THE ROLE OF ELECTRONIC MESSAGING IN THE
THE INTERMEDIATE BUSINESS CONTEXT

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

Carl Jay Case, B.B.A., M.B.A.
Denton, Texas
May, 1996
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Computer-Mediated Communication Systems (CMCS), including electronic mail, are a major facet of American business in an age when organizations are faced with the problem of facilitating more timely and cost-effective interpersonal communication. However, as information technology proliferates, it is critical that advantages, not disadvantages, be derived from its use.

This research examines the role of electronic messaging in business firms. The study presents a taxonomy of electronic mail uses, develops a theoretical framework for analyzing electronic mail impact, and investigates risks and advantages of electronic messaging. The research focus is intermediate-size firms.

The study employs a three-site case study design and uses multiple data sources including interviews, electronic mail messages, a user questionnaire, and a management questionnaire. Electronic mail messages were coded using computerized coding and human coders and analyzed using word and thematic content analysis. One organization is utilized
for theoretical model development. The model was next replicated using two additional organizations.

The study examined message content by distribution, characteristic, function, and context. Findings indicate dysfunctional electronic mail uses such as personal use and flaming have minimal incidence. Messages are directed, relative to workgroup orientation, with few messages sent to all mail boxes. Workgroup orientation is also related to distribution of influence messages. In addition, electronic messaging systems are utilized primarily for information presentation, internal data, administrative purposes, internal discussion, and not as a mechanism to expedite urgent communication. Moreover, storage of phone messages appears related to the presence or absence of a voice mail system. And, use of message attachments may be linked to message sophistication.

Overall, the study demonstrates the taxonomy and Impact Model provide a foundation for electronic messaging research. In addition, workgroup orientation is introduced as a factor affecting electronic messaging. The study closes with a discussion of implications and future areas of electronic messaging research.
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TABLE OF CONTENTS

ACKNOWLEDGMENTS viii
LIST OF TABLES ix
LIST OF ILLUSTRATIONS x

Chapter

1. INTRODUCTION 1
    Problem
    Purpose
    Research Questions
    Significance
        Intermediate Business
        Electronic Mail
    Definition of Terms
    Scope and Limitation
    Organization of the Dissertation

2. PREVIOUS RESEARCH 15
    Intermediate Business
    Electronic Mail
        User Characteristics
        Function
        Medium Characteristics
        Factors Affecting Usage
        Impact On The Organization
    Competitive Advantage
    Research Frameworks
    Summary

3. THEORETICAL FRAMEWORK 53
    The Research Framework
    Research Questions
    Research Propositions
    Summary

4. METHODOLOGY 63
    Case Study Research
    Subjects
P. Message Function Frequency for Individuals . . 204
Q. Message Function Frequency for Groups . . . 206
R. Message Function Frequency for Everyone . . 208
S. Message Function Frequency for Providing Info. . 210
T. Message Function Frequency for Requesting Info. . 212
U. Message Context Frequency for Internal Info. . 214

BIBLIOGRAPHY . . . . . . . . . . . . . . . . . . . . . . . 216
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Message Recipients</td>
</tr>
<tr>
<td>2</td>
<td>Variety of Communication Partners Within A Given Week</td>
</tr>
<tr>
<td>3</td>
<td>Message Characteristics</td>
</tr>
<tr>
<td>4</td>
<td>Messages Attached</td>
</tr>
<tr>
<td>5</td>
<td>Message Function</td>
</tr>
<tr>
<td>6</td>
<td>Message Context</td>
</tr>
<tr>
<td>7</td>
<td>Message Recipient Percentage</td>
</tr>
<tr>
<td>8</td>
<td>Message Characteristic Percentage</td>
</tr>
<tr>
<td>9</td>
<td>Messages Attached Percentage</td>
</tr>
<tr>
<td>10</td>
<td>Word Count Averages by Organization</td>
</tr>
<tr>
<td>11</td>
<td>Message Function Percentage</td>
</tr>
<tr>
<td>12</td>
<td>Message Context Percentage</td>
</tr>
<tr>
<td>13</td>
<td>Message Function for Individual Recipients</td>
</tr>
<tr>
<td>14</td>
<td>Message Function for Group Recipients</td>
</tr>
<tr>
<td>15</td>
<td>Message Function for Everyone Recipients</td>
</tr>
<tr>
<td>16</td>
<td>Message Function for Providing Information</td>
</tr>
<tr>
<td>17</td>
<td>Message Function for Requesting Information</td>
</tr>
<tr>
<td>18</td>
<td>Message Context for Internal Information</td>
</tr>
<tr>
<td>19</td>
<td>Word Count Averages by Study Factor</td>
</tr>
<tr>
<td>20</td>
<td>Research Observations</td>
</tr>
<tr>
<td>21</td>
<td>Research Findings</td>
</tr>
</tbody>
</table>
# LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Illustration</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>Theoretical Framework</td>
<td>56</td>
</tr>
<tr>
<td>3</td>
<td>Taxonomy of Factors</td>
<td>59</td>
</tr>
<tr>
<td>4</td>
<td>Impact Model</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Revised Impact Model</td>
<td>134</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Computer-Mediated Communication Systems (CMCS), including electronic mail, are a major facet of American business; and lower microcomputer costs and advances in communication technology are providing the impetus for the dramatic growth of CMCS organizational usage. However, organizations are overloaded with information (Landau, 1995; Valovic, 1995). Managers find it more difficult to function with the deluge of information in the form of voice mail, electronic mail, facsimile (FAX), and so on (Tetzeli, 1994).

Drucker (1994) suggests that the performance capacity of any organization in today's society will be based upon the quality and productivity of knowledge. Moreover, Mann et al. emphasize that "we are challenged by an explosion of unselected information--the edge belongs to those who have the right information;--and those who have it at the right time to apply it to their advantage" (1991, 403). Electronic communication may have an influential impact upon this "edge."

Purpose

The purpose of this research is to examine the role of electronic messaging in business firms. Objectives are to:
(1) develop a taxonomy of electronic mail uses, (2) develop a theoretical framework for analyzing the impact of electronic mail, and (3) investigate the risks and advantages of electronic messaging. The research focus is the examination of the role of information communication systems in intermediate-size firms.

The taxonomy and framework will serve as a foundation for future research which will establish the variables and relationships which promote the use of electronic mail communication and which result in advantage or disadvantage. The taxonomy will be created through the empirical investigation of managerial philosophy, user perception, and organizational communication processes relative to electronic mail. The framework will be developed based upon a thorough investigation of one organization. The robustness of the framework will be subsequently examined through the use of two additional organizations.

**Problem**

Organizations are faced with the problem of facilitating more timely and more cost-effective interpersonal communication in an age where the pace of change is accelerating. Alternative forms of internal communication include face-to-face (FTF) contact, the telephone, and the paper memo. FTF communication is time consuming. The telephone messaging system may result in telephone tag as message recipients in today's mobile
environment may not always be near their work station. The paper memo is easily misplaced and tedious to maintain. One growing alternative solution is to utilize electronic mail to facilitate communication.

Managers are finding it difficult to function in an environment of electronic information overload (Tetzeli, 1994). A current study of the most effective users of information technology suggests that electronic mail does not automatically cause the information productivity of a firm to increase (Strassman, 1995; Strassman, 1994). Moreover, in a recent survey (Moad, 1991), Information Systems (IS) executives state there is a rising tide of upper management skepticism over the benefits of Information Technology (IT) investments. Although the benefits are not detailed, executives state that skepticism over IT's payoffs have slowed IS budget growth dramatically. Peter Keen (Moad, 1991) states that IT spending is out of control and is failing to deliver measurable benefits. In a study by Malone, et al., from 1971 to 1989, results indicated that for every 1% increase in IT investment, the average firm employment only dropped .13% within two years (Aley, 1994).

Another challenge is long-term survivability. The annual death rate for businesses which had 500 or less employees was approximately 9.3 percent from 1980 to 1988 (U.S. Census, 1991). In particular, one year survivability rates for new manufacturing jobs from 1973 to 1988 for
business with 20-499 employees varied between 65% to 70% (Aley, 1993). Overall, the mortality of one out of every eleven businesses represents a tremendous cumulative annual burden on the economy.

A component of long-term viability is the ability to compete. Today, competition is based in an environment in which the main producers of wealth have become information and knowledge (Drucker, 1993). Porter and Millar (1985) suggest that executives should determine the role of IT in the industry structure and develop a plan for taking advantage of IT. Parsons (1983) emphasizes that in spite of technological advances, the ability to assimilate and apply IT lags behind available opportunities. Boynton and Zmud (1987) suggest that information technologies are being applied as a means of gaining competitive advantage by improving organizational effectiveness and efficiency.

Relative to impacts, researchers have neglected an important IT--electronic messaging systems. Organizations spend considerable funds and time communicating. Communication is important to coordinate organizational efforts. In particular, most businesses are already using electronic mail systems in the organization. However, maintaining and utilizing systems that may be unproductive or counter-productive are a waste of limited resources, resources which are more profoundly limited in the intermediate business arena.
As IT proliferates, it is critical that advantages, not disadvantages, be derived from its use. One danger is that electronic mail could negatively impact employee productivity and thus negatively impact organizational effectiveness. For example, time critical messages may not be read within the time frame required or the electronic mail system may be overburdened with junk electronic mail. Several chief executives of major computer companies have removed their name from their electronic mail systems because of the volume of junk mail (Zachary, 1994). Moreover, one firm disables the electronic mail system five hours per day so that employees can accomplish work (Zachary, 1994).

As a consequence of these problems, there will be loss of competitiveness. Furthermore, in that electronic messaging communication is in the early stages of its life cycle within the business community, other potential risks may not have fully surfaced. Thus, it is difficult to provide prescriptive and proactive assistance regarding electronic mail to business.

Compounding the problems is the lack of empirical research. Relatively little research has been executed with respect to IS in the intermediate business context, a growing and important context which accounts for 65% of the workforce and 24% of business establishments (Census Bureau, 1991).
Research Questions

The research question is:

"What is the impact of electronic messaging on the firm?"

Implicit a priori questions to consider include:

1) What are the benefits that result from the use of electronic mail?

2) What are the risks or potential problems that result from the use of electronic mail?

To address these questions: industry, organizational, technical, and individual factors governing the use of electronic mail were studied and analyzed. Answers to these questions are beneficial from two perspectives. Answers provide a research framework in which relational impacts can be tested so that advantages can be maximized and risks minimized. Second, practitioners will benefit from prescriptive and proactive assistance regarding electronic mail.

Significance

The scope and characteristics of organizations and IS are changing. Tom Peters (1989) emphasizes that this is the age of the hustling mini-company. Peters notes that the Fortune 500 in 1989 employed only 11% of the U.S. work force, down from 16% in 1979. Moreover, 46% of the 1979 Fortune 500 were no longer in existence in 1989. In a report to the President (1990), the Small Business
Administration (SBA) presented that during 1988 to 1989, although large-business-dominated industries grew in employment by 1.4%, industries dominated with firms employing 500 individuals or less grew by 3.2%. As a result, American business is evolving from large "big" businesses into smaller, intermediate units.

IS is also transforming. Technologies such as electronic messaging systems are becoming a popular and important facet of IS. Messaging is the sleeping giant that networking was five years ago (Berlind, 1992). Lower microcomputer costs, advances in communication technology, and the proliferation of local area networks (LANs) are providing the platform for the growth in CBMS organizational usage. International Data Corporation calculates that the number of U.S. LAN mailboxes will jump from the 1990 level of 2.7 million boxes to 19.6 million in 1994 and to 35.6 million users in 1995 (Dern, 1992). This represents an dramatic eleven-fold increase in a six-year period. The Electronic Messaging Association further estimates that in 1994, 60 million people will send electronic mail messages, a 50% increase from 1993 (Zachary, 1994).

Thus, this research is motivated by the explosive growth in electronic mail use and its unknown impact upon business firms and IS. The research is justifiable and important in the field of IS, with both theoretical and practical value.
The usage taxonomy and framework provide a basis for understanding the impact and implications of IT use. IT diffusion may affect customer service, internal communication structures, communication effectiveness, and ultimately the ability of the firm to compete. Past and present EM theorists have explored media richness, flow, acceptance, social presence, and so on with conflicting results. This study's investigation of EM impact on the firm helps explain the effect of distribution, function, and context upon the organization. Moreover, a research foundation is provided which permits exploration of the effective use of electronic mail communication. In addition, frameworks are necessary to facilitate and ratify the development of consensus among Management Information System (MIS) scholars with regard to the phenomena constituting MIS research (Cushing, 1990).

Results have practical value in assisting IS managers charged with implementing and supporting IT. A use taxonomy will influence the IS manager's approach in anticipating the effect of IT implementation. Findings will also aid management in determining how to maximize the benefits, identify the risks, and thus minimize the problems when using communication technology. For example, the manager may implement EM to increase communication effectiveness but may find that flaming and junk mail pervade the system.
In short, results will provide a foundation for understanding the potential impact of the technology. Moreover, the study calls attention to factors which impact communication effectiveness.

Definition of Terms

For the purpose of this study, a description of the key terms is provided.

Electronic mail is a computer-based messaging system that is generally asynchronous and "uses computer text-processing and communication tools to provide a high-speed information exchange service" (Sproull & Kiesler, 1986, 1493; Trevino and Webster, 1992).

Small business are establishments with less than ten employees. The Census Bureau (1991) estimates that small business employ 15% of the U.S. work force.

Intermediate business are establishments which have at least 10 employees, but less than 500 employees.

Large business are establishments with a minimum of 500 employees (U.S. Small Business Administration, 1990). Large business constitute .25% of the U.S. business establishments.

Scope and Limitation

The main limitation is the one-shot nature of the study. A stream of research which includes other research methods and organizations will be needed to strengthen study
results. Not all types of organizations are investigated, nor are all electronic mail systems examined.

Furthermore, the analysis is weakened by the self-reporting of perceived value, the inability to measure intangible benefits, and potential user self-selection of messages to store. Respondent fatigue is also an issue because of the level of depth and length of the survey instruments.

There may be researcher bias due to the nature of case study research and research obtrusiveness. Message coding may also introduce researcher bias. Bias, however, is minimized by using two independent coders and a mediator.

External validity is weakened because of the limited sample size. Internal validity is limited in that an experiment is not performed. Linkages and linkage strengths cannot be tested in a case study research approach because of the lack of control and inability to manipulate independent variables.

**Organization of the Dissertation**

This study is organized into seven chapters. Chapter Two contains a review of the research/literature relevant to this study. Chapter Three presents the research framework. Chapter Four describes the methodology used. It documents the subjects, data collection procedures, questionnaire development, and data analysis. Chapter Five describes an initial case study. It documents the organization
competitive strategy, user perceptions, electronic mail
system usage, and results of the content analysis. In
addition, it contains the proposed research model for the
study of electronic messaging. Chapter Six describes the
application of the model to two additional organizations.
Results are compared to determine the robustness of the
research model. Chapter Seven discusses the conclusions,
implications, significance of the research, and
opportunities for future study.


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CHAPTER 2

PREVIOUS RESEARCH

The subject for this study is the role of electronic messaging in business. Because of the interdisciplinary and pervasive nature of electronic messaging, the relevant literature in the business, sociology, psychology, and education domains are presented.

The literature is divided into four groups. The first group deals with IS research in the intermediate-size business context, a subset of business. The second group explores electronic mail, a subset of communications. The electronic mail section is further organized into five subsections. These subsections include user characteristics, function, medium characteristics, factors affecting usage, and the impact on the organization. The third literature group deals with competitive advantage, an area in which messaging may play a role. The fourth group presents research frameworks relevant to this study.

Intermediate Business

The literature review explores research in the realm of intermediate business, a subset of business. Research areas include MIS success, effectiveness of computer use, end-user computer satisfaction, and organizational effectiveness.
However, prior research has been limited with no consistent IS theme.

Raymond (1985) investigated the relationship between organizational characteristics and MIS success in businesses with between 20 and 250 employees. Raymond found that MIS satisfaction and usage will increase in businesses that implement a greater number of administrative applications, who implement on-line applications, whose MIS function is situated at a higher organizational level, who have in-house applications processing, and who develop a greater proportion of their applications internally.

DeLone (1988) surveyed manufacturing firms to identify characteristics related to the effectiveness of computer use. Effectiveness was measured through top management use of computer-generated reports and the CEO's rating of the business impact of the computer applications. Results suggest that CEO knowledge of computers and active involvement in the computerization effort was the strongest link to effectiveness. Employee enthusiasm for computer technology, length of time of computer use, and formal training were not linked to effectiveness.

Montazemi (1988) performed a mail survey to measure end-user computing satisfaction. Results indicate that end-user literacy and end-user participation in systems design are positively related to user satisfaction. No correlation, however, was found between the length of
Computer-Based Information System (CBIS) use and user satisfaction.

Raymond's meta-analysis of IS in small business provides an overview of the extent of smaller business research (1990). Authors have suggested that smaller businesses possess advantages such as rapid implementation of decisions, proximity to their markets, and greater capacity for adaption and reorientation. In addition, as managers have less computer experience and training, their expectations tend to be lower and their attitudes more favorable toward their organizational IS. Moreover, the strategic time frame or decision cycle is short term, with a reactive rather than proactive orientation. Finally, there is a lack of managerial expertise to plan, organize and control the use of information resources by the organization.

Murphy (1992) performed a case study to analyze electronic communication in smaller organizations from a theoretical perspective. Murphy notes that smaller organizations in the technical industries have more difficulty deciding whether electronic communication mechanisms are worthwhile.

Murphy created a model, based upon the Information Processing model of Tushman and Nadler, to analyze the fit between communication requirements and communication capabilities to maximize organizational effectiveness.
Contextual variables (e.g., environment, inter-unit relationships, and task technology) are hypothesized to affect information processing requirements (e.g., uncertainty and equivocality). Organizational design variables (e.g., structure, IT, and coordination mechanisms) are hypothesized to affect information processing capabilities (e.g., information quantity and information richness). Basically, as task variety increases, more effort should be directed toward information processing. Moreover, as equivocality increases, information-rich communication strategies should be used.

The author used a case study of a software-development company to illustrate the application of the fit theory. Murphy concludes that problems involving business communication can be "more easily understood by applying the theoretical models which relate organizational structure to information processing" (1992, 32). Moreover, organizations must match communication capabilities to needs if strategic ends are to be achieved.

**Electronic Mail**

The section presents research in the area of electronic mail, a subset of communications. Although the literature encompasses several disciplines, five themes are apparent. Themes include research identifying user characteristics, research describing the function or usage of the technology, research exploring medium characteristics such as media
richness, research investigating factors affecting usage, and research examining the impact on the organization.

User Characteristics

Komsky (1991) studied the differences between frequent and occasional electronic mail users. Research revealed that user preferences for electronic mail and telephone communication, concern for system problems, and ease of system use are "more important for discriminating among groups than forced compliance is" (1991, 328).

Waern, et al., (1991) monitored the introduction of a new electronic mail system in a workplace characterized by high needs of communication between people, both within the company at different locations and between the company and its clients. User experience was examined using Moran's "command language grammar" frame of reference. The frame of reference divides a system into four levels: task, semantic, syntax, and interaction. Results indicate that the users were satisfied with the system but knew little about the system, particularly at the semantic level. The semantic level refers to concepts and operations which are dealt within the interface between the user and the system. Moreover, neither prior computer experience or type of work tasks had an effect on the users' knowledge of the electronic mail system.

Mabrito (1991) compared group conversations of high and low apprehensive writers to determine peer group preferences
of FTF relative to electronic mail communication. Results suggest that high apprehensives participated more, offered more direction, and relied more on group comments received during electronic mail sessions rather than during FTF meetings. Moreover, the research indicates that electronic mail, rather than FTF communication, provides a more effective delivery system for peer evaluation and provides more interaction opportunities for peripheral members of an organization.

Dykman (1986) performed a field survey using three organizations to investigate the relationship between electronic mail system use and user satisfaction. Survey data concerning user satisfaction with the electronic mail system, user attitude toward computer-based systems, and managerial support for the electronic mail system was collected.

Dykman's results suggest a strong relationship between electronic mail use and user satisfaction. Correlates of system use included frustration with other communication means, attitudes toward computer-based systems, an increase in upward communication, and a decrease in FTF contact. Additional correlations of system use were perceptions of increased effectiveness of meetings, time savings, and increased travel effectiveness for individuals accessing the system remotely. Managers were also found to use the system
significantly more than professional/technical and clerical users.

Hjalmarsson, et al., (1989) explored how human factor aspects and system design may cooperate in the design of an electronic mail system. These researchers suggest that a task analysis is essential in system design. Results of a study indicated that users differed mainly in terms of the tasks they performed and wanted to perform. In addition, user comments indicated that electronic mail was used to compliment, rather than replace ordinary mail or the telephone.

Function

Sherblom (1988) examined electronic mail to discern the function of the mail and the impact of the medium upon the communication. Areas of study included the direction of the communication through the hierarchy of the organization, the communication function of the mail, and whether or not the mail contained a redundant signature. Direction was classified as upward, downward, horizontal, and from other offices. Function was coded as requests for information, providers of information, influence attempts, administrative items, personal and social remarks, and miscellaneous. The author used content analysis to examine the electronic mail messages received by a middle level manager of a large organization.
Results suggested significant differences in the communication function according to the direction of communication. Vertical mail was more restricted in function than horizontally directed mail. Vertical mail was also used primarily to exchange information. Presence or absence of a signature in the message further reflected the direction of mail through the organizational hierarchy. Subordinates and others signed mail significantly more often than superiors. In terms of function, mail designed to exchange information was sent more frequently than more complex communication functions such as personal, social, influence, and negotiated communication.

McCormick and McCormick (1992) explored the content of undergraduates' electronic mail. Content analysis was used to analyze the messages of 700 undergraduates over a 6-month period. Results indicate that less than 50% of the messages addressed work-related concerns. Electronic mail generally served a purely social function, with approximately 25% of the messages containing intimate content. There were few messages with hostile or socially inappropriate content. The most common reason for not using electronic mail was the inability to perceive the practicality of computer-mediated communication.

Smeltzer (1992) analyzed the relationship of message structure and message intent in computer-mediated communication (CMC). The author inspected electronic
bulletin board (BBS) communication to determine the general structural characteristics of the messages and to determine the relationship of message intent to the individual bulletin board categories. Message structure was factored into three divisions: message length, message complexity, and message readability. Message intent was identified by three categories: information requesting, information giving, and information neutral. Board type categories included technical, educational, and general.

Results indicate that the CMC environment was primarily used to obtain information. These requests generally occurred in the technical and general boards. Whenever the purpose of the message was to give information, the message length, the message complexity, and the message readability all increased. A CMC's board category had no apparent influence on the structure of the messages. Thus, identification of a message's board category was not a predictor of the complexity and level of sophistication of the CMC message.

Haeckel and Nolan (1993) propose that companies can use IT to manage by wire. Managing by wire involves using IT to augment the ability to react and assimilate changing environmental information. These authors utilized multiple case studies to illustrate that managers must assess a company's corporate IQ in terms of connecting, sharing, and structuring information.
Rice (1994) studied the relationship of electronic mail use and network structure to research and development (R&D) work networks and performance. Electronic mail usage of mentors and their summer interns was monitored. Results indicated the network and amount measures of electronic mail usage were significantly associated with work and work familiarity networks. As time passed, interns used electronic mail to communicate more outside their formal mentor-intern relations. Overall, most forms of communication were negatively associated with performance ratings. Rice suggests that it not necessarily how much one uses an electronic mail system, but how the user is positioned in the system's structural context, that affects R&D performance.

Schaefermeyer and Sewell (1988) investigated computer-mediated communication (CMC) over BITNET in an academic setting. These authors cite several prior researchers who studied how CMC is used to increase organizational effectiveness. Survey results indicate that electronic mail users utilize electronic mail to replace other communication channels such as telephone, letter, and FTF communication.

Ang, et al., (1993) examined the effects of IT and the perceived mood of the feedback giver on feedback seeking. The authors' proposition is the IT can be designed to mediate feedback communication and deliver feedback that promotes feedback seeking. For example, IT, such as using
electronic mail, can reduce dynamic social contextual cues by serving as a buffer between the seeker and the giver and can preserve the feedback-seeker's anonymity. Results illustrate that individuals using electronic mail sought feedback more frequently than individuals in the FTF feedback environment.

Phillips (1989) explored the political aspects of electronic mail. The study suggested that electronic mail was used for simple, direct requests, but also for manipulative, coercive ends. In essence, the communication was utilized as a tool for persuasion.

Dr. Sara Kiesler of Carnegie-Mellon University has found that electronic mail users use a much bolder communication style than most individuals would use in FTF conversation (Rheingold, 1992). The use of capital letters, denoting shouting, is an example. In addition, Rheingold states that it is easy to communicate on-line in a manner which is construed as being too familiar or personal.

Thompsen and Ahn (1992) explored the efficacy E-Prime through a study of copula deletion and flaming in electronic mail. E-Prime is a technique for increasing the awareness of abstraction through deliberate deletion of all forms of the verb "to be". Copula deletion is the omission of auxiliary verbs. Flaming is described as the heated exchange of messages expressing hostility or defensiveness towards others on a computer network. These authors
attempted to identify the characteristics of those individuals who are exposed to flaming. An computer program was used to administer an interactive questionnaire to users of a university electronic mail system.

Results indicated that less than half of those surveyed were aware of either copula deletion or flaming in electronic mail. Moreover, a fourth of the users experienced at least 25 flaming incidents during the past year while one-third experienced less than 5 flaming incidents. Results identified those individuals exposed to flaming spend more time working on the computer, received more electronic messages, and received a higher percentage of electronic mail from discussion lists.

The most frequently cited motivation for copula deletion was the desire to write messages quickly. No statistically significant relationship was found between copula deletion and flaming. Findings suggest that the omission of the verb “to be” does not by itself convey the advantages of E-Prime. In addition, the authors suggest that copula deletion and flaming are not as widespread in electronic mail in a university setting as they may be in other settings. Thompsen and Ahn hypothesize this may be due to the greater stigma attached to nonstandard English usage in a university environment.
Medium Characteristics

Schmitz and Fulk (1991) conducted research to study the effects of social influences from colleagues and perceived media richness of the use and assessment of electronic mail. The social influence model proposes that richness perceptions are influenced by the attitudes, statements, and behaviors of the individual's peers. The media richness model suggests that a primary objective is to reduce ambiguity through selection of media. Ambiguity reduction is a function of the media's capability to facilitate feedback, convey subtleties, communicate multiple cues, and present individually tailored messages. Electronic mail ranks third in media richness behind FTF contact and the telephone.

The study results indicate that perceived electronic mail richness varied across individuals and covaried with relational social influences and with media experience factors. Moreover, perceived richness could predict electronic mail use and assessment.

Zack (1993) utilized a multimethod case study to examine the fit between the interactivity of the chosen communication mode, i.e., electronic mail versus FTF, and the mode of discourse it was used for, i.e., alternation versus interaction/discussion. Findings suggest that matching the richness of the medium to the ambiguity or equivocality of the message results in more effective
communication. In addition, the author emphasizes that electronic mail complements, rather than substitutes for FTF interaction and that channel interactivity should be matched with the extent of interactive exchange required.

Lee (1994) employs a research approach of interpretism in general and hermeneutics in particular to study the electronic mail exchanged among managers in a corporation. Interpretive understanding is how an observing researcher understands human subjects to understand themselves and the world around them. Hermeneutics is a method for studying textual information and assumes that messages have meanings that extend well beyond their original author, intended audience, and culture surrounding the sender. Lee challenges the positivist theory of communication richness that assumes FTF meetings are far richer than electronic mail because of body language, tone of voice, and immediate feedback.

Results indicate that richness or leanness is not an inherent property of the electronic mail medium, but an emergent property of the interaction of the electronic mail medium with its organizational context. The interaction is described in terms of distanciation, autonomization, social construction, appropriation, and enactment.

Lee concludes that managers who receive electronic mail are not passive recipients of data, but active producers of meaning. They transform the data into information they find
meaningful. In addition, IS researchers need to dedicate attention to the actual processes by which the users of a communication medium come to understand themselves, their use of the medium, and their organizational context.

Durand, et al., (1989) conducted research using analysis of written and spoken predicate patterns to determine the possibility of maintaining interpersonal rapport while using electronic mail. These authors note that much interpersonal communication depends upon nonverbal cues, which may be significantly lost or reduced by electronic media. Sensory predicate analysis, i.e., matching verbs, adverbs, and adjectives which indicate the senses of visual, auditory, and kinesthetic, suggested that sensory predicates were used significantly more often in spoken communication than in written communication. There was no significant difference between usage in hand-written and electronic mail communication.

Walther (1992) studied the interpersonal effects in computer-mediated interaction. The author cites research in social presence theory, the lack of social context cues hypothesis, and media richness theory as addressing the lack of nonverbal cues in CMC. Walther alleges that CMC cannot convey relational information in the form of nonverbal cues in the same way that verbal communication can, thus creating impersonal and task-oriented messages.
A meta-analysis of media theories and empirical findings shows numerous weaknesses which include time limits used in experiments, the use of only verbal data, and criticism of coding procedures. Walther suggests that communicators develop individuating impressions of others through accumulated messages. Based upon these impressions, user may then develop relationships and express multidimensional relational messages through verbal or textual cues.

Factors Affecting Usage

Bostrom et al. (1988) explored the role of training as a motivator of electronic mail use. These researchers studied MBA students who were new program entrants that received or did not receive specialized training in the use of the electronic mail system and returning students who also had not received training. Dependent measures included student beliefs, attitudes, anticipated use of the system, and self-reported use of the system. Measures were taken at three points in time.

Results indicated that trainees had the highest perceived usefulness of the system at the outset of the semester. These authors suggested that unless follow-up assistance is provided after training, perceived usefulness of the system will fade.

Trevino and Webster (1992) investigated the effects of multiple variables on user evaluation and perceived impacts
of electronic mail and voice mail systems. These authors introduced "flow" as a construct which characterizes the perceived interaction with computer-mediated communication technologies as more or less playful and exploratory. The flow state, therefore, is self-motivating because it is pleasurable and encourages repetition. Study measures included flow, ease of use, management support, attitudes, communication effectiveness, quantity of communication, and communication barrier reduction.

Field study results suggested that flow, type of technology, perceived technology ease of use, and organizational factors such as management support and communication partners' medium use positively influenced employee evaluations and perceived impacts. These researchers conclude that systems which are designed to incite curiosity and interest, provide more user control, and focus the user's attention, may result in more positive changes in communication-related outcomes and in more positive attitudes.

Hiltz and Johnson (1989) examined three dimensions of acceptance (use, subjective satisfaction, and benefits) for computer-mediated communication systems (CMCS). The most common form of CMCS is electronic mail. Subjective satisfaction factors identified include satisfaction with the interface, feelings that the system's performance was productive and stimulating, ability of the CMCS to support
expressive interpersonal communications, and problems with CMCS as a mode of communication and information exchange. Benefit factors identified include impacts on productivity and impacts on career advancement. Productivity was operationalized as increased work quantity completed, quality of work completed, overall system usefulness, and whether the system made it easier to reach other people. These authors suggest that usage or subjective satisfaction alone are not adequate measures of a successful implementation. Use, subjective satisfaction, and perceived benefits may vary independently.

Childs (1991) describes seven steps which can be followed to create a successful electronic mail system. Childs views messaging as an extension of the thinking process, as opposed to the automation of telephone or FTF communication.

These following steps were used at LTV in Dallas, Texas to create a successful enterprise mail system. First, an electronic mail plan was developed which integrates the multiple, independent systems into a enterprise system. LTV moved from proprietary to standard electronic mail protocols and reduced the number of separate electronic mail implementations. Second, an electronic mail backbone was established that links the entire organization. Third, a critical mass of electronic mail users was established. To encourage LTV employees to use electronic mail, printed
messages were made inconvenient to distribute and use and services such as FAX and Telex were added to make the system more enticing to use.

Fourth, mail directories were synchronized and kept accurate, current, and complete. Fifth, once the internal communication system was implemented, intercompany electronic mail capabilities were developed. Sixth, mail-enabled applications were implemented. Finally, publicity was utilized to inform potential electronic mail users about the benefits of the electronic mail system.

Schlitz and Fulk (1991) conducted research to study the effects of social influences from colleagues and perceived media richness of the use and assessment of electronic mail. The social influence model proposes that richness perceptions are influenced by the attitudes, statements, and behaviors of the individual's peers. The media richness model suggests that a primary objective is to reduce ambiguity through selection of media. Ambiguity reduction is a function of the media's capability to facilitate feedback, convey subtleties, communicate multiple cues, and present individually tailored messages.

Results indicate that colleagues' social influences, mostly in the form of co-worker use, have pervasive effects on others' media assessments. These authors build "ego networks" composed of interconnected individuals who are linked by patterned communication flows to a focal
individual. Schlitz and Fulk found that the attitudes and technology-related behaviors of individuals converged with the average of the actual attitudes and behaviors of the individuals in their ego networks.

Another factor identified through interviews was the positive influence of the organization's CEO on electronic mail use. As a result, the researchers conclude that an explicit consideration of social influence aids understanding of use and perception of new IT.

Fulk (1993) conducted a field survey to analyze the social construction of communication technology. Findings indicate that social influences on technology-related attitudes and behavior were consistently stronger when individuals were highly attracted to their workgroups. In addition, compliance and internalization effects emerged. For individuals with low attraction, the specific patterns of influence were consistent with predictions from conformity research for compliance effects only. Thus, richness of a communication medium may be an important contributor to attitudes and behaviors related to the technology.

Fulk presents four implications for management. First, monitoring the organization's social system interactions during the early phases of communication technology implementation makes early detection and correction of difficulties possible. Second, early users should be
informal leaders and positively disposed toward the system. Third, training, advice, and leadership are methods of promoting effective use of technology when problems arise. Fourth, formal or informal peer training effectively uses social influence processes.

Straub (1994) explored the effect of culture on the diffusion of electronic mail and FAX. Knowledge workers in Japanese firms using FAX and using or considering electronic mail were sampled and compared with firms in the U.S. Study variables include social presence, perceived usefulness, ease of use, and usage. The primary media explored included electronic mail, FTF meeting, telephone, voice mail, FAX, government mail services, internal mail, overnight delivery courier services, and hand delivery. Results suggest that cultural effects play an important role in the predisposition toward and selection of electronic communication media. Uncertainty avoidance and complex written language symbols predispose Japanese workers against electronic mail, but in favor of FAX. Responses to traditional media such as FTF and telephone were similar between cultures.

Childs and Sheets (1992) demonstrated how management can regularly get users to tap into the vast amount of information stored on the organization’s computers. These authors, a project leader and the electronic mail administrator at LTV Aerospace and Defense Company in
Dallas, describe how LTV mail enabled its applications. LTV's system permits the 4,000 regular electronic mail users to access company information through a new window, the electronic mail front-end.

These authors found that electronic mail could be used not only for communication between individuals, but could be used to communicate with computers. Moreover, mail enabling may be utilized to communication from application to person. For example, at LTV, the disk storage management system automatically creates and sends mail messages to users prompting them to reduce disk space. Furthermore, the mail enabling may be in the form of communication from one application to another application. At LTV, the electronic mail directory synchronization system uses a central directory which is updated daily from employee IS.

However, several problems were encountered. Large volume requests of text may overload the system. In addition, the electronic mail interface does not have the help facilities which might be available through an on-line direct access into an application. Moreover, mail-enabled systems may circumvent chargeback systems, which are common in several organizations.

Authors suggest that to improve ease of system use, designers should establish basic standards, such as with regard to query syntax, and to listing which applications are mail enabled. In addition, these following applications
are especially suited for mail enabling: employee benefits, quality instructions, financial information, electronic mail directory services, production information, real-time data collection, vendor analysis, and news services.

Crum (1988) conducted a survey within the United States Department of Agriculture. She found factors which influence electronic mail use to include colleague pressure, organizational position, program area of responsibility, and type of equipment used to perform electronic mail.

Zack (1994) examined the use of electronic messaging versus traditional modes of communication in an ongoing workgroup performing a cooperative task. Traditional modes of communication include FTF, telephone, and written memo. The author explored the context surrounding why a particular communicate mode was chosen and its relationship to effectiveness. Results indicate that communication was more effective when FTF was used to build or share interpretive context where deficient, when leaner electronic mail was used to communicate within an existing shared interpretive context, and when communicators complied with communication procedure by choosing the expected mode of communication. Electronic messages might range from simple facts to moderately rich messages depending on the extent and richness of the shared context.
Impact on Organization

Crawford's (1982) study of Digital Equipment Corporation's electronic mail system revealed that most managers reported the electronic mail system increased their speed of decision making because information collection and staff coordination was facilitated. However, managers expressed concerns relative to information overload and electronic mail system abuse. Both managers and secretaries estimated that the electronic mail system saved them over seven hours per week.

Montgomery and Benbasat's (1983) literature review of CBMS articles illustrate the problems with prior methods of communication. These problems include: interruptions, time zones, record keeping, long-windedness, and so on. Intangible benefits of CBMS include more corporate awareness, a flattening of communication flows within the hierarchy, and a decoupling of the sender and receiver. CBMS problems include non-clerical worker resistance to the system, miscommunication as a result of a lack of nonverbal clues, and CBMS etiquette.

Sproull & Kiesler (1986) studied the ways in which electronic mail effects the patterns of information distribution within the organization. These researchers examined how social context cues regulate communication information exchange in electronic mail and other media. Results indicated users preferred to use electronic mail to
send messages to superiors rather than to subordinates. Users also preferred using electronic mail for sending bad news. In addition, 60% of electronic mail messages contained new information.

Eisenhardt (1990), in studying how managers make fast, yet high-quality, strategic decisions, found that certain executives favor electronic mail. Specifically, the executives studied avoided time delayed media such as memos because the memos were perceived as too slow and too dated.

D'Souza (1991) investigated the benefits of using electronic mail to disseminate instructional information. Results indicate that electronic mail removed time and distance barriers and led to greater communication among members of the class as well as between the instructor and the student. Electronic mail provided a greater opportunity for the instructor to offer individualized and personalized instruction. Moreover, students were able to share data, consult on issues, and query with group members.

Lea (1991) outlined the systems-rationalist perspective on computer-mediated communication. The rationalist perspective focus on efficiency and productivity of the system by determining the impacts of CMC. In terms of cross-media comparisons, the perspective predicts that costs and benefits are major determinants in media substitution. Study results indicate that electronic mail was construed as being similar to FTP communication on the dimension of
spontaneity and similar to written activities on dimensions such as asynchrony and emotional quality. Overall, the users construed CMC mainly in terms of its attributes as a medium for conversation and social interaction.

Mann et al. (1991) studied a state-of-the-art electronic communication and delivery system at Electric Power Research Institute. Electronic mail users stated they could stay in touch with many more people and more frequently using the electronic mail system.

The Process Quality Management and Improvement team at AT&T (Parker, 1992) suggested that electronic mail was fast, easy to use, flexible, and superior relative to alternative communication. The regular company mail was too slow and delivery uncertain. FAX was fast but involved paper. Moreover, the telephone was too time-consuming for a three-member team.

Mantovani (1994) challenged the technological deterministic approach which views computer-mediated communication as inherently apt to support democracy in organizations. The author examines research which claimed CMC results in equal access, openness, overcoming social barriers, and de-individualization.

Mantovani concurs with the network paradigm which emphasizes the social and organizational side of communication by refocusing attention toward individuals as actors in a network consisting of independent relationships.
embedded in organizational and social structures. The author submits that electronic mail use can alter rhythms and patterns of social interaction both powerfully and pervasively, neither positive or negative in themselves, but shaped by local contexts of use. Democracy depends upon the social context, history of the organization, and regulations ruling the specific network application. In addition, organizational changes due to CMC many include increased stress for employees and time management distortions.

**Competitive Advantage**

Competitive advantage research is significant to this study because electronic mail use may be a contributing factor to advantage or disadvantage. Competitive advantage is the resultant value that a firm creates for its clients or customers that exceeds the firm's cost of creation (Porter, 1985).

Porter and Millar (1985) state that in order to compete in the age of information, senior executives can follow five steps to take advantage of the opportunities afforded by the information revolution. These authors suggest that executives should assess information intensity, determine the role of IT in the industry structure, identify and rank the ways in which IT might create competitive advantage, investigate how IT might spawn new businesses, and develop a plan for taking advantage of IT. Porter and Millar do not,
however, limit competitive advantage to a specific size or category of organization.

Parsons emphasizes that in spite of technological advances, the ability to assimilate and apply IT lags behind the available opportunities (1983). Parsons includes Porter's five forces model within a three-level framework to assist managers in assessing the current and potential impact of IT on their businesses. In particular, Porter's model is used to identify how IT affects the key competitive forces at the firm level. Five forces include buyers, suppliers, substitution, new entrants, and rivalry.

Boynton and Zmud (1987) suggest that information technologies are being applied as a means of gaining competitive advantage in the marketplace. In addition, IS managers are improving IS and suggesting new applications to improve organizational effectiveness and efficiency. These authors state that any market advantage possessed by the IS function depends on technical and/or managerial expertise and an established line of information products or services. However, Boynton and Zmud emphasize that the IS function advantages decrease as other subunits become skilled in new technologies.

Neo (1988) performed a content analysis of 14 cases to explore which factors facilitate the use of IT for competitive advantage. Results revealed that existing systems are important for organizational deployment of IT
(IT) for competitive purposes. Other factors that are important in IT organizational decisions are external precipitating events, such as environmental threats and opportunities. In addition, Neo found that customer needs and management support are important factors facilitating the use of IT for competitive advantage.

Bharadwaj, et al. (1993) proposed a conceptual model for sustainable competitive advantage in service industries. The focus of the model is the organizational skills and resources underlying the competitive advantages of service businesses, and the moderating effects of the characteristics of services, service industries, and firms within an industry on the skills and resources underlying a business's competitive advantages. Potential sources of competitive advantages include resources and skills such as scale, communication good effects, functional skills, IT, customer service skills, and so on. Barriers include isolating mechanisms and resources/skills stock such as time compression diseconomies. Sustainability of competitive positional advantages relate to differentiation and cost advantage.

Hall (1993) constructed a framework linking intangible resources and capabilities to sustainable competitive advantage. Intangible resources include intellectual property, databases, reputation of products and company, employee know-how, the organization culture such as the
ability to react to challenge, and so on. Hall devised and tested a technique for identifying the relative contribution which the different intangible resources make to competitive advantage. Case study results suggest that the most important resources are reputation, followed by employee know-how.

Peteraf (1993) explored the underlying economics of the resource-based view of competitive advantage. The author creates a model with four cornerstones to competitive advantage: superior resources (heterogeneity within an industry), ex post limits to competition, imperfect resource mobility, and ex ante limits to competition. Peteraf suggests that all four conditions must be met to sustain competitive advantage. Overall, the basis assumption of resource-based work is there is heterogeneity or firms with different levels of efficiency and resources necessary to produce more economically and/or better satisfy customer wants. Moreover, heterogeneity must be preserved and resources cannot be traded.

Day and Nedungadi (1994) studied the mental models or representations that managers use regarding competitive advantage. Findings identify four different types of models which managers use to simplify and impose order on complex and ambiguous competitive environments and isolate points of competitive advantage or deficiency. Models varied in the emphasis placed on customer-based measures (e.g., customer
satisfaction, customer ratings, and loyalty), competitor/cost-based measures (e.g., relative profit, relative cost, and size of resources), and market share. Four models derived are labeled self-centered, competitor-centered, customer-oriented, and market-driven. Representations were equally influenced by the environment and choice of competitive strategy.

Platt (1990) utilized a case study to examine the factors related to the selection, design, development, implementation, use, and effects of an IS intended to generate competitive advantage. Results identified factors having a fundamental impact on competitive advantage. Factors include rapid implementation, presence of a system advocate, management advocation of proactive use of IT, and IS differentiation of the company from industry rivals.

Sethi and King (1994) developed the construct "Competitive Advantage Provided by an Information Technology Application" (CAPITA) to measure the extent to which IT provides competitive advantage. CAPITA is defined as the benefits accruing to a firm in terms of changes in the firm's competitive position, that are caused by a single IT application. Dimensions of CAPITA include primary activity efficiency, support activity efficiency, resource management functionality, resource acquisition functionality, threat, preemptiveness, and synergy. CAPITA can thus form the basis of a preliminary measure or index of competitive advantage.
**Research Frameworks**

The research framework is based upon the frameworks of Chervany, Dickson, and Kozar (1972); Lucas (1973); Nolan and Wetherbe (1980); and Ives, Hamilton, and Davis (1980). Each framework is briefly described.

Chervany et al. (1972) constructed an experimental gaming framework for investigating the influence of MIS on decision effectiveness. Independent constructs include the decision maker, the decision environment, and the characteristics of the IS. The dependent construct is decision effectiveness.

Lucas (1973) developed a descriptive model of IS in the context of the organization. Variable classes include management action, IS department policies and attitudes, contact involvement, user attitudes and perceptions, quality of system, use of system, analysis action, performance, situational and personal factors, and decision style.

Nolan and Wetherbe (1980) presented a comprehensive framework for MIS. The framework is composed of a series of models which include the transformation process (hardware, software, database, procedures, and personnel subsystems), the organizational system (goals and values, technical, structural, managerial, and psychosocial subsystems), and the overall model of MIS and its environment.

Ives et al. (1980) developed a model for IS research which includes three IS environments, three information
processes, and the information subsystem itself. Environments include the user, IS development, and IS operations environments. Processes include the use, development, and operation processes.

**Summary**

The chapter reviewed research/literature relevant to this study. Research/literature is organized into four groups: IS research in the intermediate-size business, electronic mail, competitive advantage, and research frameworks. The electronic mail section is further categorized into five subsections. These subsections include user characteristics, function, medium characteristics, factors affecting usage, and the impact on the organization.
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CHAPTER 3

THEORETICAL FRAMEWORK

The purpose of this research is to examine the role of electronic messaging in the organization. The conceptual research overview is represented in Figure 1. The overview illustrates two dimensions of research domain:

![Figure 1 Overview](image)

Communication Usage:
- Internal *
- External

Organization Context:
- Small
- Intermediate *
- Large

* Area of study in the research
communication usage and organization context. Electronic communication usage is characterized as either internal communication or communication to external entities. Organization context is segmented into small, intermediate, and large business. The research focus for this study is the internal communication within the organization in the intermediate context.

This chapter also presents the theoretical research framework. In addition, the research question and two implicit a priori questions to consider are introduced. Finally, four research propositions are made.

The Research Framework

The research framework is presented in Figure 2. The framework utilizes the constructs of organizational factors, industry factors, technical factors, individual factors, and impact. These constructs are based upon four previous frameworks: Chervany, Dickson, and Kozar (1972); Lucas (1973); Nolan and Wetherbe (1980); and, Ives, Hamilton, and Davis (1980). Each construct's relationship to the previous frameworks is briefly described.

The "organizational factors" construct is a composite of the Nolan and Wetherbe managerial subsystem, the Kozar situational variables, and the Ives et al. user environment. The managerial subsystem relates the MIS to its environment in areas such as setting goals, developing strategic and operational plans, and establishing control processes.
Situational variables include competitive environment of the organization. The user environment is the environment surrounding the user and can be described by the user's organization.

This construct is also a function of Porter's (1980) taxonomy of firm strategy. The taxonomy can be used to characterize the firm's competitive advantage strategy. Porter (1980) states that successful firms implement one or more of the following generic strategies: cost leadership, differentiation of products or services, and focus or concentration on a particular market or product niche.

The "industry factors" construct is based upon Porter's (1985) five forces model. The model can be used to
determine the industry's attractiveness based upon the factors of the threat of new competitors, the threat of substitute products, the bargaining power of suppliers, the bargaining power of buyers, and the rivalry among existing competitors.

The "technical factors" construct is derived from the Nolan and Wetherbe technical subsystem and the Ives et al. operations process. The technical subsystem involves the knowledge required to perform the various tasks used directly or indirectly in the transformation of inputs into outputs. The operations process is the physical operation of the system and can be measured by resource use, performance, and service to users (e.g., turnaround time, availability, error rates, and so on).

The "individual factors" construct originates from the Nolan and Wetherbe psychosocial subsystem, the Dickson et al. decision maker, and the Kozar system use and personal variables. The psychosocial subsystem relates to individual behavior, motivation, and status. The decision maker includes indirectly acquired attributes such as aptitudes and attitudes; and directly acquired attributes such as training and experience. System use is operationalized by the number of messages sent. Personal variables include variables such as age, education, and length of service. Although four independent constructs have been suggested, this study focused on the user construct.
The "impact" construct is a combination of the Kozar performance, user attitudes, and perceptions and the Ives et al. use process. The performance variable is operationalized by sales, profit, return on investment, and so on. User attitude and perceptions relate to IS quality. The use process focuses on usage of the system by the primary user and is measured by task accomplishment leading to productivity and decision quality effects.

Framework constructs and factors are presented in 3. Advantage, neutrality, and disadvantage are determined through tangible and intangible benefits as perceived by top management and electronic mail users. In addition, impact is measured relative to customer support time, communication effectiveness, message function, and so on.

Appendices A and B provide a listing of study factors, surrogates, and data types. Surrogate measures include: task, message dispersion (e.g., the number of letters forwarded, carbon copied, and sent to groups), message type (e.g., memos and meeting scheduling), and so on. In addition, surrogates identified by Trevino and Webster (1992, 554) are utilized. These constructs and surrogate measures include communication effectiveness (e.g., keep others up-to-date, size of my communication network, and speed of information sharing), quantity of communication (e.g., communication initiated by me, received by me, and
Figure 3  Taxonomy of Factors
information overload), and communication barrier reduction (e.g., barriers to communication and useless messages received).

Research Questions

The research question is:

"What is the impact of electronic messaging on the firm?"

Implicit a priori questions to consider include:

1) What are the benefits that result from the use of electronic mail?

2) What are the risks or potential problems that result from the use of electronic mail?

To address these questions: industry, organizational, technical, and individual factors governing the use of electronic mail were studied and analyzed.

Research Propositions

The research question is used to postulate several research propositions. For example, propositions include:

1) Less than 10% of messages are used for personal purposes.

2) Less than 10% of messages are used for flaming.

3) More than 50% of messages are used for one-to-one distribution.

4) More than 50% of messages are used for providing information.

It is posited that communications:
1) are lean, containing minimal "chit chat"
2) contain a minimal amount of flaming
3) are directed, used primarily for one-to-one discussion
4) are used more for information giving than requesting

Summary

This chapter presented an overview and the theoretical research framework. The framework is based upon four previous frameworks and utilizes the constructs of organizational factors, industry factors, technical factors, individual factors, and impact. In addition, the research question and two implicit a priori questions to consider are introduced. Questions explore the benefits and risks that result from electronic mail use. Finally, four research propositions are made.
CHAPTER BIBLIOGRAPHY


The study employs a multi-site case study design. It examines factors related to the impact of electronic messaging upon business firms. Due to the lack of research in this domain, this study is exploratory.

One organization, henceforth labeled organization "A", was investigated in the initial study. Two additional organizations, designated organizations "B" and "C", were examined in the second study.

The study uses multiple data sources. These data sources include interviews, electronic mail messages, a user questionnaire, and a management questionnaire. Using multiple methods of data collection offers the opportunity for triangulation and lends greater support to the researcher's conclusions (Benbasat, Goldstein, and Mead, 1987).

Case Study Research

The case study approach is used rather than the ethnographic approach in that the specific questions of study are defined and the field work is carried out in a targeted rather than longitudinal fashion (Yin, 1989). The ethnographic approach, on the other hand, is characterized as one in which the investigator seeks to challenge the
logical positivist position, gain a detailed rendition of the real world, and continue fieldwork for long periods of time.

According to Yin (1989), the researcher may be able to use analytic generalization from the case study. In analytic generalization, a previously developed theory is used as a template against which to compare the empirical results of the case study. If two or more cases are shown to support the same theory, replication may be claimed.

Benbasat, Goldstein, and Mead (1987) emphasize case study research is a viable IS research strategy because the IS can be studied in a natural setting and the case method allows the researcher to answer "how" and "why" questions. These authors state the approach is appropriate in an area in which few previous studies have been conducted and the boundaries of phenomenon are not clear at the outset of the research. Moreover, multiple-case designs are desirable when the intent of the research is description, theory building, or theory testing. Benbasat, Goldstein, and Mead caution that site selection should be carefully thought out rather than opportunistic.

There are several benefits in using the case research design. The researcher can capture practitioner knowledge and develop theories, understand the nature and complexity of processes, and conduct detailed analysis of an individual or group phenomenon in a natural setting (Benbasat,
Goldstein, and Mead, 1987). In addition, the researcher may employ multiple data collection methods such as interviews, direct observation, and review of documentation, archival records, and physical artifacts.

An example of a successful case study utilized in the field of IS is the Platt (1990) study of competitive advantage. Platt (1990) utilized a case study to examine the factors related to the selection, design, development, implementation, use, and effects of an IS intended to generate competitive advantage. Results provided a clear understanding of how and why the firm developed the IS.

Case research can be criticized. The researcher may have less a priori knowledge of what the variables of interest will be and how they will be measured (Benbasat, Goldstein, and Mead, 1987). Case research is not an experimental design. Thus, the researcher may not have control over the independent variable and variable manipulation may be limited. Moreover, the research may be obtrusive, time consuming, difficult to replicate, and biased due to nonsystematic data collection, condensation, or interpretation.

Lee (1989) presented four methodological problems that can be identified in MIS research that is conducted in the form of case studies. Problems include making controlled observations, making controlled deductions, allowing for replicability, and allowing for generalizability.
Lee suggests using natural controls or treatments to make controlled observations. The researcher should seek naturally occurring events or characteristics that appear in the organization environment. To respond to the problem of controlled deductions, Lee emphasizes that mathematics is a subset of logic and that logical deductions in the general case do not require mathematics. Thus, an MIS case study that performs deductions with verbal propositions (i.e., qualitative analysis) is therefore still carrying out the task of making controlled deductions. Moreover, generalizability poses no more or less a problem than in the natural sciences. Generalizability is a quality describing that a theory has been tested and confirmed in a variety of situations. This study addresses the weakness of replicability by using three organization case studies.

Yin (1991) outlines an approach to case study research. The researcher should define specific questions of study, emulate logical positivism in developing rival hypotheses, collect external evidence bearing on these questions, and carry out fieldwork. A good research design should force an investigator to (1) articulate the objectives and questions of the study, (2) link the objectives and questions to the basic unit of study, (3) identify the critical evidence that will support the major (or rival) hypotheses of the study, (4) stipulate analyzing techniques, and (5) provide clear direction for generalizing the results.
Subjects

The unit of study is the organization unit. The target population is U.S. organizations which have implemented an internal electronic mail IS, have at least 10 employees, have less than 500 employees, and have more than five electronic mail accounts.

Microsoft Mail® and Lotus cc:Mail® were selected as the electronic mail packages for the study. These software packages were chosen because of their wide acceptance and commonality of functions. Practitioner literature consistently rate these two packages as the best and most popular electronic mail products (Burden, 1994; Stewart, 1995). A recent user survey evaluating client functionality such as creating and sending mail found that both packages were rated similarly (Burden, 1994).

The sample population includes three U.S. service organizations. One organization is utilized for the initial study. A theoretical model was developed from the initial study. The model was next replicated using two additional organizations.

Interview subjects come from two groups. The first group is the company management. Management provided written permission (Appendix B) for the study to be conducted. In addition, management supplied company demographic information. The second group is electronic mail users within the organization. Each participant signed
a consent form (Appendix F) granting the researcher permission to read and copy his/her electronic mail message archives to disk.

Data Collection

The study utilizes a two-phase multimethod data collection procedure. The first phase involved structured interviews with management and users using questionnaires. A management questionnaire was utilized to collect company demographic data. A user questionnaire was utilized to collect user data regarding electronic mail usage. Questionnaires were administered in written format, with verbal prompting.

The second phase involved collecting electronic mail messages. Each participating user set a default software flag which would automatically store all outgoing messages into an ASCII file. ASCII files were collected and stored electronically by the researcher at the conclusion of the data collection phase.

Questionnaires

Two interview questionnaires in this study were created by the author to assess attitudes and obtain demographic data pertinent to the study. Question content was adapted from the concepts identified by Trevino and Webster (1992), Smeltzer (1992), Platt (1990), and Sherblom (1985).

The management questionnaire was developed to assess management's perception of the systems' usage. In addition,
the questionnaire is used to determine industry structure and the organization's competitive strategy. A preliminary version of the questionnaire was evaluated by three management professionals at a northeastern United States university. Minor structural modifications in the questionnaire were made to increase question clarity. The management questionnaire is presented in Appendix C. The final version of the questionnaire was used on all subsequent observations.

The user questionnaire was developed to assess user perceptions of the electronic mail system and individual usage. A preliminary version of the questionnaire was evaluated by 38 students enrolled in computer classes at a northeastern United States university. All students were users on the university's internal electronic mail system. Minor structural modifications in the questionnaire were made to increase question clarity. The user questionnaire is presented in Appendix D. The final version of the questionnaire was used on all subsequent observations.

Data Analysis Overview

Data analysis began at the end of the initial study's data collection phases. Interview and content analysis findings from the initial study formed the basis for the framework model. Transcripts from the interview questionnaires were summated and analyzed by counting
responses, isolate themes, and organizing content. As a result, usage statistics and patterns could be discerned.

Electronic mail messages were analyzed entirely using content analysis. Recording units for the research included words and themes collected from the messages. Messages were converted into a computer-based system to improve the ease of message coding and tabulation. Thus, an electronic coding sheet was used for both search word counts and to summate human-coded data. The coding form is illustrated in Appendix G.

Messages were exported from Microsoft Mail® and Lotus cc:Mail® in WordPerfect 4.2 and ASCII formats. These messages were next converted into a " .DBF " database format for use in FoxPro®, a microcomputer-based database management system. The conversion program and electronic coding sheet program were created by the researcher. Message components were electronically parsed into individual fields such as subject, date, priority, sender, recipient, message, and so on. The structure of the file was then modified to incorporate the coding fields. Coding fields included fields such as message urgency, internal versus external use, and number of messages attached. The file structure is displayed in Appendix H.

Messages were coded using computerized coding and human coders. A representation of the computerized coding algorithms is contained in Appendix I. Coding fields such
as audience, urgency, and carbon-copied were coded and summated using the algorithms listed. Word searches were used in instances such as determining urgency.

Remaining coding fields were coded by human coders into the computerized coding sheet. Coding algorithms are contained in Appendix J. Messages were coded by two independent coders. Coding discrepancies were mediated by a third coder. Analysis concentrated on data domains relative to message function, distribution, and content. A FoxPro® program was used to tabulate and generate computerized counts.

Data analysis was repeated in full to analyze the results of organizations "B" and "C". Results of all organizations were compared and contrasted. Finally, to assure the validity of the findings, the results were reviewed and validated with the participating management.

A Review of Content Analysis

Content analysis is a qualitative research technique that uses a set of procedures to classify or categorize communications to permit valid inferences to be drawn (Weber, 1990; Holsti, 1969). Inferences can be generated about the values, attitudes, and intentions of individuals by identifying characteristics in text messages (Morris, 1994).

Content analysis has been used in several disciplines. McCormick and McCormick (1992) explored the content of
undergraduates' electronic mail. These researchers used content analysis to determine whether messages were work-related, served a social function, were hostile, or were socially inappropriate.

Sayre (1992) outlined a method for using content analysis of print media to answer questions about how to present products for effective consumer advertising. Sayre found content analysis especially useful in studying research questions in two situations. Situations include when available information or resources are limited and when language and mode of expression are crucial to message delivery. Advertising formats, visual symbols, and consumer values were quantified systematically by coders.

Sayre cautions that the coding form and instructions must be constructed so coders can analyze objectively. Using content analysis, however, the researcher was able to address the research questions. In addition, the analysis provided a understanding of the competition, the company's position in the marketplace, and a thick, descriptive profile of their consumers. Sayre emphasizes that researchers can retrieve a wealth of useful information for understanding the characteristics and motivations of consumers.

Neo (1988) used a content analysis of 14 cases to reveal that existing systems have been important for organizational deployment of IT for competitive purposes.
The researcher found that customer needs and management support are important factors facilitating the use of IT for competitive advantage.

There are a plethora of further examples of researchers employing content analysis. In this study, archival content analysis is chosen to examine how users utilize electronic mail in their organization.

A product of archival research is naturalness (Kidder and Judd, 1986). Naturalness has the dimensions of natural behavior, natural setting, and natural treatment. Advantages of naturalness are described by Kidder and Judd. The assumption that subjects will not shape their behavior to take account of being studied may lead to greater generalizability or external validity of the research results. Unobtrusively observed behavior is likely to reflect the desired construct to a greater extent than other types of methodologies, thus contributing to construct validity. Other advantages are that the analysis may generate new hypotheses, reveal previously unsuspected empirical relationships, and identify limits of theories. One disadvantage is that the natural setting often limits the researcher's ability to control extraneous factors that introduce error and reduce reliability. Thus, internal validity is weakened.
**Human Coding**

Steps in human scored content analysis (Morris, 1994) include defining the text unit to be analyzed, developing categories for classification and coding rules for each category, training coders to classify text using coding rules, coding a sample of the text by multiple coders and assessing reliability. If the reliability is acceptable, then the coders can apply the coding rules to all text. If the reliability is not acceptable, the researcher should continue training and testing until acceptability is reached.

Common coding units are a word, theme or assertion, paragraph, item, characters, group, object, institution, and space or time (Budd et al., 1967). An assertion is a single thought unit or idea unit that conveys a single item of information extracted from a segment of content. A theme is an assertion about a subject matter.

Categories should reflect the purposes of the research, be exhaustive, be mutually exclusive, independent, and be derived from a single classification principle (Holsti, 1969). Control is exercised through the use of multiple media, e.g., newspapers, magazines, and radio (Kidder and Judd, 1986).

Kidder and Judd (1986) suggest that the analysis requires objectivity in coding categories to assure reliability, systematic application of these coding systems.
across a representative sample of material to control observer bias, and consistency in theoretical aims so that the findings can be related to relevant variable or variables. In addition, semantic validity must be demonstrated (Krippendorff, 1980). Semantic validity is the extent to which persons familiar with the language and texts agree the list of words placed in the category have similar meanings or connotations. This validity can be established through the use of multiple coders.

As a technique for analyzing message content, content analysis is an ideal tool for observing and analyzing the overt communication behavior of selected communicators (Budd, Thorpe, and Donohew, 1967). Moreover, the researcher can use historical or current documents.

There are potential weaknesses. Coding is subjective, thus bias may be introduced in coding (Kidder and Judd, 1986). Human coders may have difficulty in remembering complex coding rules and applying them consistently, thus reliability is an issue (Morris, 1994).

**Computer Coding**

Morris (1994) compares human-coded content analysis to computerized coding of the same text communications. The researcher performed content analysis of corporate mission statements to compare coding techniques. Results indicate that the computerized content analysis scheme for mission statements had an acceptable level of semantic validity for
the analysis of most mission elements. Moreover, the human coded categorization of the text was in agreement. Morris concludes that better reliability, improved stability, and comparability of results suggest more extensive use of computerized content analysis in future research.

By formalizing coding rules through the creation of computer content-coding schemes, Morris claims that perfect coding reliability is obtained. Validity and reliability of text classification in human-scored analysis can be achieved by demonstrating the extent to which multiple coders code the text in the same way. Individual-word count systems classify the text by assigning words to pre-specified categories. Simple computerized coding systems which perform individual word counts are considered superior due to their cost effectiveness and near perfect reliability (Rosenberg, Schnurr, and Oxman, 1990). However, the classification scheme must be reliable in terms of consistency and reproducibility if valid inferences about the symbolic content of the message are to be drawn (Morris, 1994).

Weber (1990) describes additional advantages of computerized content analysis over human coded analysis. There is perfect stability of the coding scheme because the computer always applies the coding rules in the same way. Explicit coding rules yield formally comparable results. Word frequency counts can be generated faster and easier.
Moreover, computerized coding frees the researcher to concentrate on other aspects of the inquiry such as interpretation and explanation.

There are limitations which may impact the validity (Morris, 1994). Software natural language processing capabilities limit analysis when ambiguous concepts are studied. The software also has the inability to recognize the communicative intent of word usage and to resolve references back or forward to words appearing elsewhere in the text. Moreover, there may be an inability of the researcher to provide an exhaustive listing of key words for a category.

Summary

Content analysis is a technique used in various domains. Human-coding is advantageous in coding ambiguous meanings and interpreting meaning. Computer-coding is faster and easier when generating word counts. This study employs a hybrid approach which maximizes the advantages of each coding strategy.

Limitations and Key Assumptions

No classification methods have yet been created for the classification of IS variables. Thus, researchers are required to create their own coding systems. Consequently, the cross-comparability of research studies is limited.

Second, there is potential for the Hawthorne effect. Users may modify their normal message content as a result of
being studied (Kidder and Judd, 1986). The effect is minimized for the messages that were stored before the study began.

Third, there may be bias in coding. The bias effect is minimized by using multiple coders.
CHAPTER BIBLIOGRAPHY


An initial case study was conducted to identify individual factors which relate to electronic mail impact. Data was collected using a management questionnaire instrument, a non-management user questionnaire instrument, interviews, and archived electronic mail messages. Questionnaires were administered in written format, with verbal prompting.

The case study utilized both management and non-management user perspectives. Within the two domains, several variables were explored. These variables include barriers to communication, user experience with IT, user experience with electronic mail, training, message distribution, message content, user perception of the system, communication effectiveness, and evaluation of competitive advantage.

Organization Profile

The initial study organization is a retailing institution in the northeastern United States. Organization "A" has annual sales of approximately $3 million in the consumer electronics industry. The primary sales emphasis is in the computer hardware, computer software, film processing, cellular phone, camera, and satellite domains.
Although the primary profit center has traditionally been in the retail sales area, in the past three years there has been a dramatic shift to the service aspects of the business. Computer repair, network installation, hardware/software technical support, and other service functions now account for an increasing percentage of the profit.

The organization's primary competitive advantage strategy is "concentration on market or product niche." The organization competes in a 50-mile radius of the northeastern city. There is a potential market of 250,000 people, of which 6,000 customer names are in the company's sales database. Primary sources of competition are from a similar-size local computer retailer, national wholesaler chains, and mail-order companies.

Although the business has been in existence for 57 years, the internal electronic mail system has been utilized for only 10 years. Only one workgroup utilized the system for the first seven years. The remainder of the staff was brought on-line three years ago.

The organization uses Microsoft Mail®, a system which operates in both the Macintosh and MS-DOS platforms. The electronic mail system permits automatic storage of outgoing and incoming messages. Sales personnel primarily utilize Macintosh systems while the administrative users prefer the MS-DOS and Windows systems. A gateway was installed so that
all employees are seamlessly interconnected. The Macintosh mail system was solely used until the MS-DOS platform was installed in 1991.

There are 25 full-time personnel and three part-time personnel. Six of the full-time personnel are designated as management by the organization. The remainder of the employees perform sales, administrative, technical support, and logistical functions. All of the management personnel participated in the case study. The president and vice president provided written consent for the study. Nine of the non-management full-time employees also participated.

A total of 1617 messages were provided by the users. Message dates span a 2 ½ year range, from November 1992 to March 1995. Approximately 1200 of the messages were created prior to the initiation of the study. Remaining messages, containing correspondence during the one month data collection period, were created after user permission was granted. A systematic sample of every tenth message from the total population of messages was coded and analyzed. The sample was withdrawn from the population and stored in a separate file. A second systematic sample of every tenth message remaining in the original file was coded and analyzed. Finally, a third systematic sample of every tenth message remaining in the original file was coded and analyzed. The total sample file contained 539 messages.
Electronic mail messaging is strongly encouraged by top management (the president and vice-president). Much of their communication to employees is through the electronic mail system. The system was implemented on a workgroup basis in which the computer infrastructure was developed to accommodate the electronic mail system. Microcomputers were placed upon the desks of all members of each group and communication was required by top management.

**Barriers to Communication**

Subjects described various barriers to communication which exist within the organization. The most common barrier is the inability to discuss issues face to face (FTF) because the party which he/she wishes to speak to is talking on the phone, interacting with a customer, or not in the office. A second barrier relates to the electronic mail system. One subject noted that poor system response time, non-use of the electronic mail system, and lack of electronic mail knowledge inhibit communication.

A third barrier is the lack of sufficient time. There is not enough time to process all of the necessary communications. In addition, there is an inability to retrieve data to answer time relevant questions in a cost effective manner due to the volume of questions. A fourth barrier is miscommunication. The president finds it difficult to communicate important strategies and goals to employees. Other employees emphasize that office noise and
inaccurate messages regarding customer contacts and requests contribute to misunderstandings.

**User Experience**

Subjects received minimal electronic mail training. One employee received two hours of training and a second person received one-half hour of training. The lack of training may be related to the user computer experience level. Users have a high degree of familiarity with computers and electronic mail. User computer experience varied from 4.5 years to 18 years, with a mean of 10.8 years. Electronic mail experience varied from 6 months to 7 years, with a mean of 3.5 years.

Management and non-management users are active electronic mail participants. The average number of messages sent and received per week was 26 for management and 23 for non-management. 80% of the respondents indicated that he/she communicated, i.e., sent or read messages, daily on the electronic mail system.

Information float, the length of time a message is in the system unread, was less than one day but varied between types of users. Management reported that mail would remain unopened in their mail box from approximately four hours to one day. Non-management personnel indicated that their float time ranged from 10 minutes to 2 hours. Moreover, participants perceive that his/her information float time is approximately the same for the other message recipients on
the system. Thus, float time is relatively short and non-management personnel indicate a more active perusal of the mail communication.

**User Perception of the Electronic Mail System**

System users characterized the electronic mail system in a positive manner on factors of ability to keep others up-to-date, speed of information sharing, ability to reach people, and control over his/her communication. Moreover, personnel perceived low electronic mail information overload with the system. However, within four criteria, management and non-management differed. Management characterized the electronic mail system as increasing the effectiveness of his/her communication, the quantity of work output, the speed of decision making, and the overall quality of work. Non-management generally described electronic mail as having neither a positive or negative effect on these criteria. Overall, subjects characterized the electronic mail system as having a positive influence on efficiency and effectiveness.

**Message Distribution**

The system was utilized primarily as a tool for one-to-one communication. Both subject interviews and message content analysis confirm that the majority of mail was sent to one communication partner. Table 1 reveals that 81% of the messages were sent to one individual. Subjects characterized the frequency of electronic mail communication
within workgroups as medium-low. Approximately 18% of the messages were sent to a group. A group is defined as more than one recipient but not the entire organization. Only 1% of the messages were sent to all the mail boxes. Thus, results suggest that the electronic mail is directed, primarily utilized for the individual and not the group audience.

<table>
<thead>
<tr>
<th># of Recipient Addresses</th>
<th># of Messages</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>437</td>
<td>81%</td>
</tr>
<tr>
<td>2-10</td>
<td>95</td>
<td>18%</td>
</tr>
<tr>
<td>Everyone</td>
<td>7</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 1. Message Recipients

<table>
<thead>
<tr>
<th># of Partners</th>
<th># of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>0</td>
</tr>
<tr>
<td>2-3</td>
<td>3</td>
</tr>
<tr>
<td>4-5</td>
<td>5</td>
</tr>
<tr>
<td>6-7</td>
<td>4</td>
</tr>
<tr>
<td>&gt;7</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2. Variety of Communication Partners Within a Given Week
In addition, Table 2 illustrates the number of electronic mail communication partners within a given week for a given user. More than half of the subjects indicated that he/she has approximately 2-5 partners.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th># of Messages</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Data</td>
<td>294</td>
<td>55%</td>
</tr>
<tr>
<td>Internal Data</td>
<td>249</td>
<td>46%</td>
</tr>
<tr>
<td>&quot;Phone&quot; in Subject</td>
<td>69</td>
<td>13%</td>
</tr>
<tr>
<td>Carbon Copied</td>
<td>48</td>
<td>9%</td>
</tr>
<tr>
<td>Urgent</td>
<td>8</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 3. Message Characteristics

**Message Content**

In terms of message content, three general aspects were analyzed. These areas include message characteristics, message function, and message context.

**Message Characteristics**

Message characteristics are presented in Table 3. The table is organized in descending order of occurrence.

The most common characteristic identified was that most of the messages, 55%, contained external data. External data is defined as data relevant to the external environment of the organization. This includes reference(s) to vendors, customers, prospects, or other external entities. Internal data references occurred were nearly as prevalent as
external references. Internal data is defined as data relevant to the internal functions or operations of the organization. Examples including content relating to human resource management, accounting, logistics, and so on. Internal data occurred in 46% of the messages.

Another characteristic is the commonality of the word "phone" in the subject field. The word appears in nearly 1 of every 7 messages analyzed. The high incidence is likely linked to the absence of a voice mail system within organization "A". As a result, the electronic mail system is used as a phone storage and notification mechanism.

Table 3 indicates that 9% of the mail was carbon copied. The majority of the carbon copy mail was carbon copied to the sender. Thus, it is likely that the system is being utilized as an individual's filing system. Messages contain information which is saved for future reference. Message content includes phone numbers, customer problems and resolutions, quote requests, internal records, and so on.

Table 4 presents the number of messages containing an attachment of a prior message. Attachments ranged from 0 to 10 messages. Results also suggest the possibility that the electronic mail system serves as a reference system. The majority, i.e., 57%, of the messages contained an attachment of a prior message. 42% of messages contained either 1 or 2 prior messages.
<table>
<thead>
<tr>
<th># of Messages Attached</th>
<th># of Messages</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>234</td>
<td>43%</td>
</tr>
<tr>
<td>1</td>
<td>151</td>
<td>28%</td>
</tr>
<tr>
<td>2</td>
<td>73</td>
<td>14%</td>
</tr>
<tr>
<td>3</td>
<td>35</td>
<td>6%</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>3%</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>3%</td>
</tr>
<tr>
<td>&gt;5</td>
<td>13</td>
<td>3%</td>
</tr>
</tbody>
</table>

Table 4. Messages Attached

It does not appear that the electronic mail system is utilized as a mechanism to expedite urgent communications. Only one percent of the messages contained priority codes or references to "urgent" or "immediate".

**Message Function**

Message functions are presented in Table 5. The table is organized in descending order of occurrence.

The most predominant function was to use the message for administrative purposes. Administrative functions include daily operations, meeting announcements, minutes of meetings, requests to meet, and so on. Nearly two-thirds of the messages were administrative.

Internal discussion was the second most common function. Internal discussion includes examining an unresolved issue, presenting an idea, and so on. Internal discussion occurred in 19% of the messages.
Three functions of phone message storage and referral, attempt to influence or persuade recipient, and other function were evidenced similarly. Occurrences were 9%, 7%, and 7% respectively. Other is defined as acknowledgments, reminders, and other miscellany.

The least common function was to use the electronic mail system for personal use. Personal use is defined as non-work related mail usage. Only one percent of the communication was used for non-company purposes.

<table>
<thead>
<tr>
<th>Function</th>
<th># of Messages</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>309</td>
<td>57%</td>
</tr>
<tr>
<td>Internal Discussion</td>
<td>103</td>
<td>19%</td>
</tr>
<tr>
<td>Phone Message</td>
<td>46</td>
<td>9%</td>
</tr>
<tr>
<td>Influence</td>
<td>39</td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>36</td>
<td>7%</td>
</tr>
<tr>
<td>Personal</td>
<td>6</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 5. Message Function

**Message Context**

Table 6 illustrates message context. Context is defined as information requesting, information giving, discussing strategies, and flaming.

The most prevalent context of the messages was to provide information. Nearly 9 of 10 messages provided information. Conversely, only 26% of the messages were requests for information. Results suggest that the system
is used considerably more for information presentation than for information request.

Six percent of the messages included strategies. Strategies are broad programs for achieving the organization's goals or objectives (Jain, 1990; Stoner, 1978). Subject perceptions, however, are dramatically different. Subjects perceived that most (50-75%) of their sent messages have strategic message content.

The research indicates that negative electronic mail use is at a minimal level. Counter-productive use includes flaming and using the system for personal or rumor purposes. Flaming is defined as a heated exchange of messages expressing hostility or defensiveness towards others on a computer network (Thompson and Ahn, 1992). The use of capital letters, denoting shouting, is an example (Rheingold, 1992).

Only 2% of the messages were identified as containing flaming and 1% of the messages were used for personal use. Furthermore, only 25% or less of the messages received are viewed as useless by respondents. However, one top manager suggests that electronic mail gossip should not be discouraged. He would rather the employees individually communicate news via electronic mail than have a group of employees conversing around the water cooler, multiplying lost productivity.
<table>
<thead>
<tr>
<th>Context</th>
<th># of Messages</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide Information</td>
<td>469</td>
<td>87%</td>
</tr>
<tr>
<td>Request Information</td>
<td>139</td>
<td>26%</td>
</tr>
<tr>
<td>Discuss Strategy</td>
<td>35</td>
<td>6%</td>
</tr>
<tr>
<td>Flame</td>
<td>12</td>
<td>2%</td>
</tr>
</tbody>
</table>

Table 6. Message Context

Message outcomes were similar for respondent type. The majority of respondents felt that the electronic mail usage resulted in a moderate increase in their ability to provide higher quality customer service. In addition, one manager commented that using electronic mail increases the ability to respond to a broader volume of customer requests, thus customer service is enhanced.

Strategic Importance

During an in-depth interview at organization "A", top management described three criteria which are used by the company in classifying the strategic importance of systems. The most important criteria is the positive or negative impact upon customers. The second criteria is the effect on employee morale and frustration level. The third criteria is the impact upon profit. Management perceive that profit is generated as a result of positive influences from the first two criteria.
When the electronic mail system was implemented, the top management did not view the system as strategically important. Original objectives were to eliminate telephone tag and to improve communication within one workgroup in the organization. Alternatives to implementing the electronic mail system included using sticky-tabs, pink slips, shouts, and paper communication. Management deemed these alternatives unreliable. Sticky tabs are still occasionally used but only for self communication reminders.

Today, top management consider the system strategically important. The current objective is to assist in decision making, to enhance company-wide communication, and to guarantee customer response. The system saves time when making important decisions that need to be discussed at length and has replaced time-consuming meetings in the organization. In addition, one employee stated that it was a step toward the "paperless" office.

Moreover, the system is utilized and perceived as a tactical tool. The majority of communication entails day to day activities which can be time-shifted to less critical times.

Thus, the electronic mail system creates multiple internal efficiencies which relieve internal daily stresses. In addition, the system has provided benefits resulting in improved customer service.
Evaluation of Competitive Advantage

Top management and the majority of non-management users agree that the electronic mail system provides the company a competitive advantage (CA). Top management emphasize that all communication advantages can be competitive advantages. CA is measured in the ability to provide employees information in their absence. The system is used as a tool for management of calls for salespeople out of the office.

In addition, the system releases stress among sales staff by relieving congestion and moving the work off their desk. Internal, non-time critical, messages can be released from the information bottleneck and moved from one's queue. Moreover, external messages, relating to customers, can be time-shifted in the same manner. Personnel can provide service to a greater number of customer requests by shifting demand from real-time to off-peak hours.

Management measures the value of the system today through the number of users, greater volume of customers, better organization of time and energy, and improved internal communications. In addition, the system allows volatile management to communicate in a professional measured response. In FTF communication, tempers can flare but using the electronic mail, flaming is lessened because the management is forced to think and cannot respond in real-time. In other words, the system allows the manager to "count to ten." This is consistent with Walther's
discussion (1992) that asynchronous users have more time to contemplate and compose messages than do synchronous communicators. This ability may afford users enhanced opportunity for selective self-presentation, thus, delivering a “qualitatively different interpersonal impressions than they might convey in synchronous CMS or FTF communication” (Walther, 1992, 81).

Non-management indicate that the system provides a competitive advantage by permitting the sender to leave messages without using post-it notes, communicate with precision, and confront others on delicate issues without emotional interference. In addition, information can be given at any point because time and place barriers are broken down, information is recorded, therefore not lost or forgotten, and information can be kept for periodic reference. Moreover, electronic mail saves time when people are not able to communicate through the usual channels due to different schedules and so on. Electronic mail also eliminates the necessity of small meetings between sales personnel.

Results include providing information in a timely fashion, allowing for quick responses, not losing the paper message notes, and fewer errors in receiving an electronic mail message. Messages can also be sent any time of the day and the sales force can be made aware of what the company sells.
One respondent did not know how to measure the advantage and two other subjects felt that no advantage has been derived. However, these respondents emphasized that not having a electronic mail system would be a disadvantage.

**Benefits Resulting From System Use**

Measuring the benefits of the electronic mail system is problematic. The majority of respondents did not know how to quantify the system benefits. Moreover, a senior manager emphasized that he cannot show a direct relationship between the internal electronic mail infrastructure and sales. However, there are psychological stresses and lost communications when the system is not accessible. One top manager also noted that during system downtime, the inadequacy of the previous communication infrastructure becomes apparent. The electronic mail system is used internally to communicate procedures, ideas, but also share data. Thus, the absence of information would result in lost sales.

One intangible benefit is enhanced customer service. The system allows the personnel to contact other employees regarding customer service situations. One benefit is the system serves as a telephone message storage device for those employees not available to talk on the telephone. Content analysis of the message file illustrates that 69 or 13% of the messages either contain a telephone number or the word "phone" in the subject field.
Few of the employees noted that the system is a determining factor in gaining new customers. One salesperson indicated that the electronic mail could be a determining factor in gaining new customers, if by receiving an important message quickly, she could quickly make the return phone call to show interest. Another salesperson emphasized that by utilizing electronic mail, sales leads are discussed effectively. As questions arise, they can be answered without a loss of quality time by either party.

**Strengths and Weaknesses of the System**

Several strengths of the current system were identified. Footwork is lessened because information can be shared without direct interfacing. The user can communicate with a sense of security and privacy. The system has a graphic orientation and is easy to learn, maintain, and interface. Sales department personnel are satisfied because the system provides a record of an entire conversation. Moreover, employees can coordinate with many parties at one time to elaborate and discuss issues with precision. Other strengths include speed, quick response time, increased legibility versus hand-written communication, and ubiquity. The user can log into any computer on the network to read or send mail. Thus, the user is not tied to a given desk and communication is available at home or at the closest computer.
Weaknesses relate primarily to the robustness of the cross-platform system architecture. User complaints are directed at the cross-platform gateway reliability and vendor related problems. Employees note that there can be considerable time elapsed before the user is aware that the gateway is not operational thus messages are delayed. In addition, when the gateway is not operating, users miss important messages that require immediate attention.

Users are also critical of message notification obtrusiveness causing interruptions in regular procedures. Moreover, there are spelling errors, the ability of recipients to forward private messages, and insufficient user control in categorizing messages. In addition, one user notes that mail wars start because users hide behind monitor and emotions are misread into messages.

One non-user describes reasons for not using the electronic mail. These reasons include no acknowledgment feedback is provided, prefers FTF contact in the close proximity environment, wants immediate action to satisfy customer, distrusts electronics.

Prescriptive measures that would provide a greater competitive advantage were described by respondents. Users suggested that one interface to all incoming and outgoing communication is important. Thus, the integration of electronic mail with voice mail and FAX would result in a greater advantage. Three employees noted that greater self-
discipline to read mail more regularly is needed. User training and voice recognition would also improve data entry.

**The Proposed Impact Model**

Case study findings indicate several factors which influence electronic mail impact in the business firms. Figure 4 illustrates the proposed model. Individual factors such as user experience with IT and experience with electronic mail may affect the user attitude. Training is proposed as a factor influencing attitude and experience, even though organization "B" users received minimal

![Figure 4 Impact Model](image-url)
training. Subjects likely received minimal training because of their relatively high level of IT experience.

Message function is proposed to effect message distribution. Personal messages, for example, are more apt to be directed to an individual, rather than a group or everyone.

User attitude, message function, message distribution, and message function are hypothesized to influence communication effectiveness, which subsequently impacts the organization. The impacts can be evidenced through improved customer service, competitive advantage, communication barrier reductions, decrease in the quantity of meetings, and so on.
CHAPTER BIBLIOGRAPHY


CHAPTER 6

ANALYSIS

Two additional case studies were conducted to assess the robustness of the model developed during the initial study. Data was collected using the same methodology and instruments utilized during the initial case study. The additional firms will be identified as organizations “B” and “C”.

Organization “B” Profile

Organization “B” is an intermediate-size distribution center in the northeastern United States. The organization has annual sales of approximately $200 million in the wholesale electronics industry. The primary sales emphasis is in capacitor, resistor, and surface mount component domains. Approximately 92 million components are sold and shipped each day. Components are obtained from nine distributors in Japan, Malaysia, Taiwan, and Singapore and sold to U.S. automobile manufacturers and telecommunications industry firms. There are three primary international distribution center competitors and the organization's primary competitive advantage strategy is “concentration on market or product niche.”

The organization's customer-service orientation has resulted in a 40% annual growth in sales during the last
five years. However, the increased demand has put pressure on the suppliers. Supplier lead times are between eight and 15 weeks and can be as long as 30 weeks. As a result, the company is taking a proactive approach and implementing a distribution resource planning system which will communicate forecasts to the suppliers.

Organization "B" is relatively flat in hierarchical structure with little workgroup orientation. There are 130 full-time personnel, ten designated as management, in the organization. Non-management employees perform sales, administrative, data processing, engineering, warehousing, and logistical functions.

Sixty-six employees have electronic mail accounts, although ten employees have not yet been issued a personal computer. Of the ten management personnel, four are electronic mail users. Non-management users are primarily employed in the data processing, marketing, engineering, and accounting departments. Warehouse personnel do not have electronic mail accounts, at the request of the warehouse manager.

The firm has been in existence for 40 years and has traditionally been highly technologically supported. Mainframes have been utilized for 30 years. In addition, a token-ring LAN, directly connected to the mainframe system, has been in operation for the past five years. The computing system is used to maintain the bar coding,
electronic data interchange (EDI), and accounting systems. A twelve-member MIS processing staff is employed to support the electronic systems. The department includes an MIS manager, EDI coordinator, two system analysts, five programmers, and three operators. A help desk is also used by the MIS department to assist in employee computer support. Even though problems are phoned into the help desk, support staff use the electronic mail system to communicate solutions.

Although communication is critical to the success of the organization, computerized communication systems are relatively new to the organization. Prior to 1992, paper notes and FTF contact were the primary means for communication. In 1992, a voice mail system was installed and is now heavily used to support the sales staff. In excess of 50,000 telephone calls are made each month.

The internal electronic mail system is in its infancy stage, being in operation for approximately one year. Organization "B" uses Lotus CC:Mail®, a system which operates in the company's graphical user interface operating environment. The system was established in response to customer decree that communication occur via electronic mail. A gateway was subsequently installed to facilitate communication to firms outside the organization. A third-party EDI vendor is used to communicate information with customers. However, the MIS manager emphasizes the third-
party system is slow. As a result, the organization is exploring the use of Internet as a mechanism to increase communication speed.

Users are slowly being added to the system as the organization is phasing personal computers into the business. When an employee receives a personal computer, an electronic mail ID is opened for the individual. At present, customer service and sales department personnel are being added to the electronic mail system. Thus, terminal and electronic mail availability are constraints.

MIS personnel note that most employees have not migrated to electronic mail. As evidence, one member of the MIS staff has observed one employee who reads the electronic mail messages but responds using paper memos. There are several factors which may contribute to the slow acceptance. Personal computer technology is new to the organization and many employees do not have a microcomputer. Moreover, most existing microcomputers are less than one year in age. In addition, the electronic mail notification mechanism is not as conspicuous as MIS perceive the system should be. Consequently, the technology infrastructure and employee microcomputer literacy are limited.

MIS personnel predict increased organizational electronic mail usage. The current office physical layout promotes a high degree of FTF contact between employees; but the layout is being modified into a more cubicle, physical
barrier arrangement. Thus, the electronic mail system may be more important as FTF contact becomes more difficult.

Two management personnel and nine non-management full-time employees participated in the study. Users provided a total of 87 messages, dated from July 1995 to August 1995.

General barriers to communication identified by subjects include not being able to reach a person, inability to contact a specific person in a short time, handling of excess paper, and people not receiving messages. In terms of the electronic mail system, subjects noted that electronic mail is not yet a preferred tool of communication, thus recipients are not reading their messages daily.

Consistent with organization "A", subjects received minimal electronic mail training, averaging 1.2 hours, and have a high degree of familiarity with computers and electronic mail. Mean years in computer and electronic mail experience was 9.9 years and 1.9 years, respectively.

Electronic mail activity was considerably less for organization "B". Management and non-management users send and receive an average of 6 messages per week, although 60% of respondents indicated daily use of the system. Information float varied between types of users. Management indicated that their float time was 10 minutes. One-half of non-management indicated that float time was one day. Both
types of users perceived that his/her float time is approximately the same for other message recipients on the system.

User perceptions of the system varied widely, with few discernable response patterns. Participants characterized the electronic mail system in a positive manner on factors of speed of information sharing, ability to reach people, and control over his/her communication. Personnel perceived low electronic mail information overload and few useless messages. However, users rate the system as low in factors such as the ability to keep others up-to-date, the quantity of work output, the speed of decision making, and the overall quality of work. Communication partners generally ranged from one to three individuals.

In terms of electronic mail impact, users perceive no effect upon total time spent in meetings. However, personnel identify positive effects as increased customer service quality and decreased customer support time.

Management measures the value of the system today in terms of time savings, communication speed, customer service, and ease of data manipulation. The benefits include new customers, better customer service, less paperwork, and increased speed of response. However, management is uncertain whether the system was a strategic move for the company. Most respondents note that the electronic mail system is not a determining factor in
gaining new customers, although two subjects emphasize that the system is a factor as new customers request communication via electronic mail.

User perceptions of the system resulting in competitive advantage are mixed. Four subjects note an advantage, two do not perceive advantage, and five are uncertain. Respondents emphasize that the system provides an advantage because more and more of the customers are requiring their suppliers to use electronic mail. Thus, since the system is in place, it is easier to obtain those types of new customers. Moreover, the competition may not have the same electronic mail ability. Finally, there is an advantage in response time in international business.

System strengths include ease of communication, ability to convey a message without actual personal contact, versatility of functions, accurate distribution, and message availability at your desk. Identified weaknesses include not being certain if the other party is actually checking mail, little internal use, minimal training through company, lack of other users, and lack of employee electronic mail knowledge.

The overwhelming suggestion for improving the system or procedures is to perform better training. Respondents emphasize that there needs to be more internal and external users. Other suggestions included forcing personnel to use the system and encouraging management use.
Organization "C" Profile

Organization "C" is a privately-own packaging firm located in the southwestern United States. The firm is a Fortune 500 organization with primary sales emphasis in the food packaging industry. Sales are international in scope and include customers in the liquid food and dairy industries. The organization's primary competitive advantage strategy is "product differentiation."

Organization "C" is also relatively flat in hierarchical structure with a workgroup orientation in the production area. There are 218 full-time personnel in the organization, five designated as management.

One hundred fifty employees utilize the LAN, but only 97 have electronic mail accounts. The number of electronic mail accounts is less than the number of users because several users share group electronic mail accounts.

The plant was opened in 1984 and has traditionally had high technological support. A mainframe has been utilized since the inception of the plant and, a LAN directly connected to the mainframe system, has been in operation for the past five years. The computing system is used to maintain production and electronic mail systems. One MIS individual is employed to support the electronic systems.

Organization "C" uses Lotus CC:Mail® and two other electronic packages for internal and international communications. The systems function in the company's
graphical user interface operating environment.

Organization "C" selected LAN electronic mail packages because mainframe electronic mail was perceived as expensive and difficult to use. The systems' objective is to keep everyone communicating through an inexpensive, effective means.

Messages were generated by two management personnel and twenty-one non-management, full-time employees. Users provided a total of 124 messages, dated from February 1994 to August 1995.

Consistent with organizations "A" and "B", subjects received minimal electronic mail training, averaging 15 minutes, and have a high degree of familiarity with computers and electronic mail. Mean years experience in computers and electronic mail are 10 years and 3 years, respectively.

General barriers to communication identified by subjects include filtering of information, time zones, and incompatible external electronic mail systems. However, electronic mail activity was relatively high. Management and non-management users report sending and receiving an average of 76 messages per week and communicating 5-7 days per week on the electronic mail system. Information float varied between types of users. Management indicated that their float time was between 10 minutes and one hour. Non-management indicated that float time was between 5 and 30
minutes. While management perceived that his/her float time is approximately the same for other message recipients on the system, non-management users perceive that other message recipients wait between one hour and one day before reading their messages.

Management and non-management user perceptions of the system were consistent. Participants strongly characterized the electronic mail system in a positive manner on factors of ability to keep others up-to-date, speed of information sharing, effectiveness of his/her communication, overall quality of work, quantity of work output, speed of decision making, ability to reach people, and control over his/her communication. Personnel perceived low to medium electronic mail information overload and few useless messages. None of the study factors were rated negatively. Communication partners generally exceeded seven individuals within a given week.

In terms of electronic mail impact, users generally perceive no effect upon total time spent in meetings and customer support time. However, personnel identify a positive effect as increased customer service quality.

Management characterize the system as a strategic move for the company. One manager noted that the system is "very beneficial in keeping everyone in touch." Most respondents are not certain whether the electronic mail system is a determining factor in gaining new customers, although one
manager stated that a firm became a new customer because organization "C" allowed the firm to have electronic mail communication with them.

User perceptions of the system resulting in competitive advantage are positive. Respondents emphasize that the system provides an advantage because of better communication across time and space boundaries. In addition, one user stated that he did not know how the firm could function without the electronic mail system.

System strengths include ease of communication, reliability, speed, and the ability to transfer data files. Weaknesses include lack of user setup preferences, lack of access to news sources, and the user must read/respond to messages.

Users provided suggestions for improving the system or procedures. One suggestion was to use only one electronic mail system, rather than three. In addition, a non-management user emphasized that each manager needs to make reading electronic mail messages a priority.

**Message Content**

Messages from the three organizations were analyzed from four general perspectives. These perspectives include message distribution, message characteristics, message function, and message context.

In addition, study factors were cross-compared to determine relationships. Function was analyzed by
distribution and context. Context was analyzed by characteristic. Moreover, message word count was utilized to further classify study factors. Several tables containing message occurrence percentages from the three organizations are utilized to illustrate the findings.

**Message Distribution**

Message distribution for organizations "B" and "C" were dissimilar. In organization "B", the system was utilized primarily as a tool for one-to-one communication. Both subject interviews and message content analysis confirm that the majority of mail was sent to one communication partner. Table 7 reveals that 87% of the messages were sent to one individual. Organization "B" is thus similar in message distribution to organization "A". Message frequencies are provided in Appendix K.

In organization "C", the system was used almost equally as a tool for one-to-one and group communication. 45% of the messages were sent to individuals while 51% of the messages were sent to a group. This dispersion is consistent with the workgroup orientation of organization "C". In all organizations, only a small percentage of the messages, between zero percent and three percent, were sent to all the mail boxes.

Overall, results indicate that message dispersion is related to the workgroup or non-workgroup orientation of the
organization. In addition, electronic mail is targeted and not likely to be sent to a mass audience.

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<tr>
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<tbody>
<tr>
<td>1</td>
<td>81%</td>
<td>87%</td>
<td>45%</td>
</tr>
<tr>
<td>2-10</td>
<td>18%</td>
<td>13%</td>
<td>51%</td>
</tr>
<tr>
<td>Everyone</td>
<td>1%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
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Table 7. Message Recipient Percentage

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>External Data</td>
<td>55%</td>
<td>37%</td>
<td>12%</td>
</tr>
<tr>
<td>Internal Data</td>
<td>46%</td>
<td>56%</td>
<td>87%</td>
</tr>
<tr>
<td>&quot;Phone&quot; in Subject</td>
<td>13%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Carbon Copied</td>
<td>9%</td>
<td>17%</td>
<td>32%</td>
</tr>
<tr>
<td>Urgent</td>
<td>1%</td>
<td>2%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Table 8. Message Characteristic Percentage

Message Characteristics

Message characteristics' percentages are presented in Table 8. Message frequencies are provided in Appendix L. The most common characteristic identified in organization "B" and "C" is the prevalence of references to internal data, i.e., data relevant to the internal functions or operations of the organization. Internal data occurred in 56% and 87%, respectively, of the two organization's messages. External
data, i.e., references to vendors, customers, prospects, or other external entities, was not as common as internal data occurrence. External data occurred in 37% and 12% of the messages.

Organization "A" differed from "B" and "C" for most characteristics. The higher occurrence of external data for organization "A" may be due to the retail nature of the organization. Personnel in retailing have considerable contact with customers and vendors. Moreover, the reference to "phone" in the subject field was more common in organization "A". Organization "B" uses a voice mail system to handle phone messages. Organization "C" uses the electronic mail system to store phone messages, but the mail senders did not use the word "phone" in the subject field. Thus, storage of phone messages appears related to the presence or absence of a voice mail system.

Table 8 indicates that in all the study organizations, carbon copying is prevalent. Percentages vary from 9% of the mail in organization "A" to 32% of the messages in organization "C". Results suggest that although messages are targeted, organizational communication of sender activity is important to the sender. In addition, many of the carbon copies were made to the sender. This indicates the use of electronic mail as a personal correspondence database.
Table 9 presents the percentage of messages containing an attachment of a prior message. Message frequencies are provided in Appendix M. Attachments ranged from 0 to 10 messages. Messages containing attachments occurred in 57%, 17%, and 43% of organization "A", "B", and "C"'s messages, respectively. Organization "B" has a much lower percentage than "A" or "C".

The range in attachment percentages may be linked to message sophistication. Table 10 illustrates that average message word counts were 50, 68, and 58 words, respectively, for firms "A", "B", and "C". Thus, as message word count drops, the incidence of message attachments increase. Therefore, organization "B" senders, for example, may be using more description, rather than attachments, to relay the flow of previous messages as they relate to the current message.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>0</td>
<td>43%</td>
<td>83%</td>
<td>57%</td>
</tr>
<tr>
<td>1</td>
<td>28%</td>
<td>17%</td>
<td>25%</td>
</tr>
<tr>
<td>2</td>
<td>14%</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td>3</td>
<td>6%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>4</td>
<td>3%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>5</td>
<td>3%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>&gt;5</td>
<td>3%</td>
<td>0%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Table 9. Messages Attached Percentage
It does not appear that electronic mail systems are utilized as a mechanism to expedite urgent communications in any of the three study firms. Only one to six percent of the messages contained priority codes or references to "urgent" or "immediate".

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<thead>
<tr>
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<tbody>
<tr>
<td>Average Word Count</td>
<td>50</td>
<td>68</td>
<td>58</td>
</tr>
</tbody>
</table>

Table 10. Word Count Averages by Organization

Message Function

Message function percentages are presented in Table 11. Message frequencies are provided in Appendix N. The predominant function was to use a message for administrative purposes. Administrative functions include daily operations, meeting announcements, minutes of meetings, requests to meet, and so on. Between 55% and 58% of each firm's messages were administrative.

Internal discussion was the second most common function. Internal discussion includes examining an unresolved issue, presenting an idea, and so on. Internal discussion occurred in 19% to 22% of the messages.

Remaining functions of phone message storage and referral, attempt to influence or persuade recipient, other, and personal varied by organization. Each function accounted for relatively small percentages of each organization's messages.
An uncommon function was to use the electronic mail system for personal use. Only one percent of the communication was used for non-company purposes in organizations "A" and "C". Even though organization "B" had a higher percentage, seven percent, all of the personal use was attributed to only one individual.

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Administrative</td>
<td>57%</td>
<td>58%</td>
<td>55%</td>
</tr>
<tr>
<td>Internal Discussion</td>
<td>19%</td>
<td>20%</td>
<td>22%</td>
</tr>
<tr>
<td>Phone Message</td>
<td>9%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Influence</td>
<td>7%</td>
<td>1%</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>7%</td>
<td>13%</td>
<td>10%</td>
</tr>
<tr>
<td>Personal</td>
<td>1%</td>
<td>7%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 11. Message Function Percentage

Message Context

Table 12 illustrates message context percentages. Context includes information requesting, information giving, discussing strategies, and flaming. Message frequencies are provided in Appendix 0.

Message context was consistent among the study organizations. The most prevalent message context was to provide information. Nearly nine of every ten messages provided information. Conversely, between 25% and 31% of the messages were requests for information. Results suggest
that electronic mail is used considerably more to supply information than for information request.

Findings indicate that negative electronic mail use is minimal. Counter-productive use includes flaming and using the system for personal or rumor purposes. Flaming occurred solely in organization "A" and only in two percent of the messages. In addition, personal use was evidenced in the messages of only one individual in each organization. Furthermore, only 25% or less of the messages received are viewed as useless by respondents in each of the study organizations.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Provide Information</td>
<td>87%</td>
<td>85%</td>
<td>89%</td>
</tr>
<tr>
<td>Request Information</td>
<td>26%</td>
<td>31%</td>
<td>25%</td>
</tr>
<tr>
<td>Discuss Strategy</td>
<td>6%</td>
<td>1%</td>
<td>5%</td>
</tr>
<tr>
<td>Flame</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 12. Message Context Percentage

Function By Distribution

Message percentages for each organization were analyzed by function and distribution to ascertain potential relationships. Resultant percentages are presented in Table 13 for "individual" recipients, Table 14 for "group" messages, and Table 15 for "everyone" messages. Message
frequencies are provided in Appendix P, Q, and R, respectively.

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<thead>
<tr>
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<tbody>
<tr>
<td>Administrative</td>
<td>80%</td>
<td>88%</td>
<td>39%</td>
</tr>
<tr>
<td>Internal Discussion</td>
<td>83%</td>
<td>78%</td>
<td>48%</td>
</tr>
<tr>
<td>Phone Message</td>
<td>98%</td>
<td>0%</td>
<td>75%</td>
</tr>
<tr>
<td>Influence</td>
<td>62%</td>
<td>0%</td>
<td>58%</td>
</tr>
<tr>
<td>Other</td>
<td>92%</td>
<td>92%</td>
<td>50%</td>
</tr>
<tr>
<td>Personal</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
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</table>

Table 13. Message Function for Individual Recipients

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<thead>
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<tbody>
<tr>
<td>Administrative</td>
<td>19%</td>
<td>12%</td>
<td>55%</td>
</tr>
<tr>
<td>Internal Discussion</td>
<td>17%</td>
<td>22%</td>
<td>52%</td>
</tr>
<tr>
<td>Phone Message</td>
<td>2%</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Influence</td>
<td>33%</td>
<td>100%</td>
<td>42%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
<td>8%</td>
<td>50%</td>
</tr>
<tr>
<td>Personal</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 14. Message Function for Group Recipients

In terms of messages sent to individuals, all functions rated high in occurrence percent for the individual organizations. For example, Table 13 depicts that 80% of all administrative messages in organization "A" were sent to individuals, rather than to a group or everyone. Internal discussion, other, and personal functions were generally
well over 50% for all study organizations. Although individual recipient administrative use was at least 80% for organizations "A" and "B", organization "C" was much lower at 39%. This anomaly may be a consequence of "C"'s workgroup structure.

Table 14 further illustrates more prevalent occurrence of organization "C"'s messaging to groups. In four of the six functions, organization "C" had at least a 42% occurrence. Message function for group recipients was much lower in organizations "A" and "B". In nearly all functions, message occurrence was less than 22%. However, organization "B"'s influence function was contrary to this finding. One hundred percent of organization "B"'s influence messages were directed at groups. No influence messages were directed either to individuals (Table 13) or to everyone (Table 15). This suggests that in a non-workgroup environment, electronic mail is used as a mechanism to persuade or influence groups of individuals.

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<tr>
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<tbody>
<tr>
<td>Administrative</td>
<td>1%</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>Internal Discussion</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Phone Message</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Influence</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Personal</td>
<td>33%</td>
<td>0%</td>
<td>0%</td>
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</table>

Table 15. Message Function for Everyone Recipients
Table 15 presents the frequency of messages sent to everyone. In all organizations, nearly all functions had a zero occurrence. This demonstrates infrequent use of mailings to all mail boxes. An exception is personal messages. One-third of organization "A"'s personal messages were mailed to everyone. This finding may be related to the corporate culture as embodied in one of organization "A"'s most active electronic mail top managers. The manager does not discourage electronic mail gossip because he perceives less productivity is lost using electronic mail than exchanging information in groups around a water cooler. However, this high occurrence of personal messages sent to everyone suggests that productivity losses may be higher than originally perceived by this manager.

One finding is apparent when comparing Tables 13-15. There is no evidence of the phone message function in organization "B". This marked absence is likely a result of organization "B"'s heavy use and reliance upon voice mail communication. As a result, it is not necessary to use electronic mail as a supplemental mechanism to relay phone messages. Consequently, there appears to be a relationship between use of voice mail and need to use electronic mail to distribute telephone messages.

Function By Context

Message occurrence for each organization was analyzed by function and context to ascertain potential
relationships. Resultant percentages are presented in Table 16 for "providing information" and Table 17 for "requesting information" messages. Message frequencies are provided in Appendix S and Appendix T, respectively. For example, Table 16 depicts that 84% of administrative messages in organization "A" were used to provide information. Conversely, Table 17 illustrates that the remaining 16% of administrative messages in organization "A" were used to request information.

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<tbody>
<tr>
<td>Administrative</td>
<td>84%</td>
<td>78%</td>
<td>84%</td>
</tr>
<tr>
<td>Internal Discussion</td>
<td>58%</td>
<td>48%</td>
<td>54%</td>
</tr>
<tr>
<td>Phone Message</td>
<td>91%</td>
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<td>100%</td>
</tr>
<tr>
<td>Influence</td>
<td>64%</td>
<td>100%</td>
<td>83%</td>
</tr>
<tr>
<td>Other</td>
<td>82%</td>
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<tr>
<td>Personal</td>
<td>71%</td>
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<td>100%</td>
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Table 16. Message Function for Providing Information

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<tbody>
<tr>
<td>Administrative</td>
<td>16%</td>
<td>22%</td>
<td>16%</td>
</tr>
<tr>
<td>Internal Discussion</td>
<td>42%</td>
<td>52%</td>
<td>46%</td>
</tr>
<tr>
<td>Phone Message</td>
<td>9%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Influence</td>
<td>36%</td>
<td>0%</td>
<td>17%</td>
</tr>
<tr>
<td>Other</td>
<td>18%</td>
<td>21%</td>
<td>8%</td>
</tr>
<tr>
<td>Personal</td>
<td>29%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 17. Message Function for Requesting Information
Table 16 illustrates that for messages which provided information, all functions, with the exception of phone messages in organization "B", rated high in occurrence percent for the organizations. Administrative, influence, other, and personal messages which provided information accounted for at least two-thirds of messages within each organization. Phone messages also were high in occurrence for providing information for organizations "A" and "C". Organization "B", however, did not have any phone messages. This absence is likely a result of the extensive use of voice mail. Relative to requesting information, internal discussion was the most common function. Internal discussion which requested information accounted for roughly 50% of the messages in each organization.

In addition, percentages within a given function were generally consistent among study organizations. For example, administrative messages which provide information accounted for 84%, 78%, and 84% of message function for organizations "A", "B", and "C", respectively. Administrative, internal discussion, and other functions had the smallest variances among organizations. This symmetry indicates a potential relationship within these individual message function areas. Phone message, influence, and personal had the largest variances. These functions, therefore, appear to have a weaker relationship.
Table 17 illustrates message function for requesting information. These percentages are inverse percentages of Table 16. In general, requesting information is far less common than providing information. For example, in organizations "B" and "C", there were no phone messages or personal messages requesting information. Internal discussion was highest in occurrence for requesting information. Incidence varied by organization from 42% to 52% of messages. Findings suggest that when requesting information, electronic messaging users are most likely to be using the message for internal discussion, rather than for administrative, phone message, influence, other, and personal functions.

When comparing Table 16 to Table 17, results indicate electronic mail is used extensively as an information distribution mechanism, rather than as a query tool, relative to administrative, phone, influence, other, and personal information. Moreover, internal discussion is used nearly equally for distribution and query.

**Context By Characteristic**

Message context for each organization was analyzed by message characteristic to ascertain potential relationships. Resultant percentages are presented in Table 18 for "internal information." Message frequencies are provided in Appendix U.
In terms of messages which contain internal information, functions generally rated high in occurrence percent for each organization. For example, Table 18 illustrates that 63% of all providing information messages in organization “B” contained internal information. Conversely, the remaining 37% of providing information messages in organization “B” contained external information. Results indicate that a high percentage of organization “C”’s messages contain internal, rather than external information. All contexts, with exception of flame, had at least 86% of messages related to internal information. There were no incidences of flaming in organization “C”.

Organizations “A” and “B” internal information vary by context, with little consistency. Of note, however, is that in all message contexts, organization “A” and “B” had less percent of messages with internal information, relative to organization “C”. In fact, providing and requesting information percents were generally one-half the internal information incidence in organization “C”. Results suggest

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Provide Information</td>
<td>45%</td>
<td>63%</td>
<td>86%</td>
</tr>
<tr>
<td>Request Information</td>
<td>44%</td>
<td>39%</td>
<td>97%</td>
</tr>
<tr>
<td>Discuss Strategy</td>
<td>64%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Flame</td>
<td>92%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 18. Message Context for Internal Information
that an organization factor or factors, possibly workgroup orientation, effects use of internal or external information in electronic mail.

There is one apparent consistent pattern within a context for the organizations. Strategy discussion of internal information, rather than external information, rate high for each study organizations. In all organizations, strategy discussion containing internal information was evidenced in at least 64% of messages. In organizations "B" and "C", 100% contained internal information. Thus, findings indicate strategies are more likely to contain data relevant to organizational internal functions or operations such as human resource management, accounting, logistics, and so on. Strategies are less likely to contain data relevant to organizational external entities such as vendors, customers, and prospects.

**Study Factor Word Count**

Study factors for each organization were analyzed by word count. Word count is used to further identify and explain message content. Table 19 illustrates the average word counts.

Overall, average word count by organization ranged from 50 words to 68 words per message. Study factor count was in most instances not constant by organization. For example, within the urgent factor category, word count averaged 44 words in organization "A" to a 101 word average in
organization "C", resulting in a 57 word differential. The smallest count differentials occurred within three factors. Internal information ranged from 61 to 69 words (8 word differential), administrative information ranged from 53 to 64 words (11 word differential), and other information ranged from 17 to 28 words (11 word differential).

Several patterns emerged when comparing individual study factors to other study factors and to the organization's overall message average. These patterns were consistent for the three study organizations. First, group messages were longer than individual messages. Moreover, group messages were approximately double the length of messages addressed to individuals. This suggests an increased complexity of messages when addressing messages to a group. Second, internal information messages were longer than external information messages. It is possible that messages relating to customer, vendors, and other external entities may not require a higher level of detail or precision. Third, phone, other, individual, and external messages are below the organization's average word count. Thus, these categories exhibit consistent phenomena as being the most concise messages in the organization. Fourth, group, provide information, strategy, and discussion messages are above the organization's average word count. Thus, these categories are consistently the longest messages in the electronic mail system.
Two other notable observations are derived from the word count analysis. Strategy messages rank as one of the most lengthy study factors. These messages are between a factor of two and three times the length of an average message. Consequently, greater detail and discussion are utilized when sending a strategy message. A second
observation is that urgent messages are not generally short. In organizations "A" and "B", urgent messages were slightly less than an average message length. In organization "C", the messages were double the length of an average message. Results indicate there are varying degrees of urgency.

Model Assessment

Organizations "B" and "C" were studied to assess the robustness of the model developed during the initial study. The Impact Model was presented in Figure 4.

The Impact Model suggests that training impacts both experience with electronic mail and experience with information technology. Moreover, each of these factors effects user attitude. Message function is hypothesized to impact message distribution. Message function, message distribution, message context, and user attitude are proposed to influence communication effectiveness and its eventual impact.

Results indicate that although subjects received little or no training, subjects were experienced with information technology and electronic mail. Average information technology experience was approximately 10 years in both organizations. Average electronic mail experience was 1.9 and 3 years, respectively, in organizations "B" and "C". Even though users are experienced, a common complaint is the necessity for training. Thus, findings indicate a relatively weak relationship between training and experience
with electronic mail and information technology. Findings suggest relationships between user attitude and factors such as training, experience with electronic mail, and experience with information technology. Overall, users characterized the electronic messaging system positively during interviews and on the questionnaire. User satisfaction scales, however, were not employed due to the bounds of this study.

Message percentage for each organization was analyzed by function and distribution to ascertain potential relationships. Resultant percentages were presented in Table 13 for "individual" recipients, Table 14 for "group" messages, and Table 15 for "everyone" messages. No discernable pattern between the two firms is visible. As a result, message function does not appear related to message distribution.

Message occurrence for each organization was analyzed by function and context to determine potential relationships. Resultant percentages were presented in Table 16 for "providing information" and Table 17 for "requesting information" messages. Percentages within a given function were consistent among organizations "B" and "C". For example, administrative messages which provide information accounted for 78% and 84% of the message function for organizations "B" and "C", respectively. This symmetry indicates a potential relationship within individual message function areas.
Content analysis and subject interviews demonstrate potential relationships exist between communication effectiveness and factors such as message distribution, message context, and user attitude. Overall, users characterized the systems as resulting in effective communication. Message context, presented in Table 11, further illustrates that flaming is at a minimal level and the primary context is information providing. Message distribution, presented in Table 7, demonstrates that messages are targeted consistently with the workgroup/non-workgroup orientation of the organization. User attitude is positive. However, message function results, presented in Table 10, do not contain effectiveness measures. As a result, a relationship between effectiveness and function cannot be demonstrated.

Subject interviews indicate that communication effectiveness is linked to positive outcomes when using the electronic messaging systems. The positive impacts include improved customer service and perceived competitive advantage.

Based upon data collected in organizations "B" and "C", the Impact Model has been revised. Four of the hypothesized relationships in the original model are not evident in the model test. Moreover, several new relationships have been suggested. The revised Impact Model is presented in Figure 5.
Within the message function and message context relationship, administration, internal discussion, other, and personal percentages were consistent among organizations "B" and "C". However, Table 11 indicates that phone message and influence varied. In organization "B", which employs voice mail, phone message notes were not found in electronic mail. Consequently, there may be a relationship between message function and voice mail usage. Moreover, in organization "B", which is not workgroup-oriented, influence messages were only evidenced in group messages. Therefore,
it is hypothesized there is also a relationship between message function and workgroup orientation.

Relative to message distribution, individual and group recipient percentages varied by organization. Percentages are indicated in Table 7, Table 13, Table 14, and Table 15. 87% of organization "B"'s messages were directed at individuals while 51% of organization "C"'s messages were directed at groups. This inconsistency is likely a result of workgroup/non-workgroup orientation. Thus, it is hypothesized there is a relationship between message distribution and workgroup orientation. Percentages for everyone messages were consistently low for both organizations.

Message context was consistent among organizations in all contexts. Table 12 indicates that providing information, requesting information, strategy discussion, and flaming percentages were similar.

Table 8 indicates message characteristics varied among organizations. Urgent messages, however, are infrequently used in all organizations. In addition, use of "phone" in the subject varied but may be related to the availability of a voice mail system.

The revised model is an improvement in several respects. First, proposed relationships are empirically examined for strength and robustness. Second, construct variables are graphically detailed. Third, relationship
consistency or variability is indicated. Overall, the revised Impact Model provides a basis for research in which relationships can be further explored.

Observations

Several observations were evident from the study. These observations relate to training, management use, urgency, competitive advantage, database storage, perceived impact, and functional context. A summary of the observations is presented in Table 20.

Training

Lack of training is a common user complaint. Even though users may have several years of computer experience, training is a user concern. Study subjects average approximately 10 years of computer experience and most received little or no training. Results suggest computer experience is not a substitute for application software training in that these experienced users still complain that
more training is needed. This implication is further strengthened by the user level of electronic mail experience. Average electronic mail experience in the three study organizations is 3.9, 1.9, and 3 years, respectively. It appears that electronic mail experience also does not necessarily eliminate the need for training. Thus, training is important regardless of user computer and application experience.

In addition, because experienced users are requesting training, training may need to be an on-going process, rather than a one-time event. This implication is consistent with contentions of Bostrom et al. (1988). Researchers explored the role of training as a motivator of electronic mail use. These authors suggested that unless follow-up assistance is provided after training, perceived usefulness of the system will fade.

**Management**

The most mentioned respondent suggestion was to encourage or force managers and other personnel to use the system. Inadequate use may be a result of the lack of electronic mail knowledge. Evidence of minimal or no training strengthens this conjecture.

**Urgency**

It does not appear that electronic mail systems are utilized as a mechanism to expedite urgent communications in any of the study firms. Only one percent to six percent of
the messages contained priority codes or references to "urgent" or "immediate". An implication is that the electronic mail compliments, rather than replaces ordinary mail or the telephone, as indicated by Hjalmarssson, et al., (1989).

**Competitive Advantage**

Respondents perceive the electronic mail system is providing a competitive advantage. Furthermore, respondents note that when the system is down, there is a competitive disadvantage. Therefore, results support research findings by Neo (1988) which concluded customer needs are an important factor facilitating the use of IT for competitive advantage. Moreover, additional support is provided for the Bharadwaj, et al. (1993) proposed conceptual model for sustainable competitive advantage in service industries. In the model, potential sources of competitive advantages include resources and skills such as communication good effects and IT.

Common user criteria defining advantage in this study relate to improved customer service and a developed electronic mail infrastructure which provides an easier mechanism for prospects to communicate with the firm. The underlying user assumption is that competition does not have a similar infrastructure developed. However, as more firms add external linkages to their electronic mail systems, advantages will lessen or disappear.
Thus, firms will need to seek other sources of electronic mail advantage. One such method may be Internet linkages. Top management at organization “A” is progressing toward a new perspective in locating prospects and better serving customers. Top management has recognized the growing influence of Internet and within five years, will increase use of Internet electronic mail to communicate with customers. As a result, organization “A” has begun printing the company Internet address on all business cards.

The vice president believes the integration of Internet into the internal system will be a sales opportunity from two perspectives. First, organization “A” can provide electronic mail addresses to customers for a fee. Second, Internet addressing will provide an opportunity for greater and immediate access to customers. A result could be a new competitive advantage for the organization.

The move toward Internet is a strategic move for organization “A”. A recent organization customer survey illustrates that only 2% of respondents have an external electronic mail address. Thus, a tremendous opportunity exists for those organizations who become providers and/or create access routes to customers, prospects, and vendors.
Many of the carbon copies were made to the sender. This indicates the use of electronic mail as a personal correspondence database. One respondent noted a system improvement would be to provide more user control in categorizing messages. Another subject emphasized that she carbon copied messages as a defense mechanism and audit trail.

**Impact**

Respondents generally characterized system use as resulting in efficient and effective communication. Participants described the electronic mail system in a positive manner on factors of speed of information sharing, ability to reach people, and control over his/her communication. In addition, subjects perceived low electronic mail information overload and few useless messages. Low information overload is contrary to Crawford's (1982) study in which managers expressed concerns relative to information overload.

Benefits include time savings because of communication speed, ease of communication, less need for FTF contact, accurate distribution of messages, increase legibility over hand-written notes, ubiquity, and day-to-day activities can be time-shifted to less critical times. One manager stated that the system provided a time buffer shielding employees from his occasional volatile temper.
In the study organizations, perception of information float varied by user and by organization. In all firms, management and non-management perception differed. In organization "A" and "C", management reported that mail would remain unopened in their mail box a shorter period of time than non-management personnel indicated. Organization "B" subjects report the opposite phenomena. Moreover, organization "A" and "B" participants perceive that his/her information float time is approximately the same for the other message recipients on the system. In organization "C", management perceived that his/her float time is approximately the same for other message recipients on the system and non-management users perceive that other message recipients wait a longer period.

The respondents also characterize the impact of electronic mail in terms of customer effects. Subjects emphasize electronic mail has increased the quality of customer service. The system permits communication across time and spacial boundaries. In addition, employees state that more customers are requiring suppliers to have electronic mail. Although employees do not perceive a general increase in customers as a result of the electronic mail system, individuals in each study organization indicated that their electronic mail system provided the opportunity for external entities to connect to their system. In one instance, a prospect became a customer
because they could communicate with the study organization using electronic mail.

One area of non-impact relates to meetings. Overall, respondents did not perceive any impact upon meeting times. Results support Zack (1993) research indicating electronic mail complements, rather than substitutes for FTF interaction and that channel interactivity should be matched with the extent of interactive exchange required. Thus, electronic mail is not a substitute for FTF meetings. Although this finding is not necessarily contrary to Dykman (1986) correlations of system use with perceptions of increased effectiveness of meetings, no evidence is provided that meeting time is affected.

Although few weaknesses are detailed, lack of internal usage is the most described weakness of electronic mail. Non-management users claim that management does not use the system as often as respondents deem necessary. These findings are contrary to Dykman's (1986) study results indicating managers were found to use the system significantly more than professional/technical and clerical users. Another weakness of electronic mail is the self-discipline needed to read messages daily.

Other system weaknesses relate to system features. These complaints, however, are program specific and vary by respondent. For instance, one individual preferred a more
obtrusive notification system while another subject preferred a less obtrusive notification process.

**Function and Context**

In analyzing message function by context, percentages within a given function were symmetrical among study organizations. For example, the administrative messages which provide information accounted for 84%, 78%, and 84% of the message function for organizations "A", "B", and "C", respectively. This consistency indicates a potential relationship within individual message function areas and context.

**Discussion**

The research yields numerous findings. Findings will be discussed from five aspects. First, use of electronic messaging is described in terms of distribution. Second, message characteristics are presented. Third, message functions are delineated. Fourth, message context is discussed. Finally, results are discussed relative to the initial research propositions. Findings are presented in the following sub-sections and summarized in Table 21.

**Distribution**

Message distribution indicates the predominance of electronic mail communication in a one-to-one mode. Results illustrate the percent of messages addressed to one recipient was 81%, 87%, and 45% in organizations "A", "B" and "C". Both subject interviews and message content
analysis confirm that the majority of mail was sent to one communication partner. In organization "C", however, the system was used almost equally as a tool for one-to-one and group communication. Approximately 51% of messages in organization "C" were sent to a group. This dispersion is consistent with the workgroup orientation and physical layout of organization "C". Organization "C" employees operate in a large spacial environment with separating dividers.

<table>
<thead>
<tr>
<th>Facet</th>
<th>Conclusion(s)</th>
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</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>generally 1:1, not &quot;everyone&quot;, related to workgroup orientation, individual messages more concise than group messages</td>
</tr>
<tr>
<td>Characteristics</td>
<td>internal data, &quot;phone&quot; in subject when no voice mail system, carbon copying, word count negatively varied with attachment use, not urgent</td>
</tr>
<tr>
<td>Function</td>
<td>administration, internal discussion, minimal personal use, no phone message notes if voice mail system, influence use varies by workgroup orientation</td>
</tr>
<tr>
<td>Context</td>
<td>provide information, minimal negative use</td>
</tr>
</tbody>
</table>

Table 21. Research Findings
Word count analysis indicates individual messages are approximately one-half the length of messages addressed to groups. Specifically, individual messages are concise and less than the organization's average word count. This suggests an increased complexity of messages when addressing messages to a group.

Only a small percentage of the messages, between zero and three percent, were sent to all mailboxes in the three study organizations. Overall, results indicate that message dispersion is related to the workgroup and physical orientation of the organization. In addition, electronic mail is targeted and unlikely to be sent to a mass audience.

Characteristics

The most common message characteristic identified is internal data. Presentation of internal data occurred in 46%, 56%, and 87%, respectively, of the three organization's messages. External data occurred in 55%, 37% and 12% of the messages. Organization "A"s higher occurrence of external data may be due to the retail nature of the organization. Personnel in retailing have considerable contact with customers and vendors. Word count analysis indicates internal information messages are longer than external information messages. It is possible that messages relating to customer, vendors, and other external entities may not require a higher level of detail or precision. In fact,
external messages are consistently less than the length of an average message.

Moreover, the reference to "phone" in the subject field was more common in organization "A", the only firm not using a voice mail system. Thus, storage of phone messages appears related to the presence or absence of a voice mail system.

Another characteristic is the commonality of carbon copying. Results suggest that although messages are targeted, organizational communication of sender activity is important to the sender, required by the organization, or part of the organizational culture.

Use of message attachments may be linked to message sophistication. Messages containing attachments occurred in 57%, 17%, and 43% respectively, of organization "A", "B", and "C"'s messages. Conversely, average message word counts were 50, 68, and 58 words. Thus, as the incidence of message attachments increase, message word count drops. Therefore, organization "B" senders, for example, may be using more description or message complexity, rather than attachments, to relay flow of previous messages as they relate to the current message.

In addition, it does not appear that electronic mail systems are utilized as a mechanism to expedite urgent communications in any of the three study firms. Only one to
six percent of the messages contained priority codes or references to "urgent" or "immediate".

**Function**

Administrative purpose was the predominant message function. Internal discussion was the second most common function. These functions accounted for 76%, 78%, and 77% of the firm's electronic mail communication. Remaining functions such as phone message storage and referral, attempt to influence or persuade recipient, other, and personal were considerably less frequent and varied by organization.

Results are consistent with the findings of other researchers. Sherblom (1988) indicated more complex communication functions such as personal, social, influence, and negotiated communication were sent less frequently. Phillips (1989) found electronic mail was used not only for simple, direct requests but also for manipulative, persuasive ends. Thus, communication was utilized as a tool for influence and persuasion.

However, findings are contrary to McCormick and McCormick (1992) and Lea (1991). McCormick and McCormick found the primary function of undergraduate electronic mail was generally to serve as a purely social function. Lea study subjects construed CMC mainly in terms of its attributes as a medium for conversation and social interaction.
Another message function of importance is use of phone message notes. Organizations "A" and "C" utilize electronic mail to collect phone message data for employees who are not at his/her desk. Neither organization, however, has a voice mail system. Organization "B" uses a voice mail system extensively, but does not have any messages with such data. Consequently, use of phone message notes may be related to availability of voice mail.

Use of influence messages varied by organization. One hundred percent of organization "B"'s influence messages were directed at groups. No influence messages were directed either to individuals or to everyone. In organizations "A" and "C", influence messages were directed primarily to individuals. This suggests that in a non-workgroup environment, electronic mail is used as a mechanism to persuade or influence groups of individuals.

Context

Providing information was the most common message context. Nearly nine of every ten messages provided information. Conversely, between 25% and 31% of the messages contained requests for information. Results suggest that electronic mail is used considerably more for information presentation than for information request. This evidence is in stark contrast to findings of Smeltzer (1992). Smeltzer found the CMC environment was primarily used to obtain information. Moreover, whenever the purpose
of the message was to give information, the message length increased over average. In this study, relative message length for information providing and requesting varied among the three study organizations.

Findings indicate that negative electronic mail use is minimal. Counter-productive use includes flaming and using the system for personal or rumor purposes. Flaming occurred solely in organization "A" and only in two percent of the messages. Only one percent of communication was used for non-company purposes in organizations "A" and "C". Even though organization "B" had a higher percentage, seven percent, all of the personal use was attributed to only one individual. The conclusion supports the work of McCormick and McCormick (1992) which identified electronic mail as containing few messages with hostile or socially inappropriate content. However, results are contrary to Thompsen and Ahn (1992). The Thompsen and Ahn study indicated a fourth of the users experienced at least 25 flaming incidents during the past year while one-third experienced less than five flaming incidents. Moreover, the researchers suggest flaming is less widespread in electronic mail in a university setting as they may be in other settings.

Furthermore, only 25% or less of the messages received are viewed as useless by respondents in each of the study organizations. Consequently, the electronic mail abuse
described in research (Zachary, 1994; Crawford, 1982) regarding larger organizations does not appear to be a common occurrence in intermediate-size firms.

Research Propositions

The research question was used to postulate several initial research propositions. For example, propositions included:

1) Less than 10% of messages are used for personal purposes.
2) Less than 10% of messages are used for flaming.
3) More than 50% of messages are used for one-to-one distribution.
4) More than 50% of messages are used for providing information.

It was posited that communications:

1) are lean, containing minimal "chit chat"
2) contain a minimal amount of flaming
3) are directed, used primarily for one-to-one discussion
4) are used more for information giving than requesting

Results support the first proposition. Table 10 illustrates that in each organization, personal use was considerably less than 10%. Messages were utilized for personal use in 1%, 7%, and 1% of organization "A", "B", and "C"'s messages, respectively. Personal use was generally limited to one individual in each organization. This minimal personal use of electronic mail is contrary to findings of McCormick and McCormick (1992) and Lea (1991) which indicated the primary function of undergraduate
electronic mail was generally to serve as a purely social function. This lack of personal use suggests a level of professionalism in industry which may be superior to that found in a university setting using students. Moreover, results also question the validity of generalizing electronic mail research when student subjects are utilized. Student usage does not appear to be consistent with non-university organizational usage in this regard.

Findings support the second proposition. Table 11 demonstrates that in each organization, flaming occurred considerably less than 10%. Flaming was evident in 2%, 0%, and 0% of organization 'A', 'B', and 'C' s messages, respectively. Thus, results strongly indicate that negative system use is minimal.

Findings do not consistently support the third proposition. Table 7 illustrates that while approximately 81% and 87% of organization 'A' and 'B' s messages were used for one-to-one distribution, less than 50% of organization 'C' s messages were utilized for one-to-one communication. Results are consistent with the workgroup orientation of organization 'C' in which more group communication would be expected.

Results support the forth proposition. In each of the study organizations, more than 50% of messages are used for providing information. Table 11 demonstrates that in each organization, information providing occurred in 87%, 85%,
and 89% of organization "A", "B", and "C"'s messages, respectively. Therefore, results strongly indicate that the primary context for electronic messaging is providing information, rather than requesting information.

Overall, findings indicate that messages are directed at individuals, rather than a mass audience. Dysfunctional uses such as personal use and flaming have minimal incidence. In addition, electronic messaging systems are also utilized primarily for information presentation rather than information request.
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CHAPTER 7

CONCLUSIONS AND IMPLICATIONS

This chapter discusses conclusions and implications of this study's findings. In addition, it identifies the research significance and potential areas of future research.

Conclusions

The purpose of this study is to examine the role of electronic messaging in business firms. The research question is: "What is the impact of electronic messaging on the firm?" The research question was used to postulate several research propositions. The research propositions included:

1) Less than 10% of messages are used for personal purposes.

2) Less than 10% of messages are used for flaming.

3) More than 50% of messages are used for one-to-one distribution.

4) More than 50% of messages are used for providing information.

It was posited that communications:

1) are lean, containing minimal "chit chat"

2) contain a minimal amount of flaming

3) are directed, used primarily for one-to-one discussion

4) are used more for information giving than requesting
The research findings described in Chapters Five and Six yield numerous conclusions. Conclusions are examined relative to the research propositions, message characteristics, and message function.

Results support the first proposition. Personal use was considerably less than 10% and generally limited to one individual in each organization.

Findings support the second proposition. Flaming was evident only in one organization and only in 2% of the organization's messages. Consequently, results strongly indicate that negative system use is minimal.

Findings do not consistently support the third proposition. However, distribution is congruent with workgroup orientation. In organizations without workgroups, over 81% of messages were used for one-to-one distribution. In an organization employing workgroups, more than 50% of messages were utilized for group communication.

Electronic mail is also targeted and unlikely to be sent to a mass audience. Although carbon copying is common, only between zero and three percent of messages were sent to all mail boxes.

Moreover, individual messages are approximately one-half the length of messages addressed to groups. In addition, individual messages are less than the organization's average word count.
Results strongly support the forth proposition. Nearly nine of every ten messages in each study organization were used for providing information, rather than requesting information.

The most common message characteristic is internal data. Internal content messages are more common and longer than external information messages. External messages are consistently less than the length of an average message.

Storage of phone messages appears related to the presence or absence of a voice mail system. In organizations without voice mail, there are references to “phone” in the subject field and use of phone message notes.

Use of message attachments may be linked to message sophistication. As the incidence of message attachments increase, message word count drops by organization.

In addition, it does not appear that electronic mail systems are utilized as a mechanism to expedite urgent communications. Only one to six percent of messages contained priority codes or references to “urgent” or “immediate”.

Administrative purpose and internal discussion are the predominant message functions, accounting for over 76% of each firm’s electronic mail communication. Remaining functions vary by organization.

Results suggest use of influence messages is related to workgroup orientation. In the workgroup organization, all
influence messages were directed at groups. In the non-workgroup organizations, influence messages were directed primarily to individuals.

Overall, initial propositions and posits were consistent with subsequent research findings. Findings indicate dysfunctional electronic mail uses such as personal use and flaming have minimal incidence. Messages are directed relative to workgroup orientation, with few messages sent to all mail boxes. Workgroup orientation is also related to distribution of influence messages. In addition, electronic messaging systems are utilized primarily for information presentation, internal data, administrative purposes, internal discussion, and not as a mechanism to expedite urgent communication. Moreover, storage of phone messages appears related to the presence or absence of a voice mail system. And, use of message attachments may be linked to message sophistication.

Implications

The three organizations investigated in this study provide numerous insights into factors relevant to electronic mail information systems. In addition, results question generalizability of research using students as electronic mail subjects.

One implication results from the finding that electronic mail messaging in industry is minimally dysfunctional. The present study's minimal personal and
flaming use of electronic mail is contrary to findings of prior research conducted in a university environment. This implies a level of professionalism in industry which may be superior to that found of students in a university. Moreover, results question validity of generalizing electronic mail research when student subjects are utilized. In addition, electronic mail abuse described in research regarding larger organizations does not appear to be a common occurrence in intermediate-size firms.

A second implication of the study is that workgroup orientation plays a role in electronic mail distribution. When workgroups are employed, communication is primarily distributed to a group. When workgroups are not present, distribution is almost exclusively one-to-one. Workgroup orientation may also effect distribution of influence or persuasion messages.

A third implication relates to the finding that electronic messaging is used primarily for presentation, rather than requesting information. This implies that electronic messaging is not perceived as appropriate mechanism for information query.

A fourth implication relates to message word count. Individual messages are more concise than group messages. This suggests an increased complexity of messages when addressing messages to a group. Moreover, internal data messages are shorter than external data messages. It is
possible that messages relating to customer, vendors, and other external entities may not require a higher level of detail or precision.

A fifth implication relates to commonality of carbon copying. Results suggest that although messages are targeted, organizational communication of sender activity is important to the sender, required by the organization, or part of organizational culture.

Finally, attachment use may relate to message complexity. Senders, for example, may be using more description or message complexity, rather than attachments, to relay flow of previous messages as they relate to a current message.

Significance of Results

The purpose of this research is to examine the role of electronic messaging in business firms. Objectives are to:
(1) develop a taxonomy of electronic mail uses, (2) develop a theoretical framework for analyzing the impact of electronic mail, and (3) investigate the risks and advantages of electronic messaging.

As a result, this research provides several meaningful contributions to the understanding of electronic mail information systems. The research is important in the field of IS, with both theoretical and practical value. A taxonomy and framework are developed and empirically utilized to analyze the impact, benefits, and risks
associated with EM technology. Furthermore, information float is introduced as a concept worthy of future research.

**Electronic Mail**

The results are important because electronic mail information systems are permeating into many facets of American business. As business is evolving from large "big" businesses into smaller, intermediate units, there has been an explosive growth in electronic mail use. Its impact has been relatively unknown, especially in intermediate-size business. Prior research has explored media richness, flow, acceptance, social presence, and so on with conflicting results. Several findings have indicated dysfunctional use.

This study's investigation of EM's role in the firm helps explain the effect of distribution, function, and context upon the organization. Moreover, workgroup orientation and voice mail presence are identified as factors which effect communication. In addition, results indicate that dysfunctional use is minimal and may not be a significant concern.

These results have practical value in assisting IS managers charged with implementing and supporting IT. Findings will aid management in anticipating the effect of IT implementation, determining how to maximize the benefits, identify the risks, and thus minimize the problems when using communication technology. Consequently, results provide a foundation for understanding potential impacts of
the technology. Moreover, the study calls attention to factors which impact communication effectiveness.

Research Framework

This research demonstrates that the taxonomy of electronic mail uses provides a foundation for classifying electronic messaging research data. The taxonomy was created through empirical investigation of managerial philosophy, user perception, and organizational communication processes relative to electronic mail. The five factor constructs yielded a total of 21 study variables.

Moreover, taxonomy and research results from the organization "A" study produced a theoretical research framework, the Impact Model, which is presented in Figure 4.

Organizations "B" and "C" were used to examine model robustness. The revised Impact Model is presented in Figure 5. This framework serves as a infrastructure for future research which can establish variables and relationships which promote electronic mail communication and which result in advantage or disadvantage.

Results in Chapter Six illustrate applicability and strength of the Impact Model. Using the research technique of content analysis supplemented with subject interviews and questionnaires, rich study results are produced. Moreover, electronic storage of messages in a DBMS increases speed of data coding and analysis. Consequently, organizations were
easily studied and analyzed. In addition, comparison of three study firms provides further support for variables and relationships identified in the model.

The usage taxonomy and framework provide a basis for understanding the impact and implications of IT use. IT diffusion may affect customer service, internal communication structures, communication effectiveness, and ultimately the ability of the firm to compete. Moreover, a research foundation is provided which permits exploration of effective use of electronic mail communication.

**Information Float**

The concept of information float is introduced. Float is the length of time a message is in the system unread. It can be measured from two perspectives: the amount of time a message is unopened in the subject’s mail box and the sender’s perception of the unopened length of time in the recipient’s mail box. Actual time can be compared to perception to determine congruence. Moreover, perception may assist in explaining which type(s) of messages are appropriate on an electronic mail system. If float is perceived as long, alternative communication mechanisms, such as the telephone, may be used to communicate urgent or immediate messages. In addition, user confidence in the system may be eroded if the user perceives recipient float time is unacceptable.
The implication of float time study relates to user confidence, attitude, and system usage. For instance, a poor employee attitude and lack of system confidence may be linked to response time delay, whether actual or perceived. IS personnel may need to employ more training or seek other methods to decrease float time or improve perception of float time. Perceptions of inadequate float time may undermine user confidence and thus jeopardize system use and effectiveness. In addition, types of messages such as those requiring immediate response or action may not be useful in a given electronic mail environment.

**Future Research Directions**

Research opportunities suggested by this research are as follows: First, replication of research using additional organizations with varying organizational characteristics in factors such as competitive strategy, industry type, and top management support would increase the generalizability and validity of the Impact Model. Next, research may be extended to small and large business contexts to determine characteristics which may maximize benefits and minimize risks within given domains.

Second, the researcher may wish to explore relationships of industry factors and technical factors to electronic mail information systems. For example, colleague use, workgroup orientation, technical support, and IT factors such as reliability, availability, and user-
friendliness can be further explored to examine their impact upon communication effectiveness and upon the organization. The relationships may be explored using experimental designs. Ultimately, variables and relationships need to be further delineated to determine which controllable variables are most influential in maximizing benefits and minimizing risks.

Third, the researcher may examine external electronic messaging. One area of research is to explore the effect and impact of Internet and external electronic communication on efficiency, effectiveness, competitive advantage, and so on.

Fourth, the researcher may investigate information float and its various dimensions. Actual float time may be compared to perceived float time to determine if perceptions are congruent with reality. Moreover, the researcher may explore how to improve usage and reduce float time.
<table>
<thead>
<tr>
<th>Construct</th>
<th>Factor</th>
<th>Example(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational</td>
<td>Top Management Support</td>
<td>Mandate</td>
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<tr>
<td>Factors</td>
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<td>Leadership</td>
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<td></td>
<td></td>
<td>Laissez-faire</td>
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<td></td>
<td>Competitive Advantage Strategy</td>
<td>Cost</td>
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<td></td>
<td></td>
<td>Product Differentiation</td>
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<td>Decision Cycle Time</td>
<td>Concentration on Market or Product Niche</td>
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<td>Industry Factors</td>
<td>Sector</td>
<td>Public</td>
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<td>Threat of New Competitors</td>
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<td>Threat of Substitute Products</td>
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<td>Bargaining Power of Suppliers</td>
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<td>Rivalry Among Existing Competitors</td>
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<td>IT Factors</td>
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<td>Availability</td>
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<td>Flexibility</td>
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<td>Response Time</td>
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<td>Obtrusiveness of Notification</td>
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<tr>
<td>Construct</td>
<td>Factor</td>
<td>Example(s)</td>
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<tr>
<td>-----------</td>
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<td>------------</td>
</tr>
<tr>
<td>Nature/Quality of Electronic Mail Technical Support</td>
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<td></td>
</tr>
<tr>
<td>Length of Time Electronic Mail Implemented into Organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual Factors</td>
<td>Status (Level) Within Organization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td></td>
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<td></td>
<td>Experience With IT</td>
<td></td>
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<td>Experience With Electronic Mail</td>
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<td>Quantity of Communication</td>
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<td>Use</td>
<td>Communication Barrier Reduction</td>
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<tr>
<td></td>
<td>Competitive Advantage</td>
<td>Management Perception</td>
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<td>User Perception</td>
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<td>Communication Effectiveness</td>
<td>Information Float Time</td>
</tr>
<tr>
<td></td>
<td>Customer Support</td>
<td>Customer Support Time</td>
</tr>
<tr>
<td></td>
<td>Internal or Customer/Vendor/Prospect Information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication of Strategies/Goals</td>
<td></td>
</tr>
<tr>
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<td>Message Context</td>
<td>Influence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flame</td>
</tr>
<tr>
<td></td>
<td>Function</td>
<td>Information Providing/Giving</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Message Dispersion</td>
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<td>Workgroup Communication</td>
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<tr>
<td>Construct</td>
<td>Factor</td>
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<td>Tool for Expediency</td>
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<td></td>
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<td>File Cabinet</td>
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</table>
APPENDIX B

FACTOR/SURROGATE TABLE
<table>
<thead>
<tr>
<th>FACTOR</th>
<th>SURROGATE MEASURE</th>
<th>DATA TYPE</th>
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<tbody>
<tr>
<td>Competitive Advantage Strategy</td>
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<tr>
<td>Implementation into Organization</td>
<td>Time (months)</td>
<td>Interval</td>
</tr>
<tr>
<td>Individual Usage</td>
<td>Communication initiated</td>
<td>Interval</td>
</tr>
<tr>
<td></td>
<td>Communication received</td>
<td>Interval</td>
</tr>
<tr>
<td></td>
<td>Information overload</td>
<td>Ordinal</td>
</tr>
<tr>
<td></td>
<td>Communication in workgroup</td>
<td>Ordinal</td>
</tr>
<tr>
<td></td>
<td>Total amount of communication</td>
<td>Interval</td>
</tr>
<tr>
<td></td>
<td>Frequency of communication</td>
<td>Ordinal</td>
</tr>
<tr>
<td></td>
<td>Variety of communication partners</td>
<td>Nominal</td>
</tr>
<tr>
<td>Experience</td>
<td>With IT (weeks)</td>
<td>Interval</td>
</tr>
<tr>
<td></td>
<td>With Electronic Mail (weeks)</td>
<td>Interval</td>
</tr>
<tr>
<td></td>
<td>With current Electronic Mail system (weeks)</td>
<td>Interval</td>
</tr>
<tr>
<td>Status in Organization</td>
<td>Level</td>
<td>Nominal</td>
</tr>
<tr>
<td>Training</td>
<td>Amount (hours)</td>
<td>Interval</td>
</tr>
<tr>
<td></td>
<td>Adequate</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Communication Effectiveness</td>
<td>Keep others up-to-date</td>
<td>Ordinal</td>
</tr>
<tr>
<td></td>
<td>Speed of information sharing</td>
<td>Ordinal</td>
</tr>
<tr>
<td></td>
<td>Effectiveness of my work</td>
<td>Ordinal</td>
</tr>
<tr>
<td></td>
<td>Overall quality of my work</td>
<td>Ordinal</td>
</tr>
<tr>
<td></td>
<td>Quantity of work output</td>
<td>Ordinal</td>
</tr>
<tr>
<td>FACTOR</td>
<td>SURROGATE MEASURE</td>
<td>DATA TYPE</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Speed of decision</td>
<td>Ordinal</td>
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</tr>
<tr>
<td>making</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My control over my</td>
<td>Ordinal</td>
<td></td>
</tr>
<tr>
<td>communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to reach people</td>
<td>Ordinal</td>
<td></td>
</tr>
<tr>
<td>Intangible Benefits</td>
<td>Customer support time</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Customer service level</td>
<td>Ordinal</td>
<td></td>
</tr>
<tr>
<td>Information float time</td>
<td>Interval</td>
<td></td>
</tr>
<tr>
<td>Message Content</td>
<td>Frequency</td>
<td>Interval</td>
</tr>
<tr>
<td># of letters forwarded</td>
<td>Interval</td>
<td></td>
</tr>
<tr>
<td># of letters sent to</td>
<td>Interval</td>
<td></td>
</tr>
<tr>
<td>groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard/soft data</td>
<td>Nominal</td>
<td></td>
</tr>
<tr>
<td>Types</td>
<td>Nominal</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Time spent on telephone tag</td>
<td>Interval</td>
</tr>
<tr>
<td>Barriers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barriers to</td>
<td>Nominal</td>
<td></td>
</tr>
<tr>
<td>communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useless messages</td>
<td>Interval</td>
<td></td>
</tr>
<tr>
<td>received</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This questionnaire will be used for determining the organization's competitive advantage strategy and the state of the internal electronic mail (EM) system in YOUR organization. Please answer all questions and feel free to add any comments to the end of the questionnaire. Your identity and responses will be confidential.

Thank you for completing the questionnaire and assisting in this research.

1. Company profile:
   - How many full-time employees are there in your organization? _____
   - How many part-time employees are there in your organization? _____
   - How many full-time employees have EM accounts? _____
   - How many part-time employees have EM accounts? _____

2. What length of time has EM been used in your organization? Please specify the approximate number of: _____ years _____ months

3. Which one of the following best describes your organization's Competitive Advantage Strategy (check only one)?
   - low-cost leadership
   - product differentiation
   - concentration on market or product niche

4. How many hours of EM Training were provided to you? _____ hours
   - If trained, was training adequate?
     - not at all
     - completely

5. The following questions relate to your experience with the internal electronic mail system within your organization. Please circle the answer which best relates to the criteria provided.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>L=low</th>
<th>ML=medium low</th>
<th>M=medium</th>
<th>MH=medium high</th>
<th>H=high</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM information overload</td>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>EM communication in workgroup</td>
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<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>Ability to keep others up-to-date using EM</td>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>Speed of information sharing</td>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>Effectiveness of my communication</td>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>Overall quality of my work because of EM</td>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>Quantity of work output because of EM</td>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>Speed of decision making because of EM</td>
<td>L</td>
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<td>M</td>
<td>MH</td>
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</tr>
<tr>
<td>Ability to reach people</td>
<td>L</td>
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<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>My control over my communication</td>
<td>L</td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>H</td>
</tr>
</tbody>
</table>
6. The following questions relate to your individual usage of the internal electronic mail system within your organization. Please circle the answer which best relates to the criteria provided.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication initiated of your total</td>
<td>0% 25% 50% 75% 100%</td>
</tr>
<tr>
<td>communication</td>
<td></td>
</tr>
<tr>
<td>Messages that you send which have strategic</td>
<td>0% 25% 50% 75% 100%</td>
</tr>
<tr>
<td>message content</td>
<td></td>
</tr>
<tr>
<td>Messages received that you forward to</td>
<td>0% 25% 50% 75% 100%</td>
</tr>
<tr>
<td>someone else</td>
<td></td>
</tr>
<tr>
<td>Messages that you send to a group of people</td>
<td>0% 25% 50% 75% 100%</td>
</tr>
<tr>
<td>Useless messages that you receive</td>
<td>0% 25% 50% 75% 100%</td>
</tr>
</tbody>
</table>

7. What is the approximate total number of messages you send and receive per week? _____

8. How often (in days) do you communicate (send or read messages) on the EM system during a given week? _____ days

9. Which best approximates your variety of EM communication partners within a given week?

   - people 0-1 2-3 4-5 6-7 >7

10. What has the effect of EM usage been upon:
    - Total time spent in meetings?
    - Support time for an individual customer?
    - Quality of customer service?

       decreased no effect increased

11. Please specify the approximate amount of time necessary for the following activities.

       ___ days ___ hrs. ___ min. Information float time (how long in system before you read average message)

       ___ days ___ hrs. ___ min. Information float time (how long in system before others read your messages)
Please provide answers to the following questions in the space provided. If more space is needed, please utilize the last page of the questionnaire.

12. What barriers to communication, in general, affect you?

13. Does the system give the company a competitive advantage? If so, how do you measure the advantage?

14. How did/does the company measure the benefit of the EM system to the company or its customers?

Is the EM system a determining factor in gaining new customers? If yes, how do you know? What was the customer's perceived benefit? Has it caused the company to lose customers?

What are the strengths and weaknesses of the system?

Strengths:

Weaknesses:

15. Was the system a strategic move for the company?

If so, does it continue to be so, and has it met your expectations?

If not, how do you classify the strategic importance of the systems?

16. How can the system or electronic mail procedures be improved to provide competitive advantage or greater competitive advantage?
17. What factors made the company decide to use the EM system?

What were the alternatives, if any?

How would you measure the value of the system today?

What was the original objective of the system?

What is the current objective?
APPENDIX D

USER QUESTIONNAIRE
This questionnaire will be used for determining the state of the internal electronic mail (EM) system in YOUR organization. Please answer all questions and feel free to add any comments to the end of the questionnaire. Your identity and responses will be confidential.

Thank you for completing the questionnaire and assisting in this research.

1. Are you a full-time employee?
   ___ yes
   ___ no

2. Which best describes your status in the organization? (check only one)
   ___ management
   ___ clerical
   ___ production
   ___ other (please describe) ____________________________

3. Please specify the amount of experience that you have with:

   ____________ years ____________ months
   EM

   ____________ years ____________ months
   current EM system

4. How many hours of EM Training were provided to you? _______ hours
   If trained, was training adequate?
   ___ not at all
   ___ completely

5. The following questions relate to your experience with the internal electronic mail system within your organization. Please circle the answer which best relates to the criteria provided.

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<tr>
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<tr>
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<tr>
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<td>MH</td>
<td>H</td>
</tr>
<tr>
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<table>
<thead>
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<tr>
<td>Messages that you send which have strategic message content</td>
<td>0% 25% 50% 75% 100%</td>
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<tr>
<td>Messages received that you forward to someone else</td>
<td>0% 25% 50% 75% 100%</td>
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<tr>
<td>Messages that you send to a group of people</td>
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<tr>
<td>Useless messages that you receive</td>
<td>0% 25% 50% 75% 100%</td>
</tr>
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</table>

7. What is the approximate total number of messages you send and receive per week? ________

8. How often (in days) do you communicate (send or read messages) on the EM system during a given week? ________ days

9. Which best approximates your variety of EM communication partners within a given week?
   people 0-1 2-3 4-5 6-7 >7

10. What has the effect of EM usage been upon:
    Total time spent in meetings?
        decreased  no effect  increased
    Support time for an individual customer?
        decreased  no effect  increased
    Quality of customer service?
        decreased  no effect  increased

11. Please specify the approximate amount of time necessary for the following activities.
    _____ days  _____ hrs.  _____ min.  Information float time (how long in system before you read average message)
    _____ days  _____ hrs.  _____ min.  Information float time (how long in system before others read your messages)
Please provide answers to the following questions in the space provided. If more space is needed, please utilize the last page of the questionnaire.

12. What barriers to communication, in general, affect you?

13. Does the system give the company a competitive advantage? If so, how do you measure the advantage?

14. How did/does the company measure the benefit of the EM system to the company or its customers?

Is the EM system a determining factor in gaining new customers? If yes, how do you know? What was the customer's perceived benefit? Has it caused the company to lose customers?

What are the strengths and weaknesses of the system?

Strengths:

Weaknesses:

15. How can the system or electronic mail procedures be improved to provide competitive advantage or greater competitive advantage?
APPENDIX E

ORGANIZATION CONSENT FORM
My organization, \hspace{1cm}
agrees to participate in the study of the company's internal
electronic mail system. The purpose of the study is to
determine the state of the internal electronic mail (EM)
system and its relationship to the firm's competitive
position. The study will be conducted by Carl Case as part
of his doctoral dissertation in Business Computer
Information Systems. The results will be used to assist
management in determining how to maximize the benefits and
minimize the problems when using electronic mail IT, thus
improving the probability of long-term organization
survival. Data will be collected through a questionnaire
and examination of past electronic mail messages.

I have been informed that any information obtained in
this study will be recorded with a code number that will
allow Carl Case to determine the organization's identity.
At the conclusion of this study, the key that relates my
organization with the assigned code number will be
destroyed. In an effort to improve data collection
accuracy, any interview conversations will be tape recorded.
Under these conditions, I agree that any information
obtained from this research may be used in any way thought
best for publication or education.

I understand that there is no organizational risk or
discomfort directly involved with this research and that I
am free to withdraw my consent and discontinue participation
in this study at any time.

If I have any questions or problems that arise in
connection with my participation in this study, I should
contact Carl Case, the project researcher at (716) 373-8100.

\begin{tabular}{ll}
\hline
\textbf{date} & \textbf{signature of participant} \\
\hline
\textbf{date} & \textbf{title of above individual} \\
\hline
\textbf{date} & \textbf{signature of investigator} \\
\end{tabular}

\hspace{1cm}
THIS PROJECT HAS BEEN REVIEWED BY THE UNIVERSITY OF NORTH
TEXAS COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (Phone:
817-565-3940)
APPENDIX F

PARTICIPANT CONSENT FORM
I, ______________________, agree to participate in the study of my company's internal electronic mail system. The purpose of the study is to determine the state of the internal electronic mail (EM) system and its relationship to the firm's competitive position. The study will be conducted by Carl Case as part of his doctoral dissertation in Business Computer Information Systems. The results will be used to assist management in determining how to maximize the benefits and minimize the problems when using electronic mail IT, thus improving the probability of long-term organizational survival. Data will be collected through a questionnaire and examination of past electronic mail messages.

I have been informed that any information obtained in this study will be recorded with a code number that will allow Carl Case to determine my identity. At the conclusion of this study, the key that relates my name with the assigned code number will be destroyed. I also understand that to improve data collection accuracy, any interview conversations will be tape recorded. Under these conditions, I agree that any information obtained from this research may be used in any way thought best for publication or education.

I understand that there is no personal risk or discomfort directly involved with this research and that I am free to withdraw my consent and discontinue participation in this study at any time. A decision to withdraw from the study will not affect my position at my place of work.

If I have any questions or problems that arise in connection with my participation in this study, I should contact Carl Case, the project researcher at (716) 373-8100.

_________________________  _______________________
date                     signature of participant

_________________________  _______________________
date                     signature of investigator

THIS PROJECT HAS BEEN REVIEWED BY THE UNIVERSITY OF NORTH TEXAS COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (Phone: 817-565-3940)
To : Carl  
CC : Carl  
From : Marsha, Julie  
Date : Mon, Aug 7, 1995  
Subject : Pay Raise  
Type : Phone:  
Message:  

Marsha,  

Please increase Julie’s pay to $11.50 per hour, beginning September 1.  
Thanks.
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<td>CC</td>
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APPENDIX I

COMPUTERIZED CONTENT CODING ALGORITHMS
AUDIENCE: (I)ndividual, (G)roup, (A)ll
 replace AUDIENCE with "I" for no comma or no semi-colon
 in TO
 replace AUDIENCE with "G" for "sales", "computers", or
 comma or semi-colon in TO
 replace AUDIENCE with "A" for "all" or "everyone" in TO

URGENT: True or False
 replace URGENT with "true" for PRIORITY CODE= "R"
 replace URGENT with "true" for "urgent" or "immediate" in
 MESSAGE

MESSAGE TYPE: (A)dministrative, (P)ersonal, (I)nfluence,
 p(H)one, internal (D)iscussion, (O)ther
 replace TYPE with "H" for length of contents in PHONE
 field greater than 0

C_COPIED: True or False
 replace COPIED with "true" for length of contents in CC
 field greater than 0
APPENDIX J

HUMAN CODING ALGORITHMS
REQUEST - information requesting
PROVIDE - information giving
INTERNAL - contains data relevant to the internal functions or operations of the organization. Examples including content relating to human resource management, accounting, logistics, and so on.
EXTERNAL - contains data relevant to the external environment of the organization. There is a reference(s) to vendors, customers, prospects, or other external entities.
FLAME - heated exchange of messages expressing hostility or defensiveness towards others on a computer network (Thompsen and Ahn, 1992). The use of capital letters, denoting shouting, is an example (Rheingold, 1992).
STRATEGY - broad programs for achieving the organization's goals or objectives (Jain, 1990; Stoner, 1978)
MESSAGE TYPE - communication categories including:
(A)dmninistrative - daily operations, meeting announcements, minutes of meetings, requests to meet, and so on
(P)ersonal - non-work related mail
(I)nfluence - attempt to influence or persuade recipient
(p(H)one - store or communicate a phone message internal (D)iscussion - discuss an unresolved issue or present an idea
(O)ther communication - acknowledgments, reminders, and other miscellany
ATTACHMNT - message contains attachment(s) of previous communication
APPENDIX K

MESSAGE RECIPIENT FREQUENCY
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MESSAGE FUNCTION FREQUENCY

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MESSAGE FUNCTION FREQUENCY FOR INDIVIDUALS
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APPENDIX S

MESSAGE FUNCTION FREQUENCY FOR PROVIDING INFORMATION
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<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
APPENDIX U

MESSAGE CONTEXT FREQUENCY FOR INTERNAL INFORMATION
<table>
<thead>
<tr>
<th>Context</th>
<th>Org. &quot;A&quot; #</th>
<th>%</th>
<th>Org. &quot;B&quot; #</th>
<th>%</th>
<th>Org. &quot;C&quot; #</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide Information</td>
<td>213</td>
<td>45%</td>
<td>45</td>
<td>63%</td>
<td>94</td>
<td>86%</td>
</tr>
<tr>
<td>Request Information</td>
<td>62</td>
<td>44%</td>
<td>11</td>
<td>39%</td>
<td>30</td>
<td>97%</td>
</tr>
<tr>
<td>Discuss Strategy</td>
<td>23</td>
<td>64%</td>
<td>1</td>
<td>100%</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td>Flame</td>
<td>11</td>
<td>92%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
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</tbody>
</table>
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