hypothesis 22

A CBMS can improve coordination of work units.

The results of the interview support this hypothesis.

One of the ways this comes about is by reducing the disruption caused by travel. When a person is away they can still participate in projects, and contribute to decision-making.

The timeliness of the information being circulated supports the coordination of people and groups. Fewer details slip by, and response time to change notifications is very high.

Increased contact with upper level personnel contributes to this improvement in a number of ways. The upper level people are aware of the events affecting those at lower levels. This can help them to detect and respond to problems.

They are also easily reached in an emergency situation, providing guidance and approval on decisions made.

4.4 Quality of Working Life

Hypothesis 23

A CBMS will not alter the physical or temporal boundaries of work.

This hypothesis is supported by results of the direct observation period, the questionnaire, and the interviews.

The organization is still characterized by the vast majority of its employees being present in the office during normal working hours. There was not a mass exodus from the office place to the home to conduct business activities. People still came to the office building to work.

While use of a CBMS may have increased travel for some of the upper level personnel, but it was not used to facilitate employees working from their homes.

The CBMS was not used to greatly alter the working day of the average employee. Those professionals and managerial workers who worked outside normal office hours were better able to do so, but the CBMS did not cause a major shift in office hours.

Hypothesis 24

A CBMS will not cause a decline in the quality of social life in an organization.

This hypothesis is supported by the results of the direct observation period, the questionnaire, and the interviews.

The atmosphere in the organization did not suffer from CBMS usage. In fact, quite the opposite could be said as the employees felt important enough to the organization to be supported with this form of technology.

The questionnaire responses show a general satisfaction with the quality of social contact, and that face-to-face contact has not been drastically curtailed as a result of CBMS adoption.

Hypothesis 25

A CBMS will not lead to the de-skilling of jobs.

This hypothesis is supported by the questionnaire results, the interviews and direct observations.

When residing in the organization, during the early part of the study, it was noted that the secretarial function was one that provided an identifiable career path. Many of the secretaries were given a broader scope in their jobs, and were able to upgrade their position. While the CBMS is certainly not the sole cause of this change, it did provide a vehicle for these employees to showcase their skills.

During the interviews a large group indicated that the variety of tasks they performed had increased. This trend also surface in the questionnaire results. One source of this increased variety is that, for many, the CBMS was the first contact they had with computer technology. For these people the CBMS provided a valuable new skill: operation of a "high technology" device. Their understanding of the technology, that the organization was involved in, had expanded.

4.5 Comparison of Study Findings with Previous Research

The findings of this study generally support the reported expectations of volume increases, and changes in communication patterns. It is primarily in the areas of productivity improvement and quality of working life that this study shows results different from those expected. In some cases this study provides evidence to contradict predictions made.

The work of Olson and Lucas¹ predicted an increased volume of communications after CBMS adoption, and this was found by the study. In addition, there were indications that the flow of communication upward in the organization increased, especially as this was encouraged by study site upper level personnel. This study found that with the increased flow of communications, and the new communication skills acquired there grew a sense that job skills had expanded, and that the variety of tasks had increased. Both of these findings are in keeping with expectations cited by Olson and Lucas¹.

When moving beyond the question of volume and communication patterns, discrepancies between these findings and predicted findings as per Olson and Lucas¹ begin to surface. For instance, the crossing of traditional physical and temporal boundaries of work were not prevalent. The feared reduction in face-to-face contact and consequent reduction in quality of social life was not noted.

Improved efficiency in communications, whereby a message can be exchanged in a shorter amount of time, was found to be realized chiefly through replacement of memoranda by CBMS messages. The same could not be said for replacement of telephone usage by CBMS messages. The prediction made by Olson and Lucas¹, and Birks² concerning reduction in telephone use surprisingly was not supported by this study.

The benefits derived from a reduced number of communication shadow functions, and the streamlining effect of having automatic features, were identified by Bair³. These benefits were supported here, and were identified as resulting in time-savings. The benefits of increased control and decreased "slack" time were also found, also in keeping with Bair's³ work. The effectiveness of communication exchanges was supported by allowing users to select the optimum time for message composition and receipt, as had also been noted by Bair³.

The development of an everyone-to-everyone network was given in the findings of Taylor⁴. This change in communication pattern was also found by this study.

4.6 The Evolution of a Communication System

The study site has undergone a period of rapid expansion during the last five years. Many people in the organization expressed the belief that System A was instrumental in supporting this growth. The organization had moved from an entrepreneurial orientation to one of corporate solidity, yet managed to keep its consensus decision-making style. While bureaucracy was creeping in, there was surprisingly little in an organization of that size.

System B was in use before System A, and was concentrated in the hands of computer professionals. This is a characteristic of System B even today. The process of System A adoption provides more insight into the organizational impact than does System B. System A was provided to many organizational members who would otherwise have very little direct computer technology exposure.

What follows is a description of the changes brought about by System A adoption, and how those changes combined into an organizational impact.

4.6.1 Impact on Communication For The Individual

When examining the impact of CBMS adoption on the individual user, the most noticeable change was the increase in volume of communications being handled. Figure 3, on page 124, depicts the composition of communications for an individual after CBMS adoption. The figure shows additional messages being

exchanged, but while the pie chart does segregate the various message sources, it is not intended to indicate the relative volume of each as a contribution to the increase in communication volume. One common source of increased volume arises from more ideas and questions being expressed. Previously these would not have been communicated. The new messages were candidates for the telephone, or perhaps memoranda, but were dropped because of the cumbersome nature of those forms of communication.

The various work units began to circulate new information to a wider circle of people. As more messages are circulated, for any given individual there is an increased probability of being exposed to an idea or question that will elicit some response. The next phase of CBMS adoption was entered when the users began to respond to communications that, without the CBMS, they would not have received. Users began to enter more information loops. Their jobs expanded as these new communications opened additional areas where they could apply their expertise.

Finally, an increase in volume and variety of tasks performed took place. These new activities in turn exposed the user to a wider circle of contacts, and gave rise to even more communications.

In addition to sheer volume of communications, the individual was given intellectual support by enabling the expression of ideas and questions as they were fresh in the mind, and by enabling a higher level of concentration to be applied to messages they received.

Being a task-oriented organization, these developments were encouraged and fostered by top level policy. It was clearly recognized as an organizational benefit for individual's to cross boundaries and freely exchange information. The instigating of new projects and activities was also encouraged in lower and middle level personnel.

4.6.2 Impact on Communication In the Organization

The adoption of CBMS usage was encouraged by several features of the organization. These introductory phase characteristics may have influenced the direction taken by changes from CBMS adoption. There was a technological orientation in many of the employees, and a large installed terminal base. There was a sufficient level of availability and technical skill present to make the introduction of the CBMS fairly painless. The top level personnel were initial users and set the tone for its use in the organization. They clearly demonstrated their availability on the system, and that messages were to be of an informal nature. Spelling mistakes, and other typographical errors not tolerated in a memorandum, were a source of good-natured amusement when found in CBMS messages.

The communication system, in this growing company, was in need of support. The secretarial base was not sufficient to support the additional number of professional staff, and a bureaucratic system of communication exchange had not been established. The CBMS allowed the company to maintain its reliance on direct and informal message exchange for organizational communications.

Figure 4, on page 125 depicts the change in communication volumes for the organization. Various sources for increased volume of message exchange are identified, again without intending to indicate relative volumes.

The expansion of the company meant crossing geographic boundaries. This created a time-zone communication problem that the CBMS was able to solve.

The company operated with a firm policy that each employee is a member of the organization in the fullest sense. The employees have a right to know what plans and actions the company is pursuing. The CBMS was a vehicle for distribution of organizational news on a timely and direct basis. Figure 4 shows this as a portion of new communications. Where the news might previously have been posted on a bulletin board somewhere, seen only by those who happened to look, it was now sent directly to the individual employee.

Three additional sources of new communications were identified: creative thought; new contacts; and new activities. As the individual and group efforts were supported, the benefits filtered out into the organization as a whole. Because decision-making is dispersed throughout the organization, the CBMS provided a vital link between people and groups. These links stimulated creative thought as the exchange of ideas occurred with greater frequency and timeliness. Organizational ties were strengthened as contact between individuals increased. New activities were instigated as people followed through on the ideas that the group had identified as worthwhile.

The organizational ideology of the studied company supported this developmental process. Organization's with a similar structure and ideology could expect to experience a similar impact from CBMS adoption. What is not so clear, is whether an organization that is highly structured, with centralized decision-making would have quite the same experience. When examining an organization to determine the probable outcome of CBMS adoption, the ways that communication is linked to the ideological structure can provide insight into how the results of this study can be applied.

FIGURE 3
IMPACT ON
COMMUNICATION FOR THE
INDIVIDUAL

FIGURE 4
IMPACT ON
COMMUNICATION IN THE
ORGANIZATION

Footnotes

1. Margrethe Olson and Henry Lucas, "The Impact Of Office Automation On The Organization; Some Implications For Research And Practice," Communications of the ACM, Nov. 1982, Vol. 25 #11, Pg. 838-846.
2. Grant Birks, "Electronic Mail - Its Use In A Corporate Information Center Network", Communicating Information, Proceedings of the 43rd ASIS Annual Meeting, Anaheim, California, Oct. 1980.
3. James H. Bair, "Productivity Assessment of Office Information Systems Technology; Trends and Applications," 1978 Distributed Processing IEEE Computer Society, Pg. 12-24.
4. James R. Taylor, "Computer Aided Message System: An Organizational Perspective", 2nd International Office Information Systems Workshop, Couvent Royal de Saint Maximin, October 12-15, 1981.

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APPENDIX A: Survey Questionnaire

SECTION I

This Section deals with the method you use to communicate with other individuals in "Company Name".

1. Check the systems available to you:

Voice Mail _____
Ontyme _____
Vax Mail _____
none of the above _____

2. The closest telephone to where you normally work is:

on your desk _____
in your area _____
in another area _____
none of the above _____

3. Do you share this phone (please circle): Yes No

4. The closest terminal to where you normally work is:

on your desk _____
in your area _____
in another area _____
none of the above _____

5. Do you share this terminal (please circle): Yes No

6. The closest printer to where you normally work is:

on your desk _____
in your area _____
in another area _____
none of the above _____

7. How many people use this printer?

5 or less _____
between 6 and 10 _____
over 10 _____

8. Employment start date:

--	--	--	--	--

MM YY

9. Circle the organizational position that best describes your work position:

1 Executive

2 Middle Management

3
Professional

4
Secretarial

5
Clerical

10. Circle the function under which your job falls:

Technology

2 Administration

3 Marketing

4 Human Resources

5
Finance

6
Support
Services

7
Other

11. Please print your department.

[illegible]

SECTION II

This Section attempts to determine the relationship between Electronic Mail and traditional modes of communication. A text message, for instance, could be sent in place of a letter.

1. Write a number in the blank beside each communication mode, based on the following classifications:

1	2	3	4
This service has been largely replaced	This service is used less often	This service is still used extensively	This service has not been affected

- (A) Enter the category number that best describes how the following modes of communication have been replaced by Ontyme or VAX mail messages.

- ☐ Telephone
- ☐ Memo
- ☐ Letter
- ☐ Face-to-Face Discussion
- ☐ Scheduled Meeting

- (B) Enter the category number that best describes how the following modes of communication have been replaced by Voice Mail messages.

- ☐ Telephone
- ☐ Memo
- ☐ Letter
- ☐ Face-to-Face Discussion
- ☐ Scheduled Meeting

2. Does anyone else regularly read your electronic mail (e.g. secretary): Yes No
3. Do you read other person's electronic mail regularly: Yes No
4. For how many people:

A	B	C	D
1-2	3-6	7-10	over 10

SECTION III

This Section should be completed by anyone who uses an electronic mail service.

Please respond to the questions concerning systems for which you have an account.

- 1 (A) How satisfied are you with the Ontyme Mail system (please circle):

-2 -1 0 1 2

Totally
dissatisfied;
I dislike all
aspects of the
system.

Moderately
satisfied;
there are
quite a
few poor
features.

Totally
satisfied;
there are no
changes I
would
make.

- (B) How frequently do you access the Ontyme Mail system (please circle):

1	2	3	4	5	6
hourly	twice daily	daily	twice weekly	weekly	occasionally

- (C) Estimate the number of people with whom you are in regular communication using the Ontyme Mail system. _____

- (D) Estimate the average number of messages you send a week. _____

- (E) Estimate the average number of messages you receive a week. _____

- (F) Date of joining Ontyme:

M	M	Y	Y	

(G) Indicate a rating for each of the following reasons you use this service, where:

2 means a very important reason

1 means sometimes a reason

0 means not a reason

- _____ difficult to reach the other person by telephone
- _____ reduces the interruptions to my work
- _____ reduces the interruptions to other people's work
- _____ paper mail takes too much time
- _____ able to broadcast messages
- _____ overcome time differences
- _____ other

2 (A) How satisfied are you with the VAX Mail system (please circle):

-2 -1 0 1 2

Totally
dissatisfied;
I dislike all
aspects of the
system.

Moderately
satisfied;
there are
quite a
few poor
features.

Totally
satisfied;
there are no
changes I
would
make.

(B) How frequently do you access the VAX Mail system (please circle):

- 1 hourly
- 2 twice daily
- 3 daily
- 4 twice weekly
- 5 weekly
- 6 occasionally

(C) Estimate the number of people with whom you are in regular, communication using the VAX mail system. _____

(D) Estimate the average number of messages you send a week. _____

(E) Estimate the average number of messages you receive a week. _____

(F) Date of joining VAX Mail:

M	M	Y	Y	

(G) Indicate a rating for each of the following reasons you use this service, where:

2 means a very important reason

1 means sometimes a reason

0 means not a reason

- _____ difficult to reach the other person by telephone
- _____ reduces the interruptions to my work
- _____ reduces the interruptions to other people's work
- _____ paper mail takes too much time
- _____ able to broadcast messages
- _____ overcome time differences
- _____ other

3 (A) How satisfied are you with the Voice Mail System (please circle):

-2 -1 0 1 2

Totally
dissatisfied:
I dislike all
aspects of the
system.

Moderately
satisfied:
there are
quite a
few poor
features.

Totally
satisfied,
there are no
changes I
would
make.

(B) How frequently do you access the Voice Mail System (please circle):

1	2	3	4	5	6
hourly	twice
daily	daily	twice
weekly	weekly	occasionally

(C) Estimate the number of people with whom you are in regular communication using the Voice Mail System. _____

(D) Estimate the average number of messages you send a week. _____

(E) Estimate the average number of messages you receive a week. _____

(F) Date of joining the Voice Mail System:

M M			Y Y		

(G) Indicate a rating for each of the following reasons you use this service, where:

2 means a very important reason

1 means sometimes a reason

0 means not a reason

- _____ difficult to reach the other person by telephone
- _____ reduces the interruptions to my work
- _____ reduces the interruptions to other people's work
- _____ paper mail takes too much time
- _____ able to broadcast messages
- _____ overcome time differences
- _____ other

SECTION IV

Below are a number of questions which relate to various aspects of your job.

Please be as specific and objective as you possibly can in responding to each of these questions.

You can indicate that a question does not apply to you by circling 1 which specifies 0.

1. What percentage of your time is spent in gathering and reviewing the status of other people's work?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

2. Some people's jobs require them to provide status reports for their job activities. For others, there is no such requirement.

What percentage of your time is spent in reporting job activity status?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

3. Some people's jobs require them to act as a representative. For others, there is no such requirement.

What percentage of your time is spent representing to outside people?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

4. Some people's jobs require them to use a terminal to perform their job activities. For others, there is no such requirement.

What percentage of your time is spent working with a terminal?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

5. Some people's jobs require them to communicate with other people on a frequent basis. For others, little time is spent on communications.

What percentage of your time is spent in communicating?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

6. For some people, their work requires them to provide a lot of support services to other people. For others, very little of these services are required.

What percentage of your work provides a service to other people?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

7. Some of us work alone; others spend much time on contacts with other people who pass on to us, or to whom we pass on, work.

What percentage of your time is spent on contacts with people for the exchange of work?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

8. Some jobs are arranged such that the information needed to do the job is obtained from other people.

What percentage of your time is spent securing information you need to perform your work?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

9. What percentage of your time is spent providing information others need to perform their work?

1	2	3	4	5	6	7	8	9	10	11
0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100

SECTION V

Listed below are a number of statements which could be used to describe a job.

You are to indicate whether each statement is an accurate or inaccurate description of your job.

Once again, please try to be as objective as you can in deciding how accurately each statement describes your job - regardless of whether or you like or dislike your job.

Write a number in the blank beside each statement, based on the following scale:

1 Very Inaccurate	2 Mostly Inaccurate	3 Slightly Inaccurate	4 Uncertain
	5 Slightly Accurate	6 Mostly Accurate	7 Very Accurate

_____	1. I depend on other people's work for the information I need to do my work.
_____	2. My job skills were expanded during the past year by the kind of technology I use for communication.
_____	3. Many messages that I receive are of no use to me in performing my job.
_____	4. My job activities often take me away from my desk.
_____	5. My job activities often take me away from the building my desk is in.
_____	6. My job activities are often performed at times other than between 9 AM and 5 PM Monday to Friday.
_____	7. My job activities in a different organization would be provided with the same kind of communications technology.
_____	8. My friends outside of "Co." and family members are impressed by the technology I use for communicating.
_____	9. My job activities are frequently interrupted by telephone calls.
_____	10. My job activities are frequently interrupted by visits from other people.
_____	11. I find the pace of my job activities too fast.
_____	12. I find the volume of tasks in my job increasing.
_____	13. I find the variety of tasks in my job increasing.

-
- _____ 14. My job does not allow me to come in contact with other groups
at "Company Name".
- _____ 15. The amount of overtime required for my job activities is de-
creasing.
- _____ 16. I find the pace of my job activities has increased.
- _____ 17. I can give an accurate description of my job when asked to.
- _____ 18. My job performs an important function for "Company Name".
- _____ 19. My job is becoming increasingly important to "Company Name".
- _____ 20. My job is becoming more of a challenge,
- _____ 21. I am increasingly free to decide how I will carry out my job
activities.
- _____ 22. There has been an increase in the amount of feedback I receive
on my job performance.
- _____ 23. My work involves providing direction to the organizational plan.

SECTION VI

Listed below are a number of statements which could be used to describe your working life.

You are to indicate whether each statement is an accurate or inaccurate description of your working life.

1 Very Inaccurate	2 Mostly Inaccurate	3 Slightly Inaccurate	4 Uncertain
5 Slightly Accurate	6 Mostly Accurate	7 Very Accurate	

- _____ 1. The quality of social interaction I have at "Co." is satisfactory.
- _____ 2. I feel that "Co." is performing well.
- _____ 3. I am increasingly able to influence events within "Company Name".
- _____ 4. I am increasingly aware of events occurring within "Company Name".
- _____ 5. I am aware of the achievements that "Co." has made.
- _____ 6. I am aware of the goals that "Co." is pursuing.
- _____ 7. I have always been able to influence the events occurring with "Company Name".
- _____ 8. My job with "Co." has provided me with additional valuable work skills.
- _____ 9. I'm fully satisfied with my job performance at "Company Name".
- _____ 10. The majority of "Co." employees perform their jobs competently.
- _____ 11. There are many employees at "Co." who do not contribute to the progress of the company.

SECTION VII

This next piece of information is strictly optional. The answers you have given in this questionnaire will be more useful if accompanied by your actual usage data. Because the system reports this data by name, I am asking for yours to provide the necessary link. Please keep in mind that all questionnaires will be held in confidence; only aggregate data will be made available to other "Co." employees.

Name: _____

APPENDIX B: Interview Score Sheets

INTERVIEW	F.
TECHNOLOGY PROFILE	System A; System B; Voice Terminal on desk.
ORGANIZATIONAL PROFILE	Lower level professional providing specialized service.
COMMUNICATION PROFILE	Support service: promote and provide a technological support service.
CBMS USAGE	Medium satisfaction of text with high voice satisfaction; Reduction in use of memo's, and substitute broadcast messages for face-to-face meetings. High use of voice system.
JOB SATISFACTION	No impact aside from increase in knowledge of company events.
INDIVIDUAL PRODUCTIVITY	Saved time from reduction in shadow functions: memo construction overhead; telephone coordination of participants. Voice saves 1 hour per day.
- EFFICIENCY	Volume of communications has increased. Community reached grown by several people (approximately 1 or 2). Increase in the number of ideas and questions passed on has occurred.
- EFFECTIVENESS	Able to give expression to ideas more effectively using a voice-based system. Job has expanded as ability to influence others has grown.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Increased volume of communications in all directions.
- EFFECTIVENESS	Improved management by increased contact with upper level personnel.

INTERVIEW	B
TECHNOLOGY PROFILE	System A Terminal on desk.
ORGANIZATIONAL PROFILE	Middle level manager providing a specialized service.
COMMUNICATION PROFILE	External direction: obtain directives from internal sources, search out information from external sources, return information to requesting and other interested groups.
CBMS USAGE	Medium level of satisfaction; noticed a reduction in telephone use and an increase in face-to-face communications.
JOB SATISFACTION	Increased as perceived job performance increased.
INDIVIDUAL PRODUCTIVITY	High time saving from reduction in shadow functions: access problems; uncertainty of message status; conversation overhead. Able to move around the building without worry of "missing" messages.
- EFFICIENCY	Increase in volume of completed communications. Increase in ideas and questions logged. Increase in volume of tasks completed.
- EFFECTIVENESS	Better able to identify interest groups in the organization, and direct questions and ideas accordingly. Earlier problem detection from message status information. Able to assign the proper priority to projects from awareness of internal trends, and mode sender chooses for the message. Group is more responsive to others in the organization.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume of communications has increased. Travel more effective when advance preparation takes place.
- EFFECTIVENESS	Centralized force for negotiating with external groups. Organization can respond quickly to opportunities in the environment that bring direct savings. Increased awareness on the part of employees helps avoid duplication of effort.

INTERVIEW	C
TECHNOLOGY PROFILE	System A Terminal on desk.
ORGANIZATIONAL PROFILE	Upper level management responsible for production facilities.
COMMUNICATION PROFILE	Internal control: expediate and co-ordinate activities. External direction: obtain information from external groups and send to appropriate internal group.
CBMS USAGE	High satisfaction; has reduced use of telephone, especially across geographic boundaries. Gears mode to that of receiver.
JOB SATISFACTION	No impact.
INDIVIDUAL PRODUCTIVITY	High time savings by removing secretarial screen; Slack time from lack of information reduced with increase in timeliness of information.
- EFFICIENCY	Volume of communications completed has increased. Size of group involved in communications has grown larger. Increased volume of ideas captured. Increased volume of tasks completed.
- EFFECTIVENESS	Decisions reached more quickly as timeliness of information increases. Problem detection and notification improved since monitoring is automated by messaging system. Able to identify and directly contact the groups in the organization that are effective, without going through "channels". Increase in contact with subordinates helps keep the group focused on the priority tasks. Ideas are sent when fresh. Replies issued when concentrating on received query or idea.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume of communications has increased in all directions. Upper management able to encourage participation by lower level employees using the informal nature of the messaging system. Travel has been reduced as many problems can be handled through message exchange.
- EFFECTIVENESS	System fosters teamwork by providing message status. Increase in number of information loops in the organization leads to increase in activities by employees.

INTERVIEW	D
TECHNOLOGY PROFILE	System A Terminal on desk.
ORGANIZATIONAL PROFILE	Secretarial position screening and organizing communications.
COMMUNICATION PROFILE	Acts as representative of superior.
CBMS USAGE	High level of satisfaction. Used only at direction of superior.
JOB SATISFACTION	Improved as many tedious portions of communication preparation were removed. Preparation and distribution of material is faster and easier on the CBMS. Operations have been streamline, and job skills expanded by learning technological manipulation.
INDIVIDUAL PRODUCTIVITY	Time saved in correspondence preparation by automated distribution lists and filing features.
- EFFICIENCY	An increased volume of communications can be processed. This translates into an increase in volume of tasks completed.
- EFFECTIVENESS	Job has expanded by assuming some of the correspondence responsibilities previously handled by the superior.
ORGANIZATIONAL PRODUCTIVITY	No opinion.

INTERVIEW	E
TECHNOLOGY PROFILE	System A; Voice Mail Terminal on desk.
ORGANIZATIONAL PROFILE	Middle level professional responsible for gathering, screening, and disseminating information to field offices.
COMMUNICATION PROFILE	Information Guardian: must obtain information from a plethora of sources. Synthesize information into usable form and distribute to interested parties. Information gathering relies heavily on the cooperation of data sources.
CBMS USAGE	Low; not able to obtain the degree of cooperation that had been expected, and that is necessary to carry out the task. Use of memo's has fallen, and use of telephone has decreased slightly.
JOB SATISFACTION	No impact.
INDIVIDUAL PRODUCTIVITY	Saved some time from reduction in shadow functions: access problems of telephone use.
- EFFICIENCY	No improvement.
- EFFECTIVENESS	Approval process can be speeded up to improve task performance while away from building or city.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Increase in volume of communications in all directions.
- EFFECTIVENESS	Growth of the organization would have been impossible without this communication tool. Travel by upper level personnel is less disruptive to the work of lower level employees.

INTERVIEW	F.
TECHNOLOGY PROFILE	System A; System B; Voice Terminal on desk.
ORGANIZATIONAL PROFILE	Lower level professional providing specialized service.
COMMUNICATION PROFILE	Support service: promote and provide a technological support service.
CBMS USAGE	Medium satisfaction of text with high voice satisfaction; Reduction in use of memo's, and substitute broadcast messages for face-to-face meetings. High use of voice system.
JOB SATISFACTION	No impact aside from increase in knowledge of company events.
INDIVIDUAL PRODUCTIVITY	Saved time from reduction in shadow functions: memo construction overhead; telephone coordination of participants. Voice saves 1 hour per day.
- EFFICIENCY	Volume of communications has increased. Community reached grown by several people (approximately 1 or 2). Increase in the number of ideas and questions passed on has occurred.
- EFFECTIVENESS	Able to give expression to ideas more effectively using a voice-based system. Job has expanded as ability to influence others has grown.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Increased volume of communications in all directions.
- EFFECTIVENESS	Improved management by increased contact with upper level personnel.

INTERVIEW	G
TECHNOLOGY PROFILE	System A Terminal in work area.
ORGANIZATIONAL PROFILE	Upper level management responsible for promoting and providing a support service to other groups.
COMMUNICATION PROFILE	Support Service: detect opportunities to promote use of the service. Oversee the provision of service.
CBMS USAGE	Moderate level of satisfaction that is increasing as CBMS use increases. Use of memo's has fallen. Use of telephone has decreased slightly.
JOB SATISFACTION	No impact.
INDIVIDUAL PRODUCTIVITY	Saved time from reduction in shadow functions: conversation overhead; telephone tag; uncertainty of task status resulting in slack "wait" time.
- EFFICIENCY	Increase in the volume of communications completed. Increase in the size of group reached in communications. Ideas and questions are captured that were previously lost. Increased number of tasks completed.
- EFFECTIVENESS	Increase in number of information loops participated in results in better identification of areas where the service can be useful. Provide timely information to organizational members on details of service provision that has resulted in increased use of the service. Ideas are sent when "fresh". Replies are given when concentrating on idea or query.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume of communications has increased in all directions. Travel time more effective.
- EFFECTIVENESS	Team spirit of employees is fostered by architecture of the system. Others can not ignore messages since message status is reported. Employees are informed on company matters, making them better company representatives. Rumor mill is side-tracked preventing a drop in morale. Duplication of effort is avoided when employees are aware of the achievements and undertakings of others.

INTERVIEW	H
TECHNOLOGY PROFILE	System A, System B, Voice Terminal on desk.
ORGANIZATIONAL PROFILE	Upper level professional involved in end-product design.
COMMUNICATION PROFILE	Specialization in task: Works with various teams to integrate and synthesize information.
CBMS USAGE	Medium satisfaction; Usage of telephone and memo's have fallen. Initial expectations were fulfilled. Medium voice and System B user.
JOB SATISFACTION	No impact. Reports that job-related stress is reduced by assurance of receiving all communications, even when away from desk, building, city.
INDIVIDUAL PRODUCTIVITY	Saved time by removing shadow functions: correspondence preparation overhead; co-ordination of communicating parties; slack time from lack of message status information.
- EFFICIENCY	Increased size of group reached in the organization. Increase in the volume of communications completed. Increase in ideas and questions captured.
- EFFECTIVENESS	Able to record ideas and questions as they arise increasing their quality and quantity. Tracking of details is automated, and co-ordination has improved.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume of communications has increased in all directions. Travel more efficient with advanced preparation.
- EFFECTIVENESS	Information not always of an increased quality. Travel is less disruptive to the organization.

INTERVIEW

TECHNOLOGY PROFILE

System A
Terminal on desk.

ORGANIZATIONAL PROFILE

Middle level professional providing technical expertise.

COMMUNICATION PROFILE

Specialization in a Task: in project team perform technical tasks.

CBMS USAGE

Medium; used mostly for scheduling of meetings. Immediate superior not a heavy user, and there is an emphasis on face-to-face communication. Has replaced memo's and some telephone calls.

JOB SATISFACTION

No impact

INDIVIDUAL
PRODUCTIVITY

Time saved from shadow functions associated with scheduling meetings.

- EFFICIENCY

Increased receipt of information. Increase in ideas and questions captured. Able to concentrate on replies.

- EFFECTIVENESS

Able to broadcast project changes which in turn supports coordination of tasks in the project. Approvals are recorded and can be accessed if back-up of decision is required.

ORGANIZATIONAL
PRODUCTIVITY

- EFFICIENCY

Increased volume of communication in the organization.

- EFFECTIVENESS

Increased awareness of internal and external events. Employees are united in a team by awareness of company goals.

INTERVIEW	3
TECHNOLOGY PROFILE	System A; System B; Voice Terminal on Desk
ORGANIZATIONAL PROFILE	Upper level professional providing technology support to other internal groups.
COMMUNICATION PROFILE	Support Service: Locate and fill needs of other organizational groups. Specialized Organizational Task: Work with geographically dispersed teams to construct technological service.
CBMS USAGE	Medium to high level of satisfaction; memo's were never part of company tradition. Telephone use has been augmented not replaced; many instances where feedback is vital to the communication.
JOB SATISFACTION	Not a strong factor; some improvement through the reduction of frustration and stress; "feels" more productive. Stress decreased from assured delivery and message status reporting.
INDIVIDUAL PRODUCTIVITY	High time savings from reduction in shadow functions: memo construction; telephone access and conversation overhead; reduction in slack time. Fewer interruptions in the day.
- EFFICIENCY	Volume of communications completed has increased. Size of group involved in communications has grown larger. Volume of tasks completed has grown larger. Increase in quantity of ideas captured.
- EFFECTIVENESS	Concentration afforded by conducting "communication sessions" results in a higher quality of response. Ideas are recorded as they arise, improving their quality and quantity.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume of communications has increased in all directions.
- EFFECTIVENESS	Groups are better able to detect and respond to problems. Growth of the organization would not have been possible without the communication system.

INTERVIEW

K

TECHNOLOGY PROFILE

System A
Terminal in work area.

ORGANIZATIONAL PROFILE

Middle Management providing a support service.

COMMUNICATION PROFILE

Specialization in a Task: provide technical advice and perform technical tasks.
Support Service: bring information into the organization to groups who require its use.

CBMS USAGE

Medium; has replaced telephone use somewhat; used for administrative support.

JOB SATISFACTION

Improved as responsiveness by other organizational members has increased. Removed tedious yet important administrative tasks.

INDIVIDUAL
PRODUCTIVITY

Time saved from shadow functions: secretarial instruction overhead; searching for information; slack time from lack of co-ordination by communicating parties.

- EFFICIENCY

Broadcast facility allows faster dissemination of information. Volume of communications has increased. Volume of tasks completed has increased.

- EFFECTIVENESS

Job has expanded into new areas by participating in more information loops. Increased accuracy in reaching intended audience; ease of maintaining community in lists. Problem detection is faster when a "no response" is noticed. Able to identify and access the relevant organizational member regardless of organizational position.

ORGANIZATIONAL
PRODUCTIVITY

- EFFICIENCY

Volume of communications has increased in all directions in a "snowballing" effect. Travel is more efficient when advanced preparation is done.

- EFFECTIVENESS

Teamwork is fostered by notification feature. Employees make better representative when they are fully informed.

INTERVIEW	L
TECHNOLOGY PROFILE	System A Terminal in Work Area
ORGANIZATIONAL PROFILE	Upper level professional responsible for end-product design
COMMUNICATION PROFILE	Specialization in task; on a team basis, provide advice and present ideas. Support Service: promote use of the groups' expertise.
CBMS USAGE	Moderately satisfied. Uses physical models to present ideas during face-to-face meetings. Has added new communications with upper management. Gears mode of communication to that used by the recipient.
JOB SATISFACTION	Improved by expanding job skills in technology.
INDIVIDUAL PRODUCTIVITY	Save a small amount of time from eliminaton of shadow functions associated with telephone access.
- EFFICIENCY	Volume of communications received has increased. Has increased project activity as exposure to other organizational members increased.
- EFFECTIVENESS	Awareness of organizational events brings participation in an increased number of information loops, improving capabilities to "sell" the groups' expertise.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Increased volume of communications in all directions.
- EFFECTIVENESS	Upper management is more responsive to ideas from below.

INTERVIEW	M
TECHNOLOGY PROFILE	• System A Terminal on desk.
ORGANIZATIONAL PROFILE	Upper level professional providing specialized expertise.
COMMUNICATION PROFILE	Specialization in a Task: work with a wide range of other groups on short project basis, providing advice.
CBMS USAGE	High satisfaction; able to maintain contact across geographic locations. Has traditional secretary screening system. Returns many messages with a telephone call. System has replaced long-distance calls and memos.
JOB SATISFACTION	Improved as access increased.
INDIVIDUAL PRODUCTIVITY	High time saving from reduction in shadow functions: access problems; time zone access; reduction in interruptions.
- EFFICIENCY	Increase in volume of communications completed. Increase in number of different people in communications. Increased volume of tasks completed.
- EFFECTIVENESS	Job performance hinges on others being able to quickly gain access to this function. Increase in participation resulted from increase in access; raised the profile of the function.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Increase in volume of communications. More efficient travel investment.
- EFFECTIVENESS	Co-ordination of groups within the organization improves ability to maneuver in the environment.

INTERVIEW	N
TECHNOLOGY PROFILE	System A Terminal on desk was a recent acquisition that has bolstered both system use and satisfaction.
ORGANIZATIONAL PROFILE	Upper level professional providing a specialized service.
COMMUNICATION PROFILE	Specialization in a Task: perform synthesis of gathered information. Internal Control: Ensure that tasks and processes are synchronized and on schedule.
CBMS USAGE	Satisfaction has greatly increased with the provision of terminal equipment. The use of memo's and letters has decreased. Uses messaging mode that the receiver is known to use.
JOB SATISFACTION	Definite improvement.
INDIVIDUAL PRODUCTIVITY	Time saving from reduction in shadow functions associated with coordination and access in communications with other organizational members.
- EFFICIENCY	The volume of communications completed has increased. Community reached has grown larger. Volume of tasks completed has increased.
- EFFECTIVENESS	The automatic nature of follow-up procedures increased the perceived quality job performance. Now better able to identify areas of the organization to which the job tasks are relevant; job has expanded in scope. Timeliness of information has improved performance of the job.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	The volume of communications completed has increased in all directions.
- EFFECTIVENESS	Responsiveness of employees in the organization has improved. The timeliness of information exchanged has improved the quality of communications.

INTERVIEW	O
TECHNOLOGY PROFILE	System A Terminal on desk a recent acquisition that has bolstered system use and satisfaction.
ORGANIZATIONAL PROFILE	Upper level professional providing a specialized service.
COMMUNICATION PROFILE	Specialization in a Task: provide expertise to project completion. Internal control: co-ordinate project team.
CBMS USAGE	Is increasing, as is the level of satisfaction with the system. Use of letters and memo's has fallen.
JOB SATISFACTION	Definite improvement.
INDIVIDUAL PRODUCTIVITY	Time saved from reduction in shadow function: access problems associated with telephone use; construction overhead associated with memo's and letters.
- EFFICIENCY	Volume of communications has increased. Community reached in communications has grown larger.
- EFFECTIVENESS	Status reporting of messages allows increased effectiveness in follow-up and problem detection.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume has increased in all directions.
- EFFECTIVENESS	Responsiveness of organizational groups has improved as timeliness of information increased.

INTERVIEW	P
TECHNOLOGY PROFILE	System A; System B; Voice Terminal on desk.
ORGANIZATIONAL LEVEL	Upper level management directing the provision of a technological support service.
COMMUNICATION PROFILE	Support Service: both promote and provide service. Internal control: ensure that tasks are planned and executed.
CBMS USAGE	High level of satisfaction. Use of telephone has been slightly reduced, while travel has increased. Memo's used infrequently.
JOB SATISFACTION	Some improvement as range of contacts broadened.
INDIVIDUAL PRODUCTIVITY	Time saved from reduction in interruptions; access problems found in telephone use eliminated, conversation overhead removed.
- EFFICIENCY	Volume of communications has increased. Circle of contact has widened.
- EFFECTIVENESS	Able to convey ideas as they are fresh and therefore with a higher quality in expression. Able to concentrate on replies by conducting communication sessions. Fewer "off the cuff" directives are given. Able to identify and directly contact the relevant personnel for a task assignment.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume of communications has increased in all directions. Travel more effective with advance preparations carried out using the system.
- EFFECTIVENESS	International marketing efforts supported with system able to overcome time zone differences.

INTERVIEW

Q

TECHNOLOGY PROFILE

System A
Terminal on desk.

ORGANIZATIONAL PROFILE

Low level manager responsible for providing facilities support.

COMMUNICATION PROFILE

Internal control: responsible for the scheduling of people and resources to ensure continued provision of support service.

CBMS USAGE

High; system has provided exposure to technology and expanded job skills. Upgraded the job of subordinates as new tasks were taken on. Memo's have been largely replaced, while telephone is still used extensively.

JOB SATISFACTION

Some improvement; skills upgraded by technology.

INDIVIDUAL
PRODUCTIVITY

Time saved from reduction in shadow functions: memo construction overhead.

- EFFICIENCY

Volume of communications has increased; access across time zones created by differing shifts has been supported.

- EFFECTIVENESS

Quality of management has improved since more time is available for dealing face to face with subordinates. Better able to detect problems and potential problems in the organization as timeliness of information increased. Send ideas as they are "fresh". Able to concentrate on replies to queries and ideas.

ORGANIZATIONAL
PRODUCTIVITY

- EFFICIENCY

Increased volume of communications in all directions. Problem detection saves the company maintenance costs by avoiding breakdowns.

- EFFECTIVENESS

A more responsive company.

INTERVIEW	R
TECHNOLOGY PROFILE	System A; System B Terminal on desk.
ORGANIZATIONAL PROFILE	Middle management supervising the provision of a technological support service.
COMMUNICATION PROFILE	Internal Control: plan and monitor the provision of a support service.
CBMS USAGE	Low; Subordinates not fully on the CBMS. Relies heavily on face-to-face meetings. Recent move to remote geographic location has increased use of the system to a small extent. Gears use according to behaviour of intended recipient.
JOB SATISFACTION	No impact.
INDIVIDUAL PRODUCTIVITY	Saved a small amount of time from reduction in shadow functions: memo preparation; co-ordination of telephone call participants.
- EFFICIENCY	Some increase in communications with superiors.
- EFFECTIVENESS	In communications with superiors the quality of expression is improved because better able to give expression to ideas in written medium.
ORGANIZATIONAL PRODUCTIVITY	
- EFFICIENCY	Volume of communications has increased in all directions. Travel more effective with advance preparation.
- EFFECTIVENESS	Employees are more aware of company events, improving morale.

APPENDIX C: Interview Request Letter

- 166 -

- 166

March 15, 1983.

Dear

is an innovative organization with an advanced electronic mail system. In this respect alone, is at least five years ahead of its time. Many of the professional office workers rely on the system heavily and have come to regard it as an essential support tool. There exists a unique opportunity to observe elements of the "Office of the Future" from this in-house development. "Co. Name" can then offer this experience to other organizations seeking to automate their communication process.

Since communicating is such a vital element in our office work, it is generally expected that automated messaging systems will have an impact on office worker productivity. To learn just exactly how electronic mail systems are used by office workers, I am conducting a series of short interviews with selected users during the weeks of March 21 to 31, 1983.

I would like to include you in this interview process. This is an opportunity for you to contribute your opinion on the messaging services available to you, how they are used, how they can be improved and how they have affected your work.

The study is being carried out as part of my Masters Thesis in Information Science at Carleton University, under the supervision of the Mitel-Systemhouse Chair of Office Automation. The results will be used by "Co." in assessing the appropriateness of using various types of technology in an organization.

I have done some preliminary scheduling and suggest we meet on one of these two days:

or

I will be contacting you on Thursday March 17, 1983 to arrange an exact time. All interviews will be conducted in the Corporate Communications area of "Location Name".

If you wish to contact me, I can be reached through:

Voice Mail	BYR
Ontyme	SX.KEB
Telephone #	

Thank you for your co-operation.

Yours truly,

Kathleen Byrne

APPENDIX D: Questionnaire Covering Letters

March 30, 1983.

Dear "Co." Employee,

I would like to ask for a few minutes of your time to complete the attached survey. The survey has been prepared by Kathleen Byrne as a part of her Masters Thesis at Carleton University. The results of this survey will be valuable to Kathleen but also to all of us at "Co." who plan and implement these services for you.

Thank you for your co-operation.

V.P. Office Technology

ANALYSIS OF DATA BY RELATIVE FREQUENCY

INTERVAL CLASS	RELATIVE FREQUENCY		ADJUSTED RELATIVE FREQUENCY	
	CLASS CENTER	PERCENT	CLASS CENTER	PERCENT
1-4	2.5	10.0	2.5	10.0
5-8	6.5	20.0	6.5	20.0
9-12	10.5	30.0	10.5	30.0
13-16	14.5	20.0	14.5	20.0
17-20	18.5	10.0	18.5	10.0
21-24	22.5	10.0	22.5	10.0
25-28	26.5	10.0	26.5	10.0
29-32	30.5	10.0	30.5	10.0
33-36	34.5	10.0	34.5	10.0
37-40	38.5	10.0	38.5	10.0
41-44	42.5	10.0	42.5	10.0
45-48	46.5	10.0	46.5	10.0
49-52	50.5	10.0	50.5	10.0
53-56	54.5	10.0	54.5	10.0
57-60	58.5	10.0	58.5	10.0
61-64	62.5	10.0	62.5	10.0
65-68	66.5	10.0	66.5	10.0
69-72	70.5	10.0	70.5	10.0
73-76	74.5	10.0	74.5	10.0
77-80	78.5	10.0	78.5	10.0
81-84	82.5	10.0	82.5	10.0
85-88	86.5	10.0	86.5	10.0
89-92	90.5	10.0	90.5	10.0
93-96	94.5	10.0	94.5	10.0
97-100	98.5	10.0	98.5	10.0
TOTAL	100	100.0	100.0	100.0

MEAN	50.5	STD. DEV.	10.0	MEDIAN	50.5
MODE	50.5	STD. DEV.	10.0	VARIANCE	100.0
KURTOSIS	3.0	SKEWNESS	0.0	RANGE	100.0
MINIMUM	1	MAXIMUM	100		
VALID CASES	100	MISSING CASES	0		

APPENDIX E: Voice Statistics

VEAT Satisfaction With Voice Service

CATEGORY / LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ. FREQ (PERCENT)
Dissatisfied	3	1	.2	4.2	4.2
	4	2	.5	9.5	14.3
	5	8	1.9	38.1	52.4
	6	9	2.1	42.9	95.2
Satisfied	7	1	.2	4.3	100.0
	8	392	93.6	MISSING	100.0
	9	6	1.4	MISSING	100.0
TOTAL		419	100.0	100.0	

MEAN	5.333	STD. ERR.	.199	MEDIAN	5.433
MODE	6.000	STD. DEV.	.913	VARIANCE	.833
KURTOSIS	.922	SKEWNESS	-.759	RANGE	4.000
MINIMUM	3.000	MAXIMUM	7.000		

VALID CASES 21 MISSING CASES 398

VFREQ Frequency of Access

CATEGORY LABEL	DOSE	ABSOLUTE	RELATIVE	ADJUSTED	CUMULATIVE
		FREQUENCY	FREQUENCY	FREQUENCY	ABS. FREQ
		(PERCENT)	(PERCENT)	(PERCENT)	(PERCENT)
TWICE DAILY	2	1	.2	4.8	4.8
DAILY	3	5	1.1	20.6	33.3
TWICE WEEKLY	4	2	.5	9.5	42.9
OCCASIONALLY	6	12	2.9	57.1	100.0
	0	392	73.6	MISSING	100.0
	9	6	1.4	MISSING	100.0
TOTAL		419	100.0	100.0	

MEAN	4.762	STD. ERR.	.380	MEDIAN	5.625
MODE	6.000	STD. DEV.	1.513	VARIANCE	2.290
KURTOSIS	-1.644	SKEWNESS	-.510	RANGE	4.000
MINIMUM	2.000	MAXIMUM	6.000		
VALID CASES	21	MISSING CASES	398		

WEEKLY MESSAGES SENT BY ME

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
	0	13	5.1	61.4	61.4
	1	3	.7	14.3	76.2
	2	3	.7	14.3	90.5
	3	2	.5	9.5	100.0
OUT OF RANGE		398	95.0	MISSING	100.0
	TOTAL	419	100.0	100.0	

MEAN .714 ST. DEV .230 MEDIAN .308

MODE .000 STD DEV 1.056 VARIANCE 1.114
KURTOSIS .092 SKEWNESS 1.202 RANGE 3.000
MINIMUM .000 MAXIMUM 3.000

VALID CASES 21 MISSING CASES 398

WEEKLY MESSAGES RECEIVED BY ME

DATE/CR LABEL	CODE	ABSOLUTE	RELATIVE	ADJUSTED	CUMULATIVE
		FREQUENCY	FREQUENCY	FREQUENCY	ADJ FREQ
		(PERCENT)	(PERCENT)	(PERCENT)	(PERCENT)
	0	12	2.9	57.0	57.0
	1	4	1.0	19.0	76.0
	2	1	.2	4.0	81.0
	3	3	.7	14.0	95.0
	4	1	.2	4.0	100.0
OUT OF RANGE		346	88.0	MISSING	100.0
	TOTAL	419	100.0	100.0	

MEAN	.905	STD ERR	.224	MEDIAN	.375
MODE	.000	STD DEV	1.300	VARIANCE	1.690
KURTOSIS	1.251	SKEWNESS	1.249	RANGE	4.000
MINIMUM	.000	MAXIMUM	4.000		

VALID CASES 21 MISSING CASES 398

NO. 1000 REGULAR CONTINUED COMMUNITY

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ. FREQ (PERCENT)
	0	12	2.9	80.0	80.0
	1	8	1.7	15.0	75.0
	2	2	.5	10.0	85.0
	3	2	.5	10.0	95.0
	4	1	.2	5.0	100.0
OUT OF RANGE		399	95.2	MISSING	100.0
TOTAL		419	100.0	100.0	

MEAN	.330	STD. ERR	.254	MEDIAN	.336
MODE	.000	STD. DEV	1.198	VARIANCE	1.436
KURTOSIS	1.679	SKEWNESS	1.643	RANGE	4.000
MINIMUM	.000	MAXIMUM	4.000		

VALID CASES 20 MISSING CASES 399

DETAILS OF REASON FOR LEAVING BY PHONE

CATEGORY	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ. FREQ (PERCENT)
NOT A REASON	0	7	1.7	33.9	33.9
SOMETIMES A REASON	1	4	1.0	21.2	55.1
IMPORTANT REASON	2	7	1.7	33.9	100.0
	3	0	0.0	MISSING	100.0
	4	0	0.0	MISSING	100.0
TOTAL		14	100.0	100.0	
MEAN	1.000	STD. DEV.	.824	MEDIAN	1.000
MODE	1.000	STD. DEV.	.907	VARIANCE	.674
RANGE	2.000	SKEWNESS	.000	RANGE	2.000
MINIMUM	0.000	MAXIMUM	2.000		
VALID CASES	14	MISSING CASES	0		

VRINTIME REDUCE INTERRUPTIONS TO MY WORK

CATEGORY LABEL	COUNT	ABSOLUTE FREQUENCY	RELATIVE	ADJUSTED	CUMULATIVE
			FREQUENCY	FREQUENCY	ADJ. FREQ
			(PERCENT)	(PERCENT)	(PERCENT)
NOT A REASON	0	12	1.7	36.7	36.7

SOMETIMES A REASON	1	4	1.0	22.2	58.9
IMPORTANT REASON	2	2	.5	11.1	100.0
	3	392	93.8	MISSING	100.0
	9	9	2.1	MISSING	100.0
TOTAL		417	100.0	100.0	

MEAN	.444	STD. ERR.	.166	MEDIAN	.250
MODE	.000	STD. DEV.	.705	VARIANCE	.497
KURTOSIS	.254	SKEWNESS	1.354	RANGE	2.000
MINIMUM	.000	MAXIMUM	2.000		
VALID CASES	18	MISSING CASES	401		

CRINTON REUCE INTERACTIONS TO OTHERS WORK

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
NOT A REASON	0	13	3.1	70.2	72.2
SOMETIMES A REASON	1	3	.7	10.7	83.9
IMPORTANT REASON	2	2	.5	11.1	100.0
	3	392	98.0	MISSING	100.0
	9	9	0.1	MISSING	100.0
	TOTAL	419	100.0	100.0	

MEAN	.059	STD DEV	.154	MEDIAN	.192
MODE	.000	STD DEV	.154	VARIANCE	.087
KURTOSIS	1.405	CORRELATES	1.013	RANGE	2.000
MINIMUM	.000	MAXIMUM	2.000		

VALID CASES 18 MISSING CASES 401

OPTIME PAPER MAIL TAKES TOO LONG

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
NOT A REASON	0	11	2.6	61.1	61.1
SOMETIMES A REASON	1	4	1.0	22.2	83.3

IMPORTANT REASON	2	3	17.7	17.7	100.0
	3	39	93.0	MISSING	100.0
	9	9	2.1	MISSING	100.0
TOTAL		419	100.0	100.0	

MEAN	.556	STD ERR	.135	MEDIAN	.315
MODE	.000	STD DEV	.784	VARIANCE	.614
KURTOSIS	-.445	SKEWNESS	1.001	RANGE	2.000
MINIMUM	.000	MAXIMUM	2.000		
VALID CASES	418	MISSING CASES	401		

BROAD WIDE TO BROADCAST MESSAGES

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
NOT A REASON	0	15	3.6	83.3	83.3
SOMETIMES A REASON	1	3	.7	10.7	100.0
	3	392	98.6	MISSING	100.0
	9	9	2.1	MISSING	100.0
	TOTAL	419	100.0	100.0	

MEAN	.167	STD ERR	.000	MEDIAN	.100
MODE	.000	STD DEV	.389	VARIANCE	.147
KURTOSIS	2.010	SKEWNESS	1.756	RANGE	1.000
MINIMUM	.000	MAXIMUM	1.000		

VALID CASES 18 MISSING CASES 401

VTIN2 OVERCOME TIME DIFFERENCES

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
NOT A REASON	0	14	9.3	77.8	77.8

SOMETIMES A REASON	1	2	.5	11.1	88.9
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IMPORTANT REASON	2	2	.5	11.1	100.0
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TOTAL	19	100.0	100.0		
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MEAN	.333	STD ERR	.160	MEDIAN	.250
MODE	.000	STD DEV	.489	VARIANCE	.471
KURTOSIS	2.144	SKEWNESS	1.739	RANGE	2.000
MIDRANGE	.000	MAXIMUM	2.000		

VALUES	19	MISSING VALUES	001
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3 3

OF / DE

OTHER OTHER REASONS

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
NOT A REASON	0	12	.9	50.0	50.0
SOMETIMES A REASON	1	2	.5	19.3	69.3
IMPORTANT REASON	2	1	.2	6.7	100.0
	3	392	95.0	MISSING	100.0
	4	12	.9	MISSING	100.0
	TOTAL	419	100.0	100.0	

MEAN	1.25	STD DEV	.418	MEDIAN	.125
MODE	0.000	STD DEV	.594	VARIANCE	.175
KURTOSIS	4.725	SKEWNESS	1.174	RANGE	2.000
MINIMUM	0.000	MAXIMUM	2.000		
VALID CASES	15	MISSING CASES	404		

VVSTEL VOICE CDS IMPACT ON TELEPHONE

CATEGORY/LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ. FREQ (PERCENT)
USED LESS OFTEN	2	8	.7	12.0	12.0
STILL USED EXTENSIVE	5	10	2.4	40.0	52.0
NOT AFFECTED	+	12	2.9	148.0	100.0
	0	892	78.0	MISSING	100.0
	9	2	.5	MISSING	100.0
TOTAL		912	100.0	100.0	

MEAN	8.360	STD. DEV.	.140	MEDIAN	8.450
MODE	4.000	STD. DEV.	.700	VARIANCE	.490
KURTOSIS	-1.641	SKEWNESS	-1.043	RANGE	2.000
MINIMUM	2.000	MAXIMUM	4.000		

VALID CASES 25 MISSING CASES 894

VVS:MEMO VOICE CHGS IMPACT ON MEMOS

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
LARGELY REPLACED	1	1	.2	4.0	4.0
USED LESS OFTEN	2	5	1.2	20.0	24.0
STILL USED EXTENSIVE	3	5	1.2	20.0	44.0
NOT AFFECTED	4	14	3.3	56.0	100.0
	0	39	93.6	MISSING	100.0
	9	1	.5	MISSING	100.0
TOTAL		41	100.0	100.0	

MEAN	3.280	STD DEV	.187	MEDIAN	3.807
MODE	4.000	STD DEV	.736	VARIANCE	.377
KURTOSIS	-1.384	SKEWNESS	-.750	RANGE	2.000
MINIMUM	1.000	MAXIMUM	4.000		

VALID CASES 25 MISSING CASES 394

VVSLRTR VOICE CBMS IMPACT ON LETTERS

CATEGORY LABEL	CODE	RELATIVE ADJUSTED CUMULATIVE			
		ABSOLUTE FREQUENCY	FREQUENCY (PERCENT)	FREQUENCY (PERCENT)	ADJUSTED (PERCENT)
LARGELY REPLACED	1	2	.5	8.0	8.0
USED LESS OFTEN	2	2	.5	8.0	16.0
STILL USED EXTENSIVE	3	4	1.0	16.0	32.0
NOT AFFECTED	4	17	4.1	58.0	100.0
	3	39	92.6	MISSING	100.0
	4	2	.5	MISSING	100.0
TOTAL		419	100.0	100.0	

MEAN	3.741	STD DEV	1.192	MEDIAN	3.735
MODE	4.000	STD DEV	1.051	VARIANCE	.920
KURTOSIS	1.590	SKEWNESS	-1.855	RANGE	3.000
MINIMUM	1.000	MAXIMUM	4.000		

VALID CASES 25 MISSING CASES 394

CATEGORY LABEL	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ. FREQ (PERCENT)
USED LESS OFTEN	2	2	.5	8.0	8.0
STILL USED EXTENSIVE	3	10	2.4	100.0	48.0
NOT AFFECTED	4	13	3.1	52.0	100.0
	5	992	95.6	MISSING	100.0
	6	2	.5	MISSING	100.0
TOTAL		419	100.0	100.0	

- 188 -

MEET VOICE USES IMPACT ON SCHEDULED MEETINGS

CATEGORY LABEL	RAW FREQUENCY	RELATIVE		ADJUSTED FREQUENCY	CUMULATIVE ADJ. FREQ. (PERCENT)
		ABSOLUTE FREQUENCY	(PERCENT)		
LARGELY AFFECTED	1	1	.1	4.0	4.0
USED LESS OFTEN	2	1	.1	4.0	8.0
STILL USED EXTENSIVELY	3	5	1.2	20.0	28.0
NOT AFFECTED	4	18	4.3	72.0	100.0
	0*	492	13.6	MISSING	100.0
	0	2	.2	MISSING	100.0
TOTAL	9-1	1,040	100.0		

MEAN	3.000	STD. DEV.	.150	MEDIAN	3.000
MODE	4.000	STD. DEV.	.150	VARIANCE	.563
KURTOSIS	4.472	SKEWNESS	-2.176	RANGE	3.000
MINIMUM	1.000	MINIMUM	1.000		
VALID CASES	25	MISSING CASES	594		

APPENDIX F: SPSS File Definition

SPSS VA=150

RUN NAME

TITLE NAME

VARIABLE LIST

BILDQUES

SPSSQS

USERID,VUSER,USER,XUSER,NUSER,PHONE,SPHONE,
TERM,STERM,PRINTR,SPNTR,EMPM,EMPV,ORGPOS,ORGFUN,
GNAME,
EVSTEL,EVSMEMO,EVSLETR,EVSFACE,EVSMEET,
VVSTEL,VVSMEMO,VVSLETR,VVSFACE,VVSMEET,
READY,READTH,MUMOTH,
OCAT,OFREQ,OCOMM,OSEND,OREC,OMM,OYY,
ODTELE,ORINTME,ORINTOH,OPTIME,OBROAD,OTIMED,OTHER,
XCAT,XFREQ,XCOMM,XSEND,XREC,XMM,XYY,
XDTELE,XRINTME,XRINTOH,XPTIME,XBROAD,XTIMED,XOTHER,
VCAT,VFREQ,VCOMM,VSEND,VREC,VMM,VYY,
VDTELE,VRINTME,VRINTOH,VPTIME,VBROAD,VTIMED,VOTHER,
SIV1,SIV2,SIV3,SIV4,SIV5,SIV6,SIV7,SIV8,SIV9,
SV1,SV2,SV3,SV4,SV5,SV6,SV7,SV8,SV9,
SV10,SV11,SV12,SV13,SV14,SV15,SV16,SV17,SV18,SV19,
SV20,SV21,SV22,SV23,
SV11,SV12,SV13,SV14,SV15,SV16,SV17,SV18,SV19,SV110,SV111

VAR LABELS

EVSTEL TEXT CBMS IMPACT ON TELEPHONE/
EVSMEMO TEXT CBMS IMPACT ON MEMOS/
EVSLETR TEXT CBMS IMPACT ON LETTERS/
EVSFACE TEXT CBMS IMPACT ON FACE TO FACE CONTACT/
EVSMEET TEXT CBMS IMPACT ON SCHEDULED MEETINGS/
VVSTEL VOICE CBMS IMPACT ON TELEPHONE/
VVSMEMO VOICE CBMS IMPACT ON MEMOS/
VVSLETR VOICE CBMS IMPACT ON LETTERS/
VVSFACE VOICE CBMS IMPACT ON FACE TO FACE CONTACT/
VVSMEET VOICE CBMS IMPACT ON SCHEDULED MEETINGS/
ODTELE DIFFICULT TO REACH BY PHONE/
ORINTME REDUCE INTERRUPTIONS TO MY WORK/
ORINTOH REDUCE INTERRUPTIONS TO OTHERS WORK/
OPTIME PAPER MAIL TAKES TOO LONG/
OBROAD ABLE TO BROADCAST MESSAGES/
OTIMED OVERCOME TIME DIFFERENCES/
OTHER OTHER REASONS/
XDTELE DIFFICULT TO REACH BY PHONE/
XRINTME REDUCE INTERRUPTIONS TO MY WORK/
XRINTOH REDUCE INTERRUPTIONS TO OTHERS WORK/
XPTIME PAPER MAIL TAKES TOO LONG/
XBROAD ABLE TO BROADCAST MESSAGES/
XTIMED OVERCOME TIME DIFFERENCES/
XOTHER OTHER REASONS/
VDTELE DIFFICULT TO REACH BY PHONE/
VRINTME REDUCE INTERRUPTIONS TO MY WORK/
VRINTOH REDUCE INTERRUPTIONS TO OTHERS WORK/
VPTIME PAPER MAIL TAKES TOO LONG/
VBROAD ABLE TO BROADCAST MESSAGES/
VTIMED OVERCOME TIME DIFFERENCES/
VOTHER OTHER REASONS/

OCOMM	REGULAR CONTACT COMMUNITY/
OSEND	WEEKLY MESSAGES SENT BY ME/
OREC	WEEKLY MESSAGES RECEIVED BY ME/
XCOMM	REGULAR CONTACT COMMUNITY/
XSEND	WEEKLY MESSAGES SENT BY ME/
XREC	WEEKLY MESSAGES RECEIVED BY ME/
VCOMM	REGULAR CONTACT COMMUNITY/
VSEND	WEEKLY MESSAGES SENT BY ME/
VREC	WEEKLY MESSAGES RECEIVED BY ME/

SIV1	TIME REVIEWING OTHERS WORK/
SIV2	TIME REPORTING JOB STATUS/
SIV3	TIME AS EXTERNAL REPRESENTATIVE/
SIV4	TIME SPENT USING TERMINAL/
SIV5	TIME SPENT IN COMMUNICATIONS/
SIV6	MY WORK AS SERVICE TO OTHERS/
SIV7	TIME IN WORK EXCHANGE/
SIV8	TIME IN SECURING INFORMATION/
SIV9	TIME IN PROVIDING INFORMATION/
SV1	DEPEND ON OTHERS FOR INFORMATION/
SV2	JOB SKILLS EXPANDED BY COMMUNICATIONS/
SV3	MANY MESSAGES ARE OF NO USE TO ME/
SV4	AWAY FROM MY DESK/
SV5	AWAY FROM THE BUILDING/
SV6	WORK OUTSIDE NORMAL HOURS/
SV7	DIFFERENT ORGANIZATION SAME TECHNOLOGY/
SV8	OUTSIDERS ARE IMPRESSED BY TECHNOLOGY/
SV9	JOB INTERRUPTED BY TELEPHONE/
SV10	JOB INTERRUPTED BY VISITS/
SV11	PACE OF JOB ACTIVITIES TOO FAST/
SV12	VOLUME OF TASKS INCREASING/
SV13	VARIETY OF TASKS INCREASING/
SV14	JOB DOES NOT ALLOW CONTACT WITH OTHERS/
SV15	OVERTIME IS DECREASING/
SV16	PACE OF JOB ACTIVITIES INCREASING/
SV17	ACCURATE DESCRIPTION OF JOB/
SV18	JOB IMPORTANT TO MITEL/
SV19	JOB INCREASINGLY IMPORTANT TO MITEL/
SV20	JOB BECOMING MORE CHALLENGING/
SV21	INCREASING AUTONOMY/
SV22	INCREASE IN FEEDBACK/
SV23	JOB PROVIDES DIRECTION TO ORGANIZATION/

VALUE LABELS

SVI1 QUALITY OF SOCIAL LIFE SATISFACTORY/
 SVI2 COMPANY PERFORMING WELL/
 SVI3 INCREASINGLY ABLE TO INFLUENCE EVENTS/
 SVI4 INCREASINGLY AWARE OF EVENTS/
 SVI5 AWARE OF COMPANY ACHIEVEMENTS/
 SVI6 AWARE OF COMPANY GOALS/
 SVI7 ALWAYS ABLE TO INFLUENCE/
 SVI8 JOB HAS EXPANDED SKILLS/
 SVI9 JOB SATISFACTION/
 SVI10 OTHER EMPLOYEES PERFORM/
 SVI11 OTHER EMPLOYEES DO NOT PERFORM/
 VUSER (0) NOT VOICE (1) HAS VOICE/
 OUSER (0) NOT ONTYPE (1) HAS ONTYPE/
 XUSER (0) NOT VAX MAIL (1) HAS VAX MAIL/
 NUSER (1) HAS NO CBMS/
 PHONE (1) ON DESK (2) IN AREA (3) IN BUILDING (4) NONE/
 SPHONE (0) SHARED (1) NOT SHARED/
 TERM (3) ON DESK (2) IN AREA (1) IN BUILDING (0) NONE/
 TERM (0) SHARED (1) NOT SHARED/
 PRINTR (1) ON DESK (2) IN AREA (3) OTHER AREA (4) NONE/
 SPRNTR (1) USED BY UNDER 5 (2) USED BY 5 TO 10
 (3) USED BY OVER 10/
 ORGPOS (1) EXECUTIVE (2) MIDDLE MANAGEMENT
 (3) PROFESSIONAL
 (4) SECRETARIAL (5) CLERICAL

---ORGFUN-(1) TECHNOLOGY (2) ADMINISTRATION (3) MARKETING
 (4) HUMAN RESOURCES (5) FINANCE

(6) SUPPORT SERVICES (7) OTHER

EVSTEL TO VVSMEET

(1) LARGELY REPLACED (2) USED LESS OFTEN
 (3) STILL USED EXTENSIVELY (4) NOT AFFECTED/
 READMY (0) OTHERS READ MY MAIL (1) ONLY I READ MY MAIL/
 READOTH (0) I READ OTHERS MAIL (1) DO NOT READ OTHERS MAIL/
 OFREQ (1) HOURLY (2) TWICE DAILY (3) DAILY
 (4) TWICE WEEKLY (5) WEEKLY (6) OCCASIONALLY/
 ODTELE TO OOTHER

(2) IMPORTANT REASON
 (1) SOMETIMES A REASON
 (0) NOT A REASON/
 XFREQ (1) HOURLY (2) TWICE DAILY (3) DAILY
 (4) TWICE WEEKLY (5) WEEKLY (6) OCCASIONALLY/
 XDTELE TO XOTHER

(2) IMPORTANT REASON
 (1) SOMETIMES A REASON
 (0) NOT A REASON/

VFREQ (1) HOURLY (2) TWICE DAILY (3) DAILY
(4) TWICE WEEKLY (5) WEEKLY (6) OCCASIONALLY/

VDTELE TO VOTHER

(2) IMPORTANT REASON

(1) SOMETIMES A REASON

(0) NOT A REASON/

SV1 TO SV111 (1) VERY INACCURATE (2) MOSTLY INACCURATE

(3) SLIGHTLY INACCURATE (4) UNCERTAIN

(5) SLIGHTLY ACCURATE (6) MOSTLY ACCURATE

(7) VERY ACCURATE

INPUT MEDIUM

N OF CASES

INPUT FORMAT

FIXED-QUEST

DOWN

VARIED (F4.0,10F1.0,2F2.0,2F1.0,35X,A4,1X,10F1.0,2F1.0,1A1,2F1.0,
3F3.0,2F2.0,9F1.0,
3F3.0,2F2.0,9F1.0,
3F3.0,2F2.0,7F1.0,
9F2.0,23F1.0,11F1.0)

RECODE

OSAT(0=5)(1=6)(2=7)(5=8)(3=4)(4=3)/

XSAT(0=5)(1=6)(2=7)(5=8)(3=4)(4=3)/

VSAT(0=5)(1=6)(2=7)(5=8)(3=4)(4=3)/

OFREQ (0=9)/

XFREQ (0=9)/

SV1 TO SV111 (9=0)/

ORGPOS TO ORGFUN (9=0)/

TERM (1=3)(3=1)(4=0)(9=0)/

STERM (9=0)/

SIV1 TO SIV9 (13=0)

COMPUTE

EDATE = (EMPHY*100)+(EMPMM)

COMPUTE

ODATE = (OYY*100) + (OMM)

COMPUTE

XDATE = (XYY*100) + (XMM)

COMPUTE

VDATE = (VYY*100) + (VMM)

MISSING VALUES

BMPMM(99)/EMPHY(99)/ORGPOS(0)/ORGFUN(0)/DNAME()/

EVSTEL TO VVSMEET (0,9)/

OSAT(9,8)/OFREQ(9,0)/OCOMM TO OREC(999)/

XSAT(9,8)/XFREQ(9,0)/XCOMM TO XREC(999)/

VSAT(9,8)/VFREQ(9,0)/VCOMM TO VREC(999)/

OMM TO OYY(99)/ODTELE TO OOTHER(9, 3)/

XMM TO XYY(99)/XDTELE TO XOTHER(9, 3)/

VMM TO VYY(99)/VDTELE TO VOTHER(9, 3)/SIV1 TO SV111(0)/

SV1 TO SV111 (0)/

EDATE TO VDATE (9999)

COMPUTE

QWL = SV11 + SV14 + SV17 + SV11 + SV19

COMPUTE

IPROD = SV12 + SV13 + SV15 + SV16 + SV18

COMPUTE

JSKILLS = SV2 + SV20 + SV18

COMPUTE

JSTATUS = SV7 + SV8

COMPUTE

JIMPORT = SV18 + SV19 + SV20

COMPUTE

JIMPRSS = SV7 + SV8 + SV18 + SV19 + SV20

COMPUTE

ORSAWR = SV14 + SV15 + SV16

COMPUTE

ORGATT = SV12 + SV110 + SV111

ASSIGN MISSING

QWL TO ORGATT (0)

```

COMPUTE      HARDW = 0
IF           ((TERM = 3) AND (STERM = 1)) HARDW = 1
ASSIGN MISSING HARDW (9)
COMPUTE      CBMS = 0
COMPUTE      CBMSDATE = 9999
IF           (OUSER = 1) CBMS = 1
IF           (OUSER = 1) CBMSDATE = ODATE
IF           (XUSER = 1) CBMS = 2
IF           (XUSER = 1) CBMSDATE = XDATE
IF           ((OUSER = 1) AND (XUSER = 1)) CBMS = 3
IF           ((OUSER = 1) AND (XUSER = 1)
              AND (ODATE LE XDATE)) CBMSDATE = ODATE
IF           ((OUSER = 1) AND (XUSER = 1)
              AND (XDATE LE ODATE)) CBMSDATE = XDATE
ASSIGN MISSING CBMS (99)
COMPUTE      USAGEBTH = 0
COMPUTE      FREQBTH = 0
COMPUTE      USAGEO = 0
COMPUTE      USAGEX = 0
IF           ((OUSER = 1) AND (XUSER = 1))
              AND (OFREQ LE XFREQ)) FREQBTH = OFREQ
IF           ((OUSER = 1) AND (XUSER = 1)
              AND (XFREQ LE OFREQ)) FREQBTH = XFREQ
IF           (OUSER = 1) USAGEO = OSEND + OREC
IF           (OUSER = 1) USAGEBTH = OSEND + OREC
IF           ((OUSER = 1) AND (XUSER = 0)) FREQBTH = OFREQ
IF           (XUSER = 1) USAGEX = XSEND + XREC
IF           (XUSER = 1) USAGEBTH = XSEND + XREC
IF           ((XUSER = 1) AND (OUSER = 0)) FREQBTH = XFREQ
IF           ((OUSER = 1) AND (XUSER = 1))
              USAGEBTH = XSEND + XREC + OSEND + OREC
ASSIGN MISSING FREQBTH, USAGEBTH, USAGEO, USAGEX (999999)
COMPUTE      COMMREQ = SIV5
IF           (SV1 = 5) COMMREQ = SIV5 * 1.5
IF           (SV1 = 6) COMMREQ = SIV5 * 2
IF           (SV1 = 7) COMMREQ = SIV5 * 2.5
ASSIGN MISSING COMMREQ (99999999)
COMPUTE      ORGPOS = 0
IF           (ORGPOS LE 3) ORGPOS = 1
IF           ((ORGPOS = 3) AND (ORGFUN = 1)) ORGPOS = 2
ASSIGN MISSING ORGPOS (9)
SAVE FILE    SPSSQUEST
FINSIH

```

ARCHIVAL RESULTS:
VOICE GROUP

Illustration 4

----- Indicates value
when outlier is
included

ARCHIVAL RESULTS;
CONTROL GROUP

Illustration 1

A. Sessions Grouped By Month

B. Connect Time Grouped By Month

C. Messages Sent By Month

D. Messages Received By Month

ARCHIVAL RESULTS:
QUESTIONNAIRE GROUP

Illustration 2

Sessions

A. Sessions Grouped By Month

Hours

B. Connect Time Grouped By Month

Messages

C. Messages Sent By Month

Messages

D. Messages Received By Month

ARCHIVAL RESULTS:
INTERVIEW GROUP

Illustration 3

ARCHIVAL RESULTS:
VOICE GROUP

Illustration 4

A. Sessions Grouped By Month

B. Connect Time Grouped By Month

C. Messages Sent By Month

D. Messages Received By Month

----- Indicates value
when outlier is
included

Distribution of Questionnaire Supplied
Employment Start Dates

Illustration 5

ORGPOCS											
COUNT I											
ROW	PCT	EXECUTIVE	MIDDLE M	PROFESSIONAL	SECRETARIAL	CLERICAL	ROW TOTAL				
COL	PCT	EXECUTIVE	MIDDLE M	PROFESSIONAL	SECRETARIAL	CLERICAL					
TOT	PCT	1	2	3	4	5					
ORGFUN		1	1	1	1	1					
TECHNOLOGY		1	1	29	16	0	3	197			
		1	15	14.7	33.2	0	1.5	47.5			
		1	14.3	29.6	64.1	0	9.1				
		1	12	7.0	39.5	0	1.7				
		1	1	1	1	1	1				
ADMINISTRATION		2	1	11	7	10	5	34			
		1	1.9	32.4	20.6	29.4	14.7	3.2			
		1	14.3	11.2	2.7	47.6	15.2				
		1	12	2.7	1.7	2.4	1.2				
		1	1	1	1	1	1				
MARKETING		3	2	22	22	1	4	51			
		1	3.9	43.1	43.1	2.0	7.8	12.3			
		1	23.6	22.4	3.6	4.3	12.1				
		1	15	5.3	5.3	12	1.0				
		1	1	1	1	1	1				
HUMAN RESOURCES		4	0	0	7	2	0	9			
		1	1.0	1.0	77.3	22.2	1.0	2.2			
		1	1.0	1.0	2.7	9.5	1.0				
		1	1.0	1.0	1.7	1.5	1.0				
		1	1	1	1	1	1				
FINANCE		5	3	2	6	2	4	17			
		1	17.5	11.8	35.3	11.3	23.5	4.1			
		1	42.9	2.0	2.3	9.5	12.1				
		1	1.7	1.5	1.4	1.5	1.0				
		1	1	1	1	1	1				
SUPPORT SERVICES		6	0	17	38	3	12	70			
		1	1.0	24.3	54.3	4.3	17.1	16.9			
		1	1.0	17.3	14.3	14.3	36.4				
		1	1.0	4.1	9.2	1.7	2.9				
		1	1	1	1	1	1				
OTHER		7	0	17	12	3	5	37			
		1	1.0	45.9	32.4	3.1	13.5	3.9			
		1	1.0	17.3	4.7	14.3	15.2				
		1	1.0	4.1	2.9	1.7	1.2				
		1	1	1	1	1	1				
COLUMN TOTAL		7	98	256	21	33	415				
TOTAL		1.7	23.6	61.7	5.1	8.0	100.0				

Illustration 6

Distribution of CBMS Provision showing Hardware
and Software From Questionnaire Data

Illustration 7

A. Respondents By CBMS Service

TERM	COUNT ROW PCT COL PCT TOT PCT	SHARED		NOT SHARED		ROW TOTAL
		0	1	0	1	
NONE	0	2	2	58.0	58.8	1.0
		1.2	.8			
		.3	.3			
IN BUILDING	1	12	0	100.0	.0	12
		7.3	.0	2.9	.0	
IN AREA	2	119.4	6	95.2	4.8	125
		72.6	2.4	28.4	1.4	
ON DESK	3	31	247	11.2	98.8	278
		18.9	96.9	7.4	58.9	
COLUMN TOTAL		164	253	39.1	68.9	419

B. Terminal Provision

PRINTER	COUNT ROW PCT COL PCT TOT PCT	USED BY 3 & TO 10		USED BY 11 TO 18		ROW TOTAL
		1	2	3	4	
ON DESK	1	48	1	1	1	42
		95.2	2.4	.4	.4	18.2
		31.7	1.3	.5	.5	
		9.7	.2	.2	.2	
IN AREA	2	76	64	10	1	238
		31.9	18.5	4.9	.4	57.6
		48.3	66.7	53.4	4.9	
		18.4	18.7	28.6	2.4	
OTHER AREA	3	9	21	100	1	134
		6.9	16.2	74.9	.7	31.5
		7.1	31.0	45.2	.5	
		2.2	5.1	24.2	.2	
NONE	4	1	0	2	0	3
		33.3	.0	66.7	.0	.7
		.8	.0	.9	.0	
		.2	.0	.3	.0	
COLUMN TOTAL		126	66	221	413	413
		38.5	16.0	53.5	100.0	

C. Printer Provision

Distribution of Communication Parameters and Terminal Usage from Questionnaire Data

Illustration 8

%Frequency
of Responses

Legend for Graph C

1. Very Inaccurate	5. Slightly Accurate
2. Mostly Inaccurate	6. Mostly Accurate
3. Slightly Inaccurate	7. Very Accurate
4. Uncertain	

Distribution of Time Spent on Communication Related
Tasks from Questionnaire Data

Illustration 9

Distribution of Time Spent in Project Reporting
and as External Representative from Questionnaire Data

Illustration 10

%Frequency
of Responses

SIV1 Time Spent Reviewing Others Work

%Frequency
of Responses

SIV2 Time Spent Reporting Job Status

SIV3 Time Spent As An External Representative

Distributions of Satisfaction and Access Frequencies,
For The 3 Systems from Questionnaire Data

Illustration 11

Distributions of Volumes and
Community Size for the 3 Systems
from Questionnaire Data

Illustration 12

Messages
Per
Week

People

30

30

20

20

10

10

0

0

SENT

RECEIVED

COMMUNITY

A. SYSTEM A ACTIVITY

Messages
Per
Week

People

30

30

20

20

10

10

0

0

SENT

RECEIVED

COMMUNITY

B. SYSTEM B ACTIVITY

Messages
Per
Week

People

30

30

20

20

10

10

0

0

SENT

RECEIVED

COMMUNITY

C. VOICE SYSTEM ACTIVITY

Distribution of Reasons for use by
System A and System B: Telephone and
Interruptions

Illustration 13

LEGEND

0 - Not a Reason

1 - Sometimes a reason

2 - Very Important Reason

SYSTEM A

Adjusted
Frequency
%

SYSTEM B

A. Difficult to reach the other Person by Phone

Adjusted
Frequency
%

B. Reduces the Interruptions To My work

Adjusted
Frequency
%

C. Reduces the Interruptions To Other People's work

Distributions of Reasons for use by
System A and System B: Paper Mail,
Broadcast, and Time Differences

Illustration 14

LEGEND

- 0 - Not a Reason
- 1 - Sometimes a reason
- 2 - Very Important Reason

A. Paper Mail Takes Too Much Time

B. Able to Broadcast Messages

C. Overcome Time Differences

Illustration 15

IMPACT OF TEXT MAIL ON OTHER MODES OF COMMUNICATIONS

LEGEND

1. This service has been largely replaced	3. This service is still used extensively
2. This service is used less often	4. This service has not been affected

Adjusted
Frequency

Telephone

Adjusted
Frequency

Face to Face Discussion

Adjusted
Frequency

Memo

Adjusted
Frequency

Scheduled Meeting

Adjusted
Frequency

Letter

LEGEND FOR ILLUSTRATIONS 16 THROUGH 25

- 1 Very Inaccurate
- 2 Mostly Inaccurate
- 3 Slightly Inaccurate
- 4 Uncertain
- 5 Slightly Accurate
- 6 Mostly Accurate
- 7 Very Accurate

Distribution of Responses on Perceptions of
Communications Technology from Questionnaire Data

Illustration 16

%Frequency
of Responses

A. SV2 Job Skills Expanded By Communications Technology

%Frequency
of Responses

B. SV7 Different Organization Would Provide Same Technology

%Frequency
of Responses

C. SV8 Outsiders Are Impressed With Communications Technology

Distributions of Perceptions on Job
Related Travel and Contact from Questionnaire Data

Illustration 17

%Frequency of Responses

A. SV4 Job Takes Me Away From My Desk

%Frequency of Responses

B. SV5 Job Takes Me Away From My Building

%Frequency of Responses

C. SV14 Job Does Not Allow Contact With Others

Distribution of Perceptions on
Job Interruptions from Questionnaire Data

%Frequency of Responses

A. SV3 Many Messages Sent To Me Are Of No Use

%Frequency of Responses

B. SV9 My Job Frequently Interrupted By Calls

%Frequency of Responses

C. SV10 My Job Frequently Interrupted By Others

Distributions of Perceptions on Pace
Of Job Activities from Questionnaire Data

%Frequency of Responses

A. SV16 Pace of Job Activities Is Increasing

%Frequency of Responses

B. SV15 Amount Of Overtime Is Decreasing

%Frequency of Responses

C. SV11 Pace Of Job Activities Is Too Fast

Distributions of Perceptions on Overtime
and Job Composition from Questionnaire Data

Illustration 20

%Frequency of Responses

A. SV6 I Work Outside Normal Working Hours

%Frequency of Responses

B. SV12 Volume Of Tasks Is Increasing

%Frequency of Responses

C. SV13 Variety Of Tasks Is Increasing

Distributions of Perceptions on Quality of
Social Life and Company Performance from
Questionnaire Data

Illustration 24

%Frequency
of Responses

A. SVI1 Quality Of Social Life Satisfactory

%Frequency
of Responses

B. SVI2 Company Performing Well

%Frequency
of Responses

C. SVI5 Aware of Company Achievements

%Frequency
of Responses

D. SVI6 Aware of Company Goals

Distributions of Perceptions on
Changing Job Responsibilities from
Questionnaire Data

Illustration 22

% Frequency
of Responses

A. SV20 - My Job Is Becoming More Challenging

% Frequency
of Responses

B. SV21 - Increasing Autonomy In My Job

% Frequency
of Responses

C. SV22 - Increase In Feedback

Distributions of Perceptions on
Influence of Company Events from
Questionnaire Data

Illustration 23

%Frequency
of Responses

A. SV13 Increasingly Able To Influence Events

%Frequency
of Responses

B. SV17 Always Been Able To Influence Events

%Frequency
of Responses

C. SV14 Increasingly Aware of Events

Distributions of Perceptions on Quality of
Social Life and Company Performance from
Questionnaire Data

Illustration 24

%Frequency
of Responses

A. SVI1 Quality Of Social Life Satisfactory

%Frequency
of Responses

B. SVI2 Company Performing Well

%Frequency
of Responses

C. SVI5 Aware of Company Achievements

%Frequency
of Responses

D. SVI6 Aware of Company Goals

Distribution of Perceptions on Individual
and Company Job Performance from
Questionnaire Data

Illustration 25

%Frequency
of Responses

A. SVI8 Job Has Expanded Work Skills

B. SVI9 Satisfied With Job Performance

C. SVI10 Majority Perform Completely

D. SVI11 Many Others Do Not Contribute

APPENDIX H: Crosstabulation Results from Questionnaire
Data

Illustration 26

Distribution of CBMS Provision By Organizational Category

Crosstabulation Of

 ORGANZ BY CBMS

 PAGE 1 OF 1

		CBMS								
		COUNT							ROW	
		ROW PCT							TOTAL	
		COL PCT								
		TOT PCT	None	A		B		A & B		
			0	1	1	2	1	3		
ORGANZ										
	0		11	28	6	9			54	
Secretarial/ Clerical			20.4	51.9	11.1	16.7			13.0	
			34.4	26.9	5.0	5.6				
			2.7	6.7	1.4	2.2				
	1		9	62	27	99			197	
Other Prof. and Mgt.			4.6	31.5	13.7	50.3			47.5	
			28.1	59.6	22.7	61.9				
			2.2	14.9	6.5	23.9				
	2		12	14	86	52			164	
Prof. in Technology			7.3	8.5	52.4	31.7			39.5	
			37.5	13.5	72.3	32.5				
			2.9	3.4	20.7	12.5				
* COLUMN			32	104	119	160			415	
TOTAL			7.7	25.1	28.7	38.6			100.0	

1 OUT OF 12 (8.3%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
 MINIMUM EXPECTED CELL FREQUENCY = 4.164
 RAW CHI SQUARE = 119.54702 WITH 6 DEGREES OF FREEDOM. SIGNIFICANCE = .000
 NUMBER OF MISSING OBSERVATIONS = 4

Illustration 27

Distribution Of Access Frequencies Between System A Only and Systems A&B

***** CROSSTABULATION OF **

X FREQ BY CBMS

***** PAGE 1 OF 1 *****

		CBMS				
		COUNT				
		ROW PCT				ROW TOTAL
		COL PCT				
		TOT PCT				
XFREQ			2	1	3	1
	1	1	59	1	32	9
HOURLY		1	64.8	1	35.2	34.5
		1	52.7	1	21.1	
		1	22.3	1	12.1	
		-1-	-1-	-1-	-1-	-1-
	2	1	25	1	40	65
TWICE DAILY		1	38.5	1	61.5	24.0
		1	22.3	1	26.3	
		1	9.5	1	15.2	
		-1-	-1-	-1-	-1-	-1-
	3	1	10	1	30	46
DAILY		1	34.8	1	65.2	17.4
		1	14.3	1	19.7	
		1	8.1	1	11.4	
		-1-	-1-	-1-	-1-	-1-
	4	1	7	1	16	23
TWICE WEEKLY		1	30.4	1	69.6	8.7
		1	8.3	1	10.5	
		1	2.7	1	8.1	
		-1-	-1-	-1-	-1-	-1-
	5	1	0	1	6	6
WEEKLY		1	.0	1	100.0	2.3
		1	.0	1	3.9	
		1	.0	1	2.3	
		-1-	-1-	-1-	-1-	-1-
	6	1	5	1	28	33
OCCASIONALLY		1	15.2	1	84.8	12.5
		1	4.5	1	18.4	
		1	1.9	1	10.6	
		-1-	-1-	-1-	-1-	-1-
COLUMN			112		152	264
TOTAL			42.4		57.6	100.0

2 OUT OF 12 (16.7%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.

MINIMUM EXPECTED CELL FREQUENCY = 2.545
RAW CHI SQUARE = 36.05247 WITH 5 DEGREES OF FREEDOM. SIGNIFICANCE = .000

NUMBER OF MISSING OBSERVATIONS = 155

Illustration 28

Distribution of Access Frequencies Between System B Only and Systems A&B

***** CROSSTABULATION OF *****
OFREQ BY CBMS

***** PAGE 1 OF 1 *****

		CBMS			
		COUNT	I		
OFREQ	ROW PCT	I			ROW
	COL PCT	I	A	A & B	TOTAL
	TOT PCT	I	1	3	I
HOURLY	1	I	7	10	17
		I	41.2	58.3	6.5
		I	6.9	6.3	
		I	2.7	3.8	
TWICE DAILY	2	I	44	69	113
		I	38.9	61.1	43.3
		I	43.6	43.1	
		I	16.9	26.4	
DAILY	3	I	36	49	85
		I	42.4	57.6	32.6
		I	35.6	30.6	
		I	13.3	18.8	
TWICE WEEKLY	4	I	4	21	25
		I	16.0	84.0	9.6
		I	4.0	13.1	
		I	1.5	8.0	
WEEKLY	5	I	3	3	6
		I	50.0	50.0	2.3
		I	3.0	1.9	
		I	1.1	1.1	
OCCASIONALLY	6	I	7	8	15
		I	46.7	53.3	5.7
		I	6.9	5.0	
		I	2.7	3.1	
COLUMN			101	160	261
TOTAL			38.7	61.3	100.0

2 OUT OF 12 (16.7%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = 2.322
RAW CHI SQUARE = 6.67944 WITH 5 DEGREES OF FREEDOM. SIGNIFICANCE = .2
456

NUMBER OF MISSING OBSERVATIONS = 158

Illustration 29

Distributions of System Satisfaction Between System A Only and Systems A&B

***** CROSS TABULATION OF *****
 USAT ***** BY CEMS *****
 ***** PAGE 1 OF 1 *****

		CEMS				ROW TOTAL
		COUNT	I			
		ROW PCT	I			
		COL PCT	I			
		TOT PCT	I			
			A	A & B		
USAT			1	3	1	
			1	1	1	
			1	1	1	
			1	1	1	
			1	1	1	
Dissatisfied			1	1	1	
			1	1	1	
			1	1	1	
			1	1	1	
			1	1	1	
Satisfied			1	1	1	
			1	1	1	
			1	1	1	
			1	1	1	
			1	1	1	
COLUMN			101	160	261	
TOTAL			38.7	61.3	100.0	

2 OUT OF 10 (20.0%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS
 THAN 5.0.
 MINIMUM EXPECTED CELL FREQUENCY = 1.161
 RAW CHI SQUARE = 39.03949 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = .0
 000

NUMBER OF MISSING OBSERVATIONS = 158

Distributions of System Satisfaction Between System B Only and Systems A&B

		CROSS				ROW
	COUNT	B		A & B		TOTAL
XSAT	ROW PCT	COL PCT	TOT PCT	B	A & B	
Dissatisfied	3	0	1	1	1	1
		.0	100.0			.4
		.0	.7			
		.0	.4			
	4	4	4	4	4	8
		50.0	50.0			3.0
		3.6	2.6			
		1.5	1.5			
	5	15	24	1	39	14.8
		58.5	61.5			
		13.5	15.7			
		5.7	9.1			
	6	89	89	1	158	56.8
		48.7	56.3			
		60.2	58.2			
		25.1	33.7			
Satisfied	7	33	35	1	58	22.0
		39.7	60.3			
		20.7	22.9			
		8.7	13.3			
COLUMNS		111	153			264
TOTAL		42.0	58.0			100.0

- 227 -

Illustration 31

Distribution of System A Access Frequency By Organizational Category

***** CROSSTABULATION OF *****

 OFFREQ BY ORGANZ

 ***** PAGE 1 OF 1 *****

ORGANZ									
	COUNT	I							
	ROW	PCT	I	Other	Prof.	ROW			
	COL	PCT	I	Mgt,	Tech	TOTAL			
OFFREQ	TOT	PCT	I	Sec/Clr	I	I			
	-----	-----	-----	-----	-----	-----			
HOURLY	1	I	0	I	17	I	17		
		I	.0	I	100.0	I	.0		
		I	.0	I	10.3	I	.0		
		I	.0	I	6.6	I	.0		
	-----	-----	-----	-----	-----	-----			
TWICE DAILY	2	I	15	I	73	I	111		
		I	13.5	I	70.3	I	16.2	42.0	
		I	41.7	I	49.4	I	28.1	I	
		I	5.9	I	30.2	I	7.0	I	
	-----	-----	-----	-----	-----	-----	-----		
DAILY	3	I	16	I	44	I	25	85	
		I	18.8	I	51.8	I	29.4	I	32.9
		I	44.4	I	27.8	I	39.1	I	
		I	6.2	I	17.1	I	9.7	I	
	-----	-----	-----	-----	-----	-----	-----	-----	
TWICE WEEKLY	4	I	1	I	12	I	12	I	25
		I	4.0	I	48.0	I	48.0	I	9.7
		I	2.8	I	7.6	I	18.8	I	
		I	.4	I	4.7	I	4.7	I	
	-----	-----	-----	-----	-----	-----	-----	-----	
WEEKLY	5	I	2	I	1	I	2	I	5
		I	40.0	I	20.0	I	40.0	I	1.9
		I	5.6	I	.6	I	3.1	I	
		I	.8	I	.4	I	.8	I	
	-----	-----	-----	-----	-----	-----	-----	-----	
OCCASIONALLY	6	I	2	I	6	I	7	I	15
		I	13.3	I	40.0	I	46.7	I	5.3
		I	5.6	I	3.8	I	10.9	I	
		I	.8	I	2.3	I	2.7	I	
	-----	-----	-----	-----	-----	-----	-----	-----	
COLUMN			36		158		64		258
TOTAL			14.0		61.2		24.8		100.0

8 OUT OF 18 (44.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.

MINIMUM EXPECTED CELL FREQUENCY = .693

RAW CHI SQUARE = 35.16841 WITH 10 DEGREES OF FREEDOM. SIGNIFICANCE = .0001

NUMBER OF MISSING OBSERVATIONS = 161

Illustration 32A

Distribution of Access Frequency By CBMS Service Group When Telephone Largely Replaced by CBMS

***** C R O S S T A B U L A T I O N O F *

FREQBTH BY CBMS
CONTROLLING FOR..
EVSTEL TEXT CBMS IMPACT ON TELEPHONE VALUE.. 1 LARGE
LY REPLACED

***** PAGE 1 OF 1

CBMS										
COUNT		I								
ROW PCT		I						ROW		
COL PCT		I						TOTAL		
TOT PCT		I		A	I	B	I	A & B	I	
FREQBTH		I		1	I	2	I	3	I	
Hourly	1	I	0	I		7	I	1	I	8
		I	.0	I	87.5	I	12.5	I	72.7	
		I	.0	I	100.0	I	50.0	I		
		I	.0	I	63.6	I	9.1	I		
Twice Daily	2	I	1	I		0	I	1	I	2
		I	50.0	I	.0	I	50.0	I	18.2	
		I	50.0	I	.0	I	50.0	I		
		I	9.1	I	.0	I	9.1	I		
Daily	3	I	1	I		0	I	0	I	1
		I	100.0	I	.0	I	.0	I	9.1	
		I	50.0	I	.0	I	.0	I		
		I	9.1	I	.0	I	.0	I		
COLUMN				2		7		2	11	
TOTAL				18.2		63.6		18.2	100.0	

8 OUT OF 9 (88.9%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS
THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .182
RAW CHI SQUARE = 10.31250 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = .0
355

Illustration 32B

Distribution of Access Frequency By CBMS Service Group When Telephone is Used Less Often

***** C R O S S T A B U L A T I O N O F *

FREQBTH BY CBMS
CONTROLLING FOR..
EVSTEL TEXT CBMS IMPACT ON TELEPHONE VALUE.. 2 USED
LESS OFTEN

***** PAGE 1 OF 1

		CBMS					
		COUNT	I				ROW
		ROW PCT	I				TOTAL
		COL PCT	I				
		TOT PCT	I				
FREQBTH			1	I	2	I	3
			1	I	2	I	3
Hourly	1	I	1	I	27	I	16
		I	2.3	I	61.4	I	36.4
		I	4.0	I	57.4	I	35.6
		I	.9	I	23.1	I	13.7
Twice Daily	2	I	12	I	14	I	21
		I	25.5	I	29.8	I	44.7
		I	48.0	I	29.8	I	46.7
		I	10.3	I	12.0	I	17.9
Daily	3	I	9	I	5	I	7
		I	42.9	I	23.8	I	33.3
		I	36.0	I	10.6	I	15.6
		I	7.7	I	4.3	I	6.0
Weekly	4	I	2	I	1	I	1
		I	50.0	I	25.0	I	25.0
		I	8.0	I	2.1	I	2.2
		I	1.7	I	.9	I	.9
Twice Weekly	5	I	1	I	0	I	0
		I	100.0	I	.0	I	.0
		I	4.0	I	.0	I	.0
		I	.9	I	.0	I	.0
COLUMN			25		47		45
TOTAL			21.4		40.2		39.5
							117
							100.0

7 OUT OF 15 (46.7%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .214
RAM CHI SQUARE = 26.30743 WITH 8 DEGREES OF FREEDOM. SIGNIFICANCE = .009

Distribution of Access Frequency By CBMS Service Group
When Telephone Still Used Extensively

CBMS						
	COUNT	1				
	ROW PCT		A	B	A & B	ROW TOTAL
	COL PCT					
FREQ/ETH	TOT PCT	1	2	3		
Hourly	1	5	19	14	38	
		13.2	50.0	36.8	21.5	
		8.8	47.5	17.5		
		2.8	10.7	7.9		
Twice Daily	2	25	9	39	73	
		34.2	12.3	53.4	41.2	
		43.9	22.5	48.8		
		14.1	5.1	28.0		
Daily	3	19	6	20	45	
		42.2	13.3	44.4	25.4	
		33.3	15.0	25.0		
		10.7	3.4	11.3		
Twice Weekly	4	2	5	3	10	
		20.0	50.0	30.0	5.8	
		3.5	12.5	3.8		
		1.1	2.8	1.7		
Weekly	5	1	0	2	3	
		33.3	.0	66.7	1.7	
		1.8	.0	2.5		
		.6	.0	1.1		
Occasionally	6	5	1	2	8	
		62.5	12.5	25.0	4.5	
		8.8	2.5	2.5		
		2.8	.6	1.1		
COLUMN TOTAL		57	40	80	177	
		32.2	22.6	45.2	100.0	

- 231 -

Illustration 32D

Distribution of Access Frequency By CBMS Service Group When Telephone Use Not Affected By CBMS

***** CROSSTABULATION OF **

FREQBTH BY CBMS
CONTROLLING FOR..
EVSTEL TEXT CBMS IMPACT ON TELEPHONE VALUE.. 4 / NOT A
FPECTED

***** PAGE 1 OF 1

		CBMS							
		COUNT	I						
		ROW PCT	I						
		COL PCT	I					ROW TOTAL	
		TOT PCT	I	A ₁	I	B ₂	I	A & B	I
FREQBTH									
Hourly	1	1	1	1	1	6	1	9	16
		1	6.3	1	37.5	1	56.3	1	28.6
		1	5.9	1	37.5	1	39.1	1	
		1	1.8	1	10.7	1	16.1	1	
Twice Daily	2	1	6	1	2	1	8	1	16
		1	37.5	1	12.5	1	50.0	1	28.6
		1	35.3	1	12.5	1	34.8	1	
		1	10.7	1	3.6	1	14.3	1	
Daily	3	1	7	1	4	1	5	1	16
		1	43.8	1	25.0	1	31.2	1	28.6
		1	41.2	1	25.0	1	21.7	1	
		1	12.5	1	7.1	1	8.9	1	
Twice Weekly	4	1	0	1	1	1	1	1	2
		1	0	1	50.0	1	50.0	1	3.6
		1	0	1	6.3	1	4.3	1	
		1	0	1	1.8	1	1.8	1	
Weekly	5	1	1	1	0	1	0	1	1
		1	100.0	1	0	1	0	1	1.8
		1	5.9	1	0	1	0	1	
		1	1.8	1	0	1	0	1	
Occasionally	6	1	2	1	3	1	0	1	5
		1	40.0	1	60.0	1	0	1	8.9
		1	11.8	1	18.8	1	0	1	
		1	3.6	1	5.4	1	0	1	
COLUMN TOTAL			17		16		23		56
			30.4		28.6		41.1		100.0

15 OUT OF 18 (83.3%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS
THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .286
RAW CHI SQUARE = 15.02225 WITH 10 DEGREES OF FREEDOM. SIGNIFICANCE = .1

313

NUMBER OF MISSING OBSERVATIONS = 58

Illustration 33A

Distribution of Job Interruption Frequency by CBMS Service Group When Telephone Largely Replaced By CBMS

***** CROSS TABULATION OF *****
SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS
CONTROLLING FOR...
EVSTEL TEXT CBMS IMPACT ON TELEPHONE VALUE.. 1 LARGE
LY REPLACED

***** PAGE 1 OF 1 *****

CBMS										
COUNT		I								ROW TOTAL
ROW PCT	COL PCT	A		B		A & B				
TOT PCT	TOT PCT	1	1	2	1	3	1			
		1	1	2	1	3	1			
SV9		1	1	0	1	2	1	0	1	3
VERY INACCURATE		1	.0	1	100.0	1	.0	1	18.2	
		1	.0	1	28.6	1	.0	1		
		1	.0	1	18.2	1	.0	1		
		2	1	0	1	3	1	0	1	3
MOSTLY INACCURAT		1	.0	1	100.0	1	.0	1	27.3	
		1	.0	1	42.9	1	.0	1		
		1	.0	1	27.3	1	.0	1		
		3	1	0	1	2	1	0	1	2
SLIGHTLY INACCUR		1	.0	1	100.0	1	.0	1	18.2	
		1	.0	1	28.6	1	.0	1		
		1	.0	1	18.2	1	.0	1		
		5	1	0	1	0	1	2	1	2
SLIGHTLY ACCURAT		1	.0	1	.0	1	100.0	1	18.2	
		1	.0	1	.0	1	100.0	1		
		1	.0	1	.0	1	18.2	1		
		6	1	2	1	0	1	0	1	2
MOSTLY ACCURATE		1	100.0	1	.0	1	.0	1	18.2	
		1	100.0	1	.0	1	.0	1		
		1	18.2	1	.0	1	.0	1		
		COLUMN	2	7	2	11				
		TOTAL	18.2	63.6	18.2	100.0				

15 OUT OF 15 (100.0%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .364
RAW CHI SQUARE = 22.00000 WITH 8 DEGREES OF FREEDOM. SIGNIFICANCE = .0049

Illustration 33B

Distribution of Job Interruption Frequency by CBMS Service Group When Telephone Used Less Often

***** CROSS TABULATION OF *****
 SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS
 CONTROLLING FOR...
 EVSTEL TEXT CBMS IMPACT ON TELEPHONE VALUE.. 2 USED
 LESS OFTEN

 ***** PAGE 1 OF 1 *****

		CBMS				
		COUNT	I			ROW
		ROW PCT	I			TOTAL
		COL PCT	I			
		TOT PCT	A	B	A & B	
			1	2	3	
SV9			1	2	3	
	1	I	0	9	2	11
VERY INACCURATE	I	.0	81.8	18.2	9.1	
	I	.0	18.8	4.2		
	I	.0	7.4	1.7		
	-1					
	2	I	0	19	11	30
MOSTLY INACCURATE	I	.0	63.3	36.7	24.8	
	I	.0	39.6	22.9		
	I	.0	15.7	9.1		
	-1					
	3	I	0	7	3	10
SLIGHTLY INACCUR	I	.0	70.0	30.0	8.3	
	I	.0	14.0	6.3		
	I	.0	5.8	2.5		
	-1					
	4	I	0	1	0	1
UNCERTAIN	I	.0	100.0	.0	.8	
	I	.0	2.1	.0		
	I	.0	.8	.0		
	-1					
	5	I	11	10	9	30
SLIGHTLY ACCURATE	I	36.7	33.3	30.0	24.8	
	I	44.0	20.8	13.8		
	I	9.1	8.3	7.4		
	-1					
	6	I	8	0	13	21
MOSTLY ACCURATE	I	38.1	.0	61.9	17.4	
	I	32.0	.0	27.1		
	I	6.6	.0	10.7		
	-1					
	7	I	0	2	10	18
VERY ACCURATE	I	33.3	11.1	55.6	14.9	
	I	24.0	4.2	20.8		
	I	5.8	1.7	8.3		
	-1					
COLUMN			48	48	121	
TOTAL		20.7	39.7	39.7	100.0	

11 OUT OF 21 (52.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
 MINIMUM EXPECTED CELL FREQUENCY = .207
 PEARSON CHI SQUARE = 50.13457 WITH 12 DEGREES OF FREEDOM. SIGNIFICANCE = .000

Distribution of Job Interruption Frequency By CBMS Service Group When Telephone Still Used Extensively

		CBMS							
		COUNT	I						
		ROW PCT	I				ROW		
		COL PCT	I				TOTAL		
		TOT PCT	4	1	1	2	1	3	1
SV9			1	2	1	3	1	2	1
	VERY INACCURATE		28.6	42.9	28.6	3.8			
			3.4	7.3	2.3				
			1.1	1.6	1.1				
			3	13	11	27			
	MOSTLY INACCURAT		11.1	48.1	40.7	14.6			
			5.2	31.7	12.8				
			1.6	7.0	5.9				
			3	6	11	26			
	SLIGHTLY INACCUR		34.6	23.1	42.3	14.1			
			15.5	14.6	12.8				
			4.9	3.2	5.9				
			4	2	3	6			
	UNCERTAIN		16.7	33.3	50.0	3.2			
			1.7	4.9	3.5				
			.5	1.1	1.6				
			5	10	22	45			
	SLIGHTLY ACCURAT		28.9	22.2	48.9	24.3			
			22.4	24.4	25.6				
			7.0	5.4	11.9				
			6	4	21	39			
	MOSTLY ACCURATE		35.9	10.3	53.8	21.1			
			24.1	9.8	24.4				
			7.6	2.2	11.4				
			7	3	16	35			
	VERY ACCURATE		45.7	3.6	45.7	18.9			
			27.6	7.3	18.6				
			8.6	1.6	8.6				
			58	41	86	185			
	COLUMN TOTAL		31.4	22.2	46.5	100.0			

- 235 -

Illustration 33D

Distribution of Job Interruption Frequency By CBMS Service Group When Telephone Use Not Affected By CBMS

***** CONTINGENCY TABLE *****
 SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS
 CONTROLLING FOR...
 EVSTEL TEXT CBMS IMPACT ON TELEPHONE VALUE.. 4 NOT A
 FFFECTED

 ***** PAGE 1 OF 1 *****

		CBMS						
COUNT		A		B		A & B		ROW
ROW PCT	COL PCT							TOTAL
TOT PCT		1	1	2	1	3	1	
SV9		-----						
1	VERY INACCURATE	1	1	3	1	1	1	5
		20.0	1	60.0	1	20.0	1	7.7
		4.8	1	15.0	1	4.2	1	
		1.5	1	4.6	1	1.5	1	

2	MOSTLY INACCURAT	0	1	5	1	2	1	7
		.0	1	71.4	1	28.6	1	10.8
		.0	1	25.0	1	8.3	1	
		.0	1	7.7	1	3.1	1	

3	SLIGHTLY INACCUR	3	1	4	1	0	1	7
		42.9	1	57.1	1	.0	1	10.8
		14.3	1	20.0	1	.0	1	
		4.6	1	6.2	1	.0	1	

4	UNCERTAIN	0	1	0	1	1	1	1
		.0	1	.0	1	100.0	1	1.5
		.0	1	.0	1	4.2	1	
		.0	1	.0	1	1.5	1	

5	SLIGHTLY ACCURAT	3	1	4	1	8	1	15
		20.0	1	26.7	1	53.3	1	23.1
		14.3	1	20.0	1	33.3	1	
		4.6	1	6.2	1	12.3	1	

6	MOSTLY ACCURATE	6	1	1	1	7	1	14
		42.9	1	7.1	1	50.0	1	21.5
		28.6	1	5.0	1	29.2	1	
		9.2	1	1.5	1	10.8	1	

7	VERY ACCURATE	8	1	3	1	5	1	16
		50.0	1	18.8	1	31.3	1	24.6
		38.1	1	15.0	1	20.8	1	
		12.3	1	4.6	1	7.7	1	

COLUMN		21		20		24		65
TOTAL		32.3		30.8		36.9		100.0

17 OUT OF 21 (81.0%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
 MINIMUM EXPECTED CELL FREQUENCY = .308
 RAW CHI SQUARE = 22.27267 WITH 12 DEGREES OF FREEDOM. SIGNIFICANCE = .0346
 NUMBER OF MISSING OBSERVATIONS = 37

Illustration 34
Distribution of Perception of Technology Provision
By CBMS Service Group

***** C R O S S T A B U L A T I O N O F *****

SV7 DIFFERENT ORGANIZATION SAME TECHNOLOGY BY CBMS

		CBMS				ROW TOTAL
		COUNT	None	A	B	A & B
		ROW PCT				
		COL PCT				
SV7		TOT PCT	0	1	2	3
VERY INACCURATE	1	I	4	9	8	10
		I	10.8	24.3	21.6	43.2
		I	12.1	8.5	6.9	10.1
		I	1.0	2.2	1.9	3.9
MOSTLY INACCURATE	2	I	1	12	21	34
		I	1.5	17.6	30.9	50.0
		I	3.0	11.3	18.1	21.4
		I	.2	2.9	5.7	8.2
SLIGHTLY INACCURATE	3	I	2	6	9	13
		I	6.7	20.0	30.0	43.3
		I	6.1	5.7	7.8	8.2
		I	.5	1.4	2.2	3.1
UNCERTAIN	4	I	10	52	33	44
		I	7.2	37.4	23.7	31.7
		I	30.3	49.1	28.4	27.7
		I	2.4	12.0	8.0	10.6
SLIGHTLY ACCURATE	5	I	1	5	8	11
		I	4.0	20.0	32.0	44.0
		I	3.0	4.7	6.9	6.9
		I	.2	1.2	1.9	2.7
MOSTLY ACCURATE	6	I	11	14	26	28
		I	13.9	17.7	32.9	35.4
		I	33.3	13.2	22.4	17.6
		I	2.7	3.4	6.3	6.8
VERY ACCURATE	7	I	4	8	11	13
		I	11.1	22.2	30.6	36.1
		I	12.1	7.5	9.5	8.2
		I	1.0	1.9	2.7	3.1
COLUMN TOTAL			33	106	116	159
			8.0	25.6	28.0	38.4
						100.0

4 OUT OF 28 (14.3%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = 1.993
RAW CHI SQUARE = 28.09182 WITH 18 DEGREES OF FREEDOM. SIGNIFICANCE = .0607
NUMBER OF MISSING OBSERVATIONS = 5

Illustration 35A

Distribution of Time Spent Away From Building By Executives Between CBMS Service Groups

R O S S T A B U L A T I O N O F * *

SV5 AWAY FROM THE BUILDING.

BY CBMS

CONTROLLING FOR..

VALUE.. 1 EXECU

ORGPOS

TIVE

***** PAGE 1 OF 1

		CBMS					
		COUNT	1				
		ROW PCT	1				
		COL PCT	1	A	A & B	B	ROW TOTAL
		TOT PCT	1	1	3	1	
SV5			1	1	1	1	
	2	1	1	1	0	1	1
MOSTLY INACCURAT	1	100.0	1		.0	1	14.3
	1	20.0	1		.0	1	
	1	14.3	1		.0	1	
			1	1	1	1	
	5	1	3	1	1	1	4
SLIGHTLY ACCURAT	1	75.0	1	25.0		1	57.1
	1	50.0	1	50.0		1	
	1	42.9	1	14.3		1	
			1	1	1	1	
	6	1	1	1	0	1	1
MOSTLY ACCURATE	1	100.0	1		.0	1	14.3
	1	20.0	1		.0	1	
	1	14.3	1		.0	1	
			1	1	1	1	
	7	1	0	1	1	1	1
VERY ACCURATE	1	.0	1	100.0		1	14.3
	1	.0	1	50.0		1	
	1	.0	1	14.3		1	
			1	1	1	1	
COLUMN			5		2		7
TOTAL			71.4		28.6		100.0

8 OUT OF 8 (100.0%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.

MINIMUM EXPECTED CELL FREQUENCY = .286

RAM CHI SQUARE = 3.32500 WITH 3 DEGREES OF FREEDOM. SIGNIFICANCE = .3

442

Illustration 35B
Distribution of Time Spent Away From Building by Middle Management
Between CBMS Service Groups

***** CROSSTABULATION OF *****
SV5 AWAY FROM THE BUILDING BY CBMS
CONTROLLING FOR... VALUE.. 2 MIDDLE
URGPUS
E MANAGEMENT

***** PAGE 1 OF 1

		CBMS							
		COUNT	I						ROW
		ROW PCT	I						TOTAL
		COL PCT	I						
		TOT PCT	I						
			0	1	2	3			
SV5			I		I		I		
VERY INACCURATE	1	0	2	3	2	7			
	I	.0	28.6	42.9	28.6	7.1			
	I	.0	6.9	30.0	3.5				
	I	.0	2.0	3.0	2.0				
MOSTLY INACCURATE	2	0	5	3	11	19			
	I	.0	26.3	15.8	57.9	19.2			
	I	.0	17.2	30.0	19.3				
	I	.0	5.1	3.0	11.1				
SLIGHTLY INACCURATE	3	0	4	1	10	15			
	I	.0	26.7	6.7	66.7	15.2			
	I	.0	13.8	10.0	17.5				
	I	.0	4.0	1.0	10.1				
UNCERTAIN	4	0	1	0	0	1			
	I	.0	100.0	.0	.0	1.0			
	I	.0	3.4	.0	.0				
	I	.0	1.0	.0	.0				
SLIGHTLY ACCURATE	5	1	10	2	11	24			
	I	4.2	41.7	8.3	45.8	24.2			
	I	33.3	34.5	20.0	19.3				
	I	1.0	10.1	2.0	11.1				
MOSTLY ACCURATE	6	1	3	1	14	19			
	I	5.3	15.8	5.3	73.7	19.2			
	I	33.3	10.3	10.0	24.6				
	I	1.0	3.0	1.0	14.1				
VERY ACCURATE	7	1	4	0	9	14			
	I	7.1	28.6	.0	64.3	14.1			
	I	33.3	13.8	.0	15.8				
	I	1.0	4.0	.0	9.1				
COLUMN TOTAL		3	29	10	57	99			
		3.0	29.3	10.1	57.6	100.0			

20 OUT OF 29 (71.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .030
RAW CHI SQUARE = 20.31321 WITH 18 DEGREES OF FREEDOM. SIGNIFICANCE = .3

Illustration 35C
Distribution of Time Spent Away From Building By Professionals
Between CBMS Service Groups

***** C R O S S T A B U L A T I O N O F *
SV5 AWAY FROM THE BUILDING BY CBMS
CONTROLLING FOR... VALUE... 3 PROFE
SSIONAL

***** PAGE 1 OF 1 *****

		CBMS									
COUNT		I									
ROW PCT		I									
COL PCT		I									
TOT PCT		I	None	A	B	A & B	ROW TOTAL				
		I	0	1	1	1	3	I			
SV5											
	1	I	3	I	0	I	45	I	15	I	63
VERY INACCURATE	I	4.8	I	.0	I	71.4	I	23.8	I	24.4	
	I	15.8	I	.0	I	43.7	I	16.3	I		
	I	1.2	I	.0	I	17.4	I	5.8	I		
	2	I	4	I	7	I	22	I	16	I	49
MOSTLY INACCURAT	I	8.2	I	14.3	I	44.9	I	32.7	I	19.0	
	I	21.1	I	15.9	I	21.4	I	17.4	I		
	I	1.6	I	2.7	I	8.5	I	6.2	I		
	3	I	0	I	7	I	7	I	15	I	29
SLIGHTLY INACCUR	I	.0	I	24.1	I	24.1	I	51.7	I	11.2	
	I	.0	I	15.9	I	6.8	I	16.3	I		
	I	.0	I	2.7	I	2.7	I	5.8	I		
	4	I	0	I	1	I	2	I	2	I	5
UNCERTAIN	I	.0	I	20.0	I	40.0	I	40.0	I	1.9	
	I	.0	I	2.3	I	1.9	I	2.2	I		
	I	.0	I	.4	I	.8	I	.8	I		
	5	I	8	I	17	I	24	I	24	I	73
SLIGHTLY ACCURAT	I	11.0	I	23.3	I	32.9	I	32.9	I	28.3	
	I	42.1	I	38.6	I	23.3	I	26.1	I		
	I	3.1	I	6.6	I	9.3	I	9.3	I		
	6	I	3	I	6	I	2	I	15	I	26
MOSTLY ACCURATE	I	11.5	I	23.1	I	7.7	I	57.7	I	10.1	
	I	15.8	I	13.6	I	1.9	I	16.3	I		
	I	1.2	I	2.3	I	.8	I	5.8	I		
	7	I	1	I	6	I	1	I	5	I	13
VERY ACCURATE	I	7.7	I	46.2	I	7.7	I	38.5	I	5.0	
	I	5.3	I	13.6	I	1.0	I	5.4	I		
	I	.4	I	2.3	I	.4	I	1.9	I		
	COLUMN		19		44		103		92		258
	TOTAL		7.4		17.1		39.9		35.7		100.0

13 OUT OF 28 (46.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .368
PAM CHI SQUARE = 42.32823 WITH 18 DEGREES OF FREEDOM. SIGNIFICANCE = .000

Illustration 35D
Distribution of Time Spent Away From Building By Sectrearial
Group Between CBMS Service Groups

***** C R O S S T A B U L A T I O N O F *

 SVS AWAY FROM THE BUILDING BY CBMS
 CONTROLLING FOR...
 URGPOS VALUE.. 4 SECRE
 TARIAL

 ***** PAGE 1 OF 1 *****

		CBMS							
		COUNT							
		ROW PCT							
		COL PCT							
		TOT PCT							
			None	A		A & B		ROW TOTAL	
			0	1	1	3	1		
SVS									
	1	1	1	1	1	1	1	6	
VERY INACCURATE	1	16.7	66.7	1	16.7	1	28.6		
	1	50.0	28.6	1	20.0	1			
	1	4.8	19.0	1	4.8	1			
	2	1	1	5	1	2	1	8	
MOSTLY INACCURAT	1	12.5	62.5	1	25.0	1	38.1		
	1	50.0	35.7	1	40.0	1			
	1	4.8	23.8	1	9.5	1			
	3	1	0	1	1	0	1	1	
SLIGHTLY INACCUR	1	.0	100.0	1	.0	1	4.8		
	1	.0	7.1	1	.0	1			
	1	.0	4.8	1	.0	1			
	5	1	0	3	1	2	1	5	
SLIGHTLY ACCURAT	1	.0	60.0	1	40.0	1	23.8		
	1	.0	21.4	1	40.0	1			
	1	.0	14.3	1	9.5	1			
	7	1	0	1	1	0	1	1	
VERY ACCURATE	1	.0	100.0	1	.0	1	4.8		
	1	.0	7.1	1	.0	1			
	1	.0	4.8	1	.0	1			
		COLUMN	2	14	5		21		
		TOTAL	9.5	66.7	23.8		100.0		

14 OUT OF 15 (93.3%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
 MINIMUM EXPECTED CELL FREQUENCY = .095
 RAW CHI SQUARE = 2.61000 WITH 8 DEGREES OF FREEDOM. SIGNIFICANCE = .9504

Illustration 35E

Distribution of Time Spent Away From Building By Clerical
Personnel Between CBMS Service Groups.

***** CROSSTABULATION OF ***

SV5 AWAY FROM THE BUILDING BY CBMS
CONTROLLING FOR... FVALUE.. 5 CLERI
ORGP05
CAL

***** PAGE 1 OF 1

CBMS									
	COUNT	1							
	ROW PCT	1							ROW
	COL PCT	1	None	A	B	A & B			TOTAL
	TOT PCT	1	0	1	1	2	1	3	1
SV5									
	1	1	4	1	6	1	1	2	1
VERY INACCURATE	1	1	30.8	1	46.2	1	7.7	1	15.4
	1	1	44.4	1	42.9	1	16.7	1	50.0
	1	1	12.1	1	18.2	1	3.0	1	6.1
	2	1	4	1	4	1	5	1	2
MOSTLY INACCURAT	1	1	26.7	1	26.7	1	33.3	1	13.3
	1	1	44.4	1	28.6	1	83.3	1	50.0
	1	1	12.1	1	12.1	1	15.2	1	6.1
	3	1	0	1	1	1	0	1	0
SLIGHTLY INACCUR	1	1	.0	1	100.0	1	.0	1	.0
	1	1	.0	1	7.1	1	.0	1	.0
	1	1	.0	1	3.0	1	.0	1	.0
	5	1	1	1	3	1	0	1	0
SLIGHTLY ACCURAT	1	1	25.0	1	75.0	1	.0	1	.0
	1	1	11.1	1	21.4	1	.0	1	.0
	1	1	3.0	1	9.1	1	.0	1	.0

14 OUT OF 16 (87.5%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS
THAN 5.0.

MINIMUM EXPECTED CELL FREQUENCY = .121

RAW CHI SQUARE = 7.37128 WITH 9 DEGREES OF FREEDOM. SIGNIFICANCE = .5
985

NUMBER OF MISSING OBSERVATIONS = 1

Illustration 36
Distribution of Job Interruption Frequency by
***** CBMS Service Group: Telephone Interruptions ***** ACTION OF *****

SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS

***** PAGE 1 OF 1 *****

CBMS											
		COUNT	I								ROW TOTAL
		ROW PCT	I								
		COL PCT	I								
		TOT PCT	I								
			None		A		B		A & B		
			0		1		2		3		
			I		I		I		I		
SV9			-----		-----		-----		-----		
	1	I	3		3		18		5		29
VERY INACCURATE		I	10.3		10.3		62.1		17.2		6.9
		I	9.1		2.6		15.1		3.1		
		I	.7		.7		4.3		1.2		
		I	-----		-----		-----		-----		
	2	I	9		3		40		24		76
MOSTLY INACCURAT		I	11.8		3.9		51.6		31.6		18.1
		I	17.3		1.8		33.8		14.9		
		I	2.1		.7		9.5		5.7		
		I	-----		-----		-----		-----		
	3	I	6		12		20		15		53
SLIGHTLY INACCUR		I	11.3		22.6		37.7		28.3		10.6
		I	18.2		11.3		16.8		9.3		
		I	1.4		2.9		4.6		3.6		
		I	-----		-----		-----		-----		
	4	I	1		1		3		4		9
UNCERTAIN		I	11.1		11.1		33.3		44.4		2.1
		I	3.0		.9		2.5		1.5		
		I	.2		.2		.7		1.0		
		I	-----		-----		-----		-----		
	5	I	5		27		14		41		97
SLIGHTLY ACCURAT		I	5.2		27.8		14.7		42.3		23.2
		I	15.2		25.5		10.2		25.5		
		I	1.2		6.4		5.7		9.2		
		I	-----		-----		-----		-----		
	6	I	3		30		5		41		79
MOSTLY ACCURATE		I	3.8		38.0		6.3		51.9		18.9
		I	9.1		28.3		4.2		25.5		
		I	.7		7.2		1.2		9.8		
		I	-----		-----		-----		-----		
	7	I	6		30		9		31		76
VERY ACCURATE		I	7.9		39.5		11.8		40.8		18.1
		I	18.2		28.3		7.6		19.3		
		I	1.4		7.2		2.1		7.4		
		I	-----		-----		-----		-----		
COLUMN			33		106		119		161		419
TOTAL			7.9		25.3		28.4		38.4		100.0

6 OUT OF 28 (21.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .709
RAW CHI SQUARE = 94.02678 WITH 18 DEGREES OF FREEDOM. SIGNIFICANCE = .0

000

Illustration 37
Distribution of Job Interruption Frequency By
Organizational Position: Telephone Interruptions

CROSSTABULATION OF

SV9 JOB INTERRUPTED BY TELEPHONE BY ORGPOS

***** PAGE 1 OF 1 *****

ORGPOS											
COUNT		1									ROW TOTAL
ROW PCT	COL PCT	EXECUTIV	MIDDLE M	PROFESSI	SECRETAR	CLERICAL					
TGT PCT	IE	ANAGEMENT						IAL			
		1	1	2	3	4	5				
SV9		1	1	1	1	1	1	1	1	1	
VERY INACCURATE	1	0	3	24	1	1	1	1	1	29	
		.0	10.3	82.8	3.4	3.4	3.4	3.4	3.4	6.9	
		.0	3.0	9.3	4.8	3.0	3.0	3.0	3.0		
		.0	.7	5.7	1.2	1.2	1.2	1.2	1.2		
MOSTLY INACCURAT	2	0	11	59	1	1	5	1	1	76	
		.0	14.5	77.6	1.3	6.6	6.6	6.6	6.6	18.2	
		.0	11.1	22.9	4.8	15.2	15.2	15.2	15.2		
		.0	2.6	14.1	1.2	1.2	1.2	1.2	1.2		
SLIGHTLY INACCUR	3	0	6	39	2	1	6	1	1	53	
		.0	11.3	73.6	3.8	11.3	11.3	11.3	11.3	12.7	
		.0	6.1	15.1	9.5	18.2	18.2	18.2	18.2		
		.0	1.4	9.3	1.5	1.4	1.4	1.4	1.4		
UNCERTAIN	4	0	0	9	0	0	0	0	0	9	
		.0	.0	100.0	.0	.0	.0	.0	.0	2.2	
		.0	.0	3.5	.0	.0	.0	.0	.0		
		.0	.0	2.2	.0	.0	.0	.0	.0		
SLIGHTLY ACCURAT	5	3	22	64	2	1	6	1	1	97	
		3.1	22.7	66.0	2.1	6.2	6.2	6.2	6.2	23.2	
		42.9	22.2	24.3	9.5	18.2	18.2	18.2	18.2		
		.7	5.3	15.3	1.5	1.4	1.4	1.4	1.4		
MOSTLY ACCURATE	6	2	26	36	9	1	6	1	1	79	
		2.5	32.9	45.6	11.4	7.6	7.6	7.6	7.6	18.9	
		28.6	26.3	14.0	42.9	18.2	18.2	18.2	18.2		
		.5	6.2	8.6	2.2	1.4	1.4	1.4	1.4		
VERY ACCURATE	7	2	31	27	6	1	9	1	1	75	
		2.7	41.3	36.0	8.0	12.0	12.0	12.0	12.0	17.9	
		28.6	31.3	10.5	28.6	27.3	27.3	27.3	27.3		
		.5	7.4	6.5	1.4	2.2	2.2	2.2	2.2		
COLUMN TOTAL		7	99	258	21	33	418				
		1.7	23.7	61.7	5.0	7.9	100.0				

18 OUT OF 35 (51.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .151
RAW CHI SQUARE = 64.74607 WITH 24 DEGREES OF FREEDOM. SIGNIFICANCE = .000

NUMBER OF MISSING OBSERVATIONS = 1

**Distribution of Job Interruption Frequency For Executives
Between CBMS Service Groups: Telephone Interruptions**

CBMS						
	COUNT	I				
	ROW	PCT	I			ROW
	COL	PCT	I	A	A & B	TOTAL
	TOT	PCT	I	1	3	I
SV9			I			I
	5	I	3	I	0	I
SLIGHTLY ACCURATE	I	100.0	I	.0	I	42.9
	I	60.0	I	.0	I	
	I	42.9	I	.0	I	
			I			I
	6	I	1	I	1	I
MOSTLY ACCURATE	I	50.0	I	50.0	I	28.6
	I	20.0	I	50.0	I	
	I	14.3	I	14.3	I	
			I			I
	7	I	1	I	1	I
VERY ACCURATE	I	50.0	I	50.0	I	28.6
	I	20.0	I	50.0	I	
	I	14.3	I	14.3	I	
			I			I
	COLUMN	5		2		7
	TOTAL	71.4		28.6		100.0

- 245 -

Illustration 38B
Distribution of Job Interruption Frequency For Middle
Management Between CBMS Service Groups: Telephone Interruptions

***** C R O S S T A B U L A T I O N . O F * *
 SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS
 CONTROLLING FOR..
 ORGPOS VALUE.. 2 MIDDLE
 E MANAGEMENT

 ***** PAGE 1 OF 1

CBMS										
	COUNT	I								
	ROW PCT	I								ROW
	COL PCT	I	None	A	B	A & B				TOTAL
	TOT PCT	I	0	1	2	3				
SV9										
	1	I	0	1	0	2				3
VERY INACCURATE		I	.0	33.3	.0	66.7				3.0
		I	.0	3.4	.0	3.5				
		I	.0	1.0	.0	2.0				
		-I								
	2	I	1	0	5	5				11
MOSTLY INACCURAT		I	9.1	.0	45.5	45.5				11.1
		I	33.3	.0	50.0	8.8				
		I	1.0	.0	5.1	5.1				
		-I								
	3	I	0	2	1	3				6
SLIGHTLY INACCUR		I	.0	33.3	16.7	50.0				6.1
		I	.0	6.9	10.0	5.3				
		I	.0	2.0	1.0	3.0				
		-I								
	5	I	0	7	2	13				22
SLIGHTLY ACCURAT		I	.0	31.8	9.1	59.1				22.2
		I	.0	24.1	20.0	22.8				
		I	.0	7.1	2.0	13.1				
		-I								
	6	I	0	8	0	18				26
MOSTLY ACCURATE		I	.0	30.8	.0	69.2				26.3
		I	.0	17.6	.0	31.6				
		I	.0	8.1	.0	18.2				
		-I								
	7	I	2	11	2	16				31
VERY ACCURATE		I	6.5	35.5	6.5	51.6				31.3
		I	66.7	37.9	20.0	28.1				
		I	2.0	11.1	2.0	16.2				
		-I								
	COLUMN		3	29	10	57				99
	TOTAL		3.0	29.3	10.1	57.6				100.0

17 OUT OF 24 (70.8%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
 MINIMUM EXPECTED CELL FREQUENCY = .091
 RAW CHI SQUARE = 26.42791 WITH 15 DEGREES OF FREEDOM. SIGNIFICANCE = .0
 338

Illustration 38C
Distribution of Job Interruption Frequency For Professionals
Between CBMS Service Groups: Telephone Interruptions

***** CROSSTABULATION OF *****
SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS
CONTROLLING FOR... VALUE... 3 PROFE
ORGPOS
SSIGNAL

***** PAGE 1 OF 1 *****

		CBMS						ROW TOTAL	
		COUNT							
		ROW PCT							
		COL PCT							
		TOT PCT	None	A	B	A & B			
SV9			0	1	1	1	1		
VERY INACCURATE	1	1	3	0	18	3		24	
		1	12.5	.0	75.0	12.5		9.3	
		1	15.8	.0	17.5	3.3			
		1	1.2	.0	7.0	1.2			
MOSTLY INACCURAT	2	1	5	3	33	18		52	
		1	8.5	5.1	55.9	30.5		22.9	
		1	26.3	6.8	32.0	19.6			
		1	1.9	1.2	12.8	7.0			
SLIGHTLY INACCUR	3	1	4	6	18	11		39	
		1	10.3	15.4	46.2	28.2		15.1	
		1	21.1	13.6	17.5	12.0			
		1	1.6	2.3	7.0	4.3			
UNCERTAIN	4	1	1	1	3	4		9	
		1	11.1	11.1	33.3	44.4		3.5	
		1	5.3	2.3	2.9	4.3			
		1	.4	.4	1.2	1.6			
SLIGHTLY ACCURAT	5	1	3	12	21	28		64	
		1	4.7	18.8	32.8	43.8		24.8	
		1	15.8	27.3	20.4	30.4			
		1	1.2	4.7	8.1	10.9			
MOSTLY ACCURATE	6	1	2	12	5	17		36	
		1	5.6	33.3	13.9	47.2		14.0	
		1	10.5	27.3	4.9	18.5			
		1	.8	4.7	1.9	6.6			
VERY ACCURATE	7	1	1	10	5	11		27	
		1	3.7	37.0	18.5	40.7		10.5	
		1	5.3	22.7	4.9	12.0			
		1	.4	3.9	1.9	4.3			
COLUMN TOTAL			19	44	103	92	258		
			7.4	17.1	39.9	35.7	100.0		

12 OUT OF 28 (42.9%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.

MINIMUM EXPECTED CELL FREQUENCY = .663
 MAX CHI SQUARE = 53.42414 WITH 18 DEGREES OF FREEDOM. SIGNIFICANCE = .000

Illustration 38D
Distribution of Job Interruption Frequency For Secretarial
Personnel Between CBMS Service Groups: Telephone Interruptions

***** C R O S S T A B U L A T I O N O F **

SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS
CONTROLLING FOR... VALUE.. 4 SECRE
GROUPS
TARIAL

***** PAGE 1 OF 1

		CBMS					ROW TOTAL
		COUNT					
		ROW PCT					
		COL PCT					
		TOT PCT	None	A	A & B		
			0	1	3		
SV9		1	0	1	0	1	1
	VERY INACCURATE	1	0	100.0	0	1	4.8
		1	0	7.1	0	1	
		1	0	4.8	0	1	
		2	0	0	1	1	1
	MOSTLY INACCURAT	1	0	0	100.0	1	4.8
		1	0	0	20.0	1	
		1	0	0	4.8	1	
		3	0	2	0	1	2
	SLIGHTLY INACCUR	1	0	100.0	0	1	9.5
		1	0	14.3	0	1	
		1	0	9.5	0	1	
		5	1	1	0	1	2
	SLIGHTLY ACCURAT	1	50.0	50.0	0	1	9.5
		1	50.0	7.1	0	1	
		1	4.8	4.8	0	1	
		6	1	6	2	1	9
	MOSTLY ACCURATE	1	11.1	66.7	22.2	1	42.9
		1	50.0	42.9	40.0	1	
		1	4.8	28.6	9.5	1	
		7	0	4	2	1	6
	VERY ACCURATE	1	0	66.7	33.3	1	28.6
		1	0	28.6	40.0	1	
		1	0	19.0	9.5	1	
COLUMN			2	14	5	21	
TOTAL			9.5	66.7	23.8	100.0	

17 OUT OF 18 (94.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS
THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .095
RAW CHI SQUARE = 9.53333 WITH 10 DEGREES OF FREEDOM: SIGNIFICANCE = .4
823

Illustration 38E
Distribution of Job Interruption Frequency For Clerical
Personnel Between CBMS Service Groups: Telephone Interruptions

***** CROSSTABULATION OF **

SV9 JOB INTERRUPTED BY TELEPHONE BY CBMS
CONTROLLING FOR.. VALUE.. 5 CLERI
ORGPOS
CAL

***** PAGE 1 OF 1 *****

CBMS									
	COUNT	1							
	ROW PCT	1							
	COL PCT	1	None	A	B	A & B	ROW TOTAL		
	TOT PCT	1	0	1	1	2	1	3	1
SV9			-----						
	1	1	0	1	1	0	1	0	1
VERY INACCURATE	1	1	.0	100.0	1	.0	1	.0	1
	1	1	.0	7.1	1	.0	1	.0	1
	1	1	.0	3.0	1	.0	1	.0	1

	2	1	3	1	0	2	1	0	1
MOSTLY INACCURAT.	1	1	60.0	1	.0	40.0	1	.0	1
	1	1	33.3	1	.0	33.3	1	.0	1
	1	1	9.1	1	.0	6.1	1	.0	1

	3	1	2	1	2	1	1	1	1
SLIGHTLY INACCUR	1	1	33.3	1	33.3	1	16.7	1	16.7
	1	1	22.2	1	14.3	1	16.7	1	25.0
	1	1	6.1	1	6.1	1	3.0	1	3.0

	5	1	1	1	4	1	1	0	1
SLIGHTLY ACCURAT	1	1	16.7	1	66.7	1	16.7	1	.0
	1	1	11.1	1	28.6	1	16.7	1	.0
	1	1	3.0	1	12.1	1	3.0	1	.0

	6	1	0	1	3	0	1	3	1
MOSTLY ACCURATE	1	1	.0	1	50.0	1	.0	1	50.0
	1	1	.0	1	21.4	1	.0	1	75.0
	1	1	.0	1	9.1	1	.0	1	9.1

	7	1	3	1	4	1	2	1	0
VERY ACCURATE	1	1	33.3	1	44.4	1	22.2	1	.0
	1	1	33.3	1	28.6	1	33.3	1	.0
	1	1	9.1	1	12.1	1	6.1	1	.0

	COLUMN TOTAL		9	14	6	4	33		
			27.3	42.4	18.2	12.1	100.0		

24 OUT OF 24 (100.0%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.

MINIMUM EXPECTED CELL FREQUENCY = .121

RAW CHI SQUARE = 20.69047 WITH 15 DEGREES OF FREEDOM. SIGNIFICANCE = .1470

NUMBER OF MISSING OBSERVATIONS = 1

Illustration 39

Distribution Of Job Interruption Frequency By Organizational Position: Visits From Others

***** CROSSTABULATION OF *****
SV10 JOB INTERRUPTED BY VISITS BY ORGPOS

***** PAGE 1 OF 1 *****

		ORGPOS						
		COUNT						ROW
		PCT	EXECUTIVE	MIDDLE M	PROFESSI	SECRETAR	CLERICAL	TOTAL
		COL PCT	ANAGEMENT	ONAL	IAL			
		TOT PCT	1	2	3	4	5	
SV10		1	0	1	15	3	3	22
	VERY INACCURATE	1	0	4.5	63.2	13.6	13.6	5.3
		1	0	1.0	5.8	14.3	9.1	
		1	0	2	3.6	7	7	
		2	0	5	42	2	2	51
	MOSTLY INACCURAT	1	0	9.8	81.4	3.9	3.9	12.2
		1	0	5.1	16.3	9.5	6.1	
		1	0	1.2	10.0	5	5	
		3	0	7	43	3	10	63
	SLIGHTLY INACCUR	1	0	11.1	68.3	4.8	15.9	15.1
		1	0	7.1	16.7	14.3	30.3	
		1	0	1.7	10.3	7	2.4	
		4	0	0	12	0	0	12
	UNCERTAIN	1	0	0	100.0	0	0	2.9
		1	0	0	7	0	0	
		1	0	0	2.5	0	0	
		5	1	28	82	3	4	118
	SLIGHTLY ACCURAT	1	8	23.7	69.5	2.5	3.4	28.2
		1	14.3	28.3	31.8	14.3	12.1	
		1	2	6.7	19.6	7	1.0	
		6	4	25	41	5	8	83
	MOSTLY ACCURATE	1	4.8	30.1	49.4	6.0	9.6	19.9
		1	57.1	25.3	15.9	23.8	24.2	
		1	1.0	6.0	9.8	1.2	1.9	
		7	2	33	23	5	6	69
	VERY ACCURATE	1	2.9	47.8	33.3	7.2	8.7	16.5
		1	28.6	33.3	8.9	23.8	18.2	
		1	5	7.9	5.5	1.2	1.4	
COLUMN		7	99	258	21	33	418	
TOTAL		1.7	23.7	61.7	5.0	7.9	100.0	

18 OUT OF 35 (51.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.

MINIMUM EXPECTED CELL FREQUENCY = .201

RAM CHI SQUARE = 78.31191 WITH 24 DEGREES OF FREEDOM. SIGNIFICANCE = .000

NUMBER OF MISSING OBSERVATIONS = 1

Illustration 40
Distribution of Message Usefulness By CBMS Service

***** C R O S S T A B U L A T I O N O F *
*
* SV3 MANY MESSAGES ARE OF NO USE TO ME BY CBMS *
*
* PAGE 1 OF 1 *

		CBMS								ROW TOTAL	
		COUNT									
		ROW PCT									
		COL PCT									
		TOT PCT	None	A		B		A & B			
			0	1	1	2	1	3	1		
SV3											
	1	1	11	1	16	1	4	1	10	41	
VERY INACCURATE		1	26.8	1	39.0	1	9.8	1	24.4	9.8	
		1	33.3	1	15.1	1	3.4	1	6.2		
		1	2.6	1	3.8	1	1.0	1	2.4		
	2	1	5	1	21	1	15	1	29	70	
MOSTLY INACCURAT		1	7.1	1	30.0	1	21.4	1	41.4	16.7	
		1	15.2	1	19.8	1	12.6	1	18.0		
		1	1.2	1	5.0	1	3.6	1	6.9		
	3	1	1	1	11	1	16	1	27	55	
SLIGHTLY INACCUR		1	1.8	1	20.0	1	29.1	1	49.1	13.1	
		1	3.0	1	10.4	1	13.4	1	16.8		
		1	.2	1	2.6	1	3.8	1	6.4		
	4	1	4	1	1	1	4	1	6	15	
UNCERTAIN		1	26.7	1	6.7	1	26.7	1	40.0	3.6	
		1	12.1	1	.9	1	3.4	1	3.7		
		1	1.0	1	.2	1	1.0	1	1.4		
	5	1	4	1	23	1	36	1	41	104	
SLIGHTLY ACCURAT		1	3.8	1	22.1	1	34.6	1	39.4	24.8	
		1	12.1	1	21.7	1	30.3	1	25.5		
		1	1.0	1	5.5	1	8.6	1	9.8		
	6	1	5	1	22	1	25	1	22	74	
MOSTLY ACCURATE		1	6.8	1	29.7	1	33.8	1	29.7	17.7	
		1	15.2	1	20.8	1	21.0	1	13.7		
		1	1.2	1	5.3	1	6.0	1	5.3		
	7	1	3	1	12	1	19	1	26	60	
VERY ACCURATE		1	5.0	1	20.0	1	31.7	1	43.3	14.3	
		1	9.1	1	11.3	1	16.0	1	16.1		
		1	.7	1	2.9	1	4.5	1	6.2		
COLUMN TOTAL			33		106		119		161	419	
			7.9		25.3		29.4		38.4	100.0	

3 OUT OF 28 (21.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = 1.181
RAW CHI SQUARE = 53.31775 WITH 18 DEGREES OF FREEDOM. SIGNIFICANCE = .000

Illustration 41
Distribution of Changing Overtime By Organizational Category

CROSSTABULATION OF

SVIS

OVERTIME IS DECREASING

BY ORGANIZATION

PAGE 1 OF 1

ORGANIZATION

	COUNT		Other	Prof.	ROW
	ROW PC1	Sec/clr	Mgt.	Tech.	TOTAL
	COL PC1				
	TOT PC1				
SVIS					
	1	11	53	45	187
VERY INACCURATE	1	10.3	49.5	40.2	26.0
	1	20.4	27.0	26.5	
	1	2.7	12.9	10.4	
	2	4	54	40	98
MOSTLY INACCURATE	1	4.1	55.1	40.8	23.8
	1	7.4	27.6	24.7	
	1	1.0	13.1	9.7	
	3	12	24	20	56
SLIGHTLY INACCURATE	1	21.4	42.9	35.7	13.0
	1	22.2	12.2	12.3	
	1	2.9	5.8	4.9	
	4	8	21	39	68
UNCERTAIN	1	11.8	30.9	57.4	16.5
	1	14.8	10.7	24.1	
	1	1.9	5.1	9.5	
	5	9	18	10	37
SLIGHTLY ACCURATE	1	24.3	48.6	27.0	9.0
	1	16.7	9.2	6.2	
	1	2.2	4.4	2.4	
	6	4	10	6	20
MOSTLY ACCURATE	1	20.0	50.0	30.0	4.9
	1	7.0	5.1	3.7	
	1	1.0	2.4	1.5	
	7	6	16	4	26
VERY ACCURATE	1	23.1	61.5	15.4	6.3
	1	11.1	8.2	2.5	
	1	1.5	3.9	1.0	
COLUMN TOTAL		54	196	162	412
		13.1	47.6	39.3	100.0

3 OUT OF 21 (14.3%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = 2.621
NOM CHI SQUARE = 34.17866 WITH 12 DEGREES OF FREEDOM.
SIGNIFICANCE = .0006
NUMBER OF MISSING OBSERVATIONS = 7

Illustration 42
Distribution of Work Performed Outside Normal Hours
By Organizational Position

***** CROSS TABULATION OF *****
SV6 WORK OUTSIDE NORMAL HOURS BY ORGPOS

***** PAGE 1 OF 1 *****

ORGPOS												
COUNT												
ROW	PCT	EXECUTIV	MIDDLE M	PROFESSI	SECRETAR	CLERICAL	ROW					
COL	PCT	IE	ANAGEMENT	ONAL	IAL		TOTAL					
TOT	PCT	1	1	2	1	3	1	4	1	5	1	
SV6		1	0	9	39	10	14					
VERY INACCURATE		.0	12.5	54.2	13.9	19.4					72	
		.0	9.1	15.1	47.6	42.4					17.2	
		.0	2.2	9.3	2.4	3.3						
		2	1	13	66	3	10				93	
MOSTLY INACCURAT		1.1	14.0	71.0	3.2	10.8					22.2	
		14.3	13.1	25.6	14.3	30.3						
		.2	3.1	15.8	.7	2.4						
		3	1	9	22	3	1				36	
SLIGHTLY INACCUR		2.8	25.0	61.1	8.3	2.8					8.6	
		14.3	9.1	8.5	14.3	3.0						
		.2	2.2	5.3	.7	.2						
		4	0	2	5	0	0				7	
UNCERTAIN		.0	28.6	71.4	.0	.0					1.7	
		.0	2.0	1.9	.0	.0						
		.0	.5	1.2	.0	.0						
		5	1	19	61	4	6				91	
SLIGHTLY ACCURAT		1.1	20.9	67.0	4.4	6.6					21.8	
		14.3	19.2	23.6	19.0	18.2						
		.2	4.5	14.6	1.0	1.4						
		6	3	26	37	1	2				69	
MOSTLY ACCURATE		4.3	37.7	53.6	1.4	2.9					16.5	
		42.9	26.3	14.3	4.8	6.1						
		.7	6.2	8.9	.2	.5						
		7	1	21	28	0	0				50	
VERY ACCURATE		2.0	42.0	56.0	.0	.0					12.0	
		14.3	21.2	10.9	.0	.0						
		.2	5.0	6.7	.0	.0						
		COLUMN	7	99	258	21	33				418	
		TOTAL	1.7	23.7	61.7	5.0	7.9				100.0	

19 OUT OF 35 (54.3%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .117
RAW CHI SQUARE = 67.64281 WITH 24 DEGREES OF FREEDOM, SIGNIFICANCE = .000
NUMBER OF MISSING OBSERVATIONS = 1

Illustration 43
Distribution of Influence Perception By Organizational Position

***** CROSSTABULATION OF **
SVC3 JOB PROVIDES DIRECTION TO ORGANIZATION BY ORGPOS

***** PAGE 1 OF 1 *****

ORGPOS												ROW TOTAL
COUNT												
ROW PCT	EXECUTIV	MIDDLE M	PROFESSI	SECRETAR	CLERICAL							
COL PCT	MANAGEMENT	ANAGEMENT	ONAL	IAL								
100 PCT	1	2	3	4	5							
SVC3	1	0	0	75	10	9						102
VERY INACCURATE	1	.0	5.9	70.5	11.8	8.8						24.6
	1	.0	6.1	29.2	57.1	28.1						
	1	.0	1.4	18.1	2.9	2.2						
	1											
MOSTLY INACCURAT	2	0	7	49	2	4						62
	1	.0	11.3	79.0	3.2	6.5						14.9
	1	.0	7.1	19.1	9.5	12.5						
	1	.0	1.7	11.8	.5	1.0						
SLIGHTLY INACOUR	3	0	4	22	2	0						28
	1	.0	14.3	78.6	7.1	.0						6.7
	1	.0	4.0	8.6	9.5	.0						
	1	.0	1.0	5.3	.5	.0						
UNCERTAIN	4	0	12	44	3	9						68
	1	.0	17.6	64.7	4.4	13.2						16.4
	1	.0	12.1	17.1	14.3	23.1						
	1	.0	2.9	10.6	.7	2.2						
SLIGHTLY ACCURAT	5	0	25	35	1	3						64
	1	.0	39.1	54.7	1.6	4.7						15.4
	1	.0	25.3	13.6	4.8	9.4						
	1	.0	6.0	8.4	.2	.7						
MOSTLY ACCURATE	6	4	28	26	0	0						58
	1	6.9	48.3	44.8	.0	.0						14.0
	1	66.7	28.3	10.1	.0	.0						
	1	1.0	6.7	6.3	.0	.0						
VERY ACCURATE	7	2	17	6	1	7						33
	1	6.1	51.5	18.2	3.0	21.2						8.0
	1	33.3	17.2	2.3	4.8	21.7						
	1	.5	4.1	1.4	.2	1.7						
COLUMN TOTAL		6	99	257	21	32						415
		1.4	23.9	61.9	5.1	7.7						100.0

18 OUT OF 35 (51.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .405
PAM CHI SQUARE = 125.49583 WITH 24 DEGREES OF FREEDOM. SIGNIFICANCE = .000
NUMBER OF MISSING OBSERVATIONS = 4.

Illustration 44
Distribution of Perceived Increase in Influence
By Organizational Position

***** CROSSTABULATION OF *****
SVI3 INCREASINGLY ABLE TO INFLUENCE EVENTS BY ORGPOS

***** PAGE 1 OF 1 *****

ORGPOS													
COUNT													
ROW	PCT	EXECUTIVE	MIDDLE	M	PROFESSIONAL	SECRETARIAL	CLERICAL					ROW	
COL	PCT	IE	ANAGEMENT		ONAL	IAL					TOTAL		
TOT	PCT	I	1	2	3	4	5						
SVI3													
VERY INACCURATE	1	I	0	I	9	I	35	I	7	I	13	I	64
		I	.0	I	14.1	I	54.7	I	10.9	I	20.3	I	15.4
		I	.0	I	9.2	I	13.6	I	33.3	I	39.4	I	
		I	.0	I	2.2	I	8.4	I	1.7	I	3.1	I	
MOSTLY INACCURATE	2	I	0	I	8	I	57	I	5	I	6	I	76
		I	.0	I	10.5	I	75.0	I	6.6	I	7.9	I	18.3
		I	.0	I	8.2	I	22.2	I	23.8	I	18.2	I	
		I	.0	I	1.9	I	13.7	I	1.2	I	1.4	I	
SLIGHTLY INACCURATE	3	I	0	I	13	I	28	I	3	I	1	I	45
		I	.0	I	28.9	I	62.2	I	6.7	I	2.2	I	10.8
		I	.0	I	13.3	I	10.9	I	14.3	I	3.0	I	
		I	.0	I	3.1	I	6.7	I	.7	I	.2	I	
UNCERTAIN	4	I	1	I	16	I	45	I	2	I	4	I	68
		I	1.5	I	23.5	I	66.2	I	2.9	I	5.9	I	16.3
		I	14.3	I	16.3	I	17.5	I	9.5	I	12.1	I	
		I	.2	I	3.8	I	10.8	I	.5	I	1.0	I	
SLIGHTLY ACCURATE	5	I	2	I	21	I	58	I	3	I	5	I	89
		I	2.2	I	23.6	I	65.2	I	3.4	I	5.6	I	21.4
		I	28.6	I	21.4	I	22.6	I	14.3	I	15.2	I	
		I	.5	I	5.0	I	13.9	I	.7	I	1.2	I	
MOSTLY ACCURATE	6	I	2	I	26	I	29	I	1	I	2	I	60
		I	3.3	I	43.3	I	48.3	I	1.7	I	3.3	I	14.4
		I	28.6	I	26.5	I	11.3	I	4.8	I	6.1	I	
		I	.5	I	6.3	I	7.0	I	.2	I	.5	I	
VERY ACCURATE	7	I	2	I	5	I	5	I	0	I	2	I	14
		I	14.3	I	35.7	I	35.7	I	.0	I	14.3	I	3.4
		I	28.6	I	5.1	I	1.9	I	.0	I	6.1	I	
		I	.5	I	1.2	I	1.2	I	.0	I	.5	I	
COLUMN TOTAL			7		98		257		21		33		416
			1.7		23.6		61.8		5.0		7.9		100.0

18 OUT OF 35 (51.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .236
RAW CHI SQUARE = 68.77448 WITH 24 DEGREES OF FREEDOM. SIGNIFICANCE = .000

NUMBER OF MISSING OBSERVATIONS = 3

Illustration 45
Distribution of Perception of Always Having Had
Influence By Organizational Position

***** CROSS TABULATION OF *****
SVI7 ALWAYS ABLE TO INFLUENCE BY ORGPOS

***** PAGE 1 OF 1 *****

ORGPOS												
COUNT		ORGPOS										ROW TOTAL
ROW	PCT	EXECUTIVE	MIDDLE M	PROFESSI	SECRETAR	CLERICAL						
COL	PCT	1	2	3	4	5						
TOT.PCT	1	2	3	4	5							

SVI7	1	0	26	83	12	17					138	
VERY INACCURATE	1	.0	18.8	60.1	8.7	12.3					33.2	
	1	.0	26.5	32.3	57.1	51.5						
	1	.0	6.3	20.0	2.9	4.1						

MOSTLY INACCURAT	2	0	14	79	4	5					102	
	1	.0	13.7	77.5	3.9	4.9					24.5	
	1	.0	14.3	30.7	19.0	15.2						
	1	.0	3.4	17.0	1.0	1.2						

SLIGHTLY INACCUR	3	2	15	31	3	3					55	
	1	3.6	27.3	53.2	5.5	5.5					13.2	
	1	28.6	15.3	12.5	14.3	9.1						
	1	.5	3.6	7.7	.7	.7						

UNCERTAIN	4	0	14	36	2	6					58	
	1	.0	24.1	62.1	3.4	10.3					13.9	
	1	.0	14.3	14.0	9.5	18.2						
	1	.0	3.4	8.7	.5	1.4						

SLIGHTLY ACCURAT	5	0	19	24	0	1					44	
	1	.0	43.2	54.5	.0	2.3					10.6	
	1	.0	19.4	9.3	.0	3.0						
	1	.0	4.6	5.8	.0	.2						

MOSTLY ACCURATE	6	4	9	3	0	0					16	
	1	25.0	56.3	18.8	.0	.0					3.8	
	1	57.1	9.2	1.2	.0	.0						
	1	1.0	2.2	.7	.0	.0						

VERY ACCURATE	7	1	1	0	0	1					3	
	1	33.3	33.3	.0	.0	33.3					.7	
	1	14.3	1.0	.0	.0	3.0						
	1	.2	.2	.0	.0	.2						

COLUMN		7	98	257	21	33					416	
TOTAL		1.7	23.6	61.8	5.0	7.9					100.0	

20 OUT OF 35 (57.1%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = .050
RAW CHI SQUARE = 126.45645 WITH 24 DEGREES OF FREEDOM. SIGNIFICANCE = .000

NUMBER OF MISSING OBSERVATIONS = 3

END

1 0 0 6 8 6

FIN