GROUP SUPPORT SYSTEMS AND POWER AND INFLUENCE:

A CASE STUDY

By

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NOMENCLATURE

AA	Administrative Assistant
CASE	Computer Aided Software Engineering
CEO	Chief Executive Officer
CSCW	Computer-based Systems for Collaborative Work
EMS	Electronic Meeting Systems
GCSS	Group Communication Support Systems
GDSS	Group Decision Support Systems
GSS	Group Support Systems
HR	Human Resources
IS	Information Systems
MIS	Management Information Systems
PR	Public Relations
QA	Quality Assurance

CHAPTER I

INTRODUCTION

1.1 Groups and Organizational Decision Making

The impact of technology on organizational decision making is a topic of importance to information systems researchers and practitioners. Providing support for organizational decision making and improving the quality of decision outcomes through information technology is a key role of Management Information Systems (MIS). A great deal of MIS research is based on the premise that creating information systems that will improve decision outcomes requires a deeper understanding of the decision making *process*. Historically, much of this research has been devoted to supporting the needs and decision making processes of individual decision makers. However, many decisions confronting organizations are made by groups. Consequently, the support of group decision making activities and processes has received increased attention from MIS researchers.

The importance of group decision making within organizational settings is clear. Researchers have noted that many significant decisions in organizations either are made by groups or are influenced by groups that are called upon in

such instances to provide recommendations to the decision maker (Nunamaker et al., 1991). A common forum for organizational decision making is the group meeting. Evidence of the importance and frequency of group meetings is demonstrated by studies showing that managers spend significant amounts of time (as much as 25% to 50%) in meetings (Hymowits, 1988). In addition to being notoriously time-consuming, meetings are also frequently perceived by participants to be unproductive (Goldhaber, 1974; Hymowits, 1988; Mosvick and Nelson, 1987; Tubbs, 1984). Furthermore, in many organizational meetings, the theoretical benefits of group interaction (such as increased sharing of ideas and more complete analysis of issues) are often not realized due to the negative influences of dominant individuals, pressures to conform, and the failure to tolerate or to be willing to express minority points of view (Forman, 1985). Recognition of these problems, together with advances in information technologies have prompted MIS researchers to design information systems specifically intended to support and improve the group decision making process.

1.2 Technological Support for Groups

Computer-based systems intended to support group work take several different forms. Systems that support groups are most commonly classified into two broad categories according to the primary purpose that the system is intended to serve: (1) those that are designed to enable or improve communication

among group members, and (2) those that are designed to support problem solving or decision making tasks (Pinsonneault and Kraemer, 1989). Systems that primarily provide support for group communication needs are known as either group communication support systems (GCSS), or computer-based systems for collaborative work (CSCW). These systems typically provide a way for group members to communicate more efficiently when involved in collaborative projects, such as jointly authoring an article or proposal. Examples include electronic mail, graphical representation aids (i.e., large video displays) and local group networks. These systems are distinguished from the second class of systems which in addition to removing communications barriers, provide explicit decision aiding techniques and/or attempt to structure the decision making process in some way. Examples would include sophisticated electronic meetings rooms in which the pattern and timing of communications is controlled by embedded expert systems, and systems that provide computer support for group decision techniques, such as the Delphi method, the nominal group technique, the analytic hierarchy process and similar tools.

Systems that are intended to support group problem solving and/or decision making tasks have traditionally been known as group decision support systems (GDSS). DeSanctis and Gallupe (1985) defined GDSS as "interactive, computer-based systems which facilitate the solution of unstructured problems by a set of decision makers working together as a group" (p.

3). This definition encompasses computer-based technologies that are qualitatively different with respect to the kinds of tasks supported, the level of technology provided, and the decision making setting. Consequently, there is a lack of consensus in the literature as to exactly what constitutes a group decision support system (Pinsonneault and Kraemer, 1989).

Information technologies that support group decision making have traditionally focused on same time-same place meetings. Such face-to-face meeting technologies are commonly referred to as electronic decision rooms, or electronic meeting rooms. However, GDSS can also address activities that occur in geographically or time dispersed settings. Dennis et al. (1988) have suggested the term "electronic meeting systems" (EMS) to designate technology that supports both the task and communication needs of group work occurring in meetings. Another "umbrella" term, group support systems (GSS), has recently been introduced that broadly includes systems that provide support at any point along the spectrum of group communication and decision making needs. The trend is to adopt terminology that does not imply a restriction on the types of tasks that the technology supports (e.g., communication, decision making, idea generation, planning, problem structuring, etc.), and to include technologies which support forums other than those in which groups must meet at the same time and same place. This study focuses on systems that provide support for any group decision making activity

and/or setting. Therefore, the more inclusive term for such technologies (i.e., GSS) will be adopted throughout the remainder of this discourse.

For purposes of this study, group decision making is defined as "two or more people who are jointly responsible for detecting a problem, elaborating on the nature of the problem, generating possible solutions, evaluating potential solutions, or formulating strategies for implementing solutions" (DeSanctis and Gallupe, 1987, p. 590). This definition does not imply that such activities are restricted to same-time, same-place meetings. GSS are intended to support and improve these activities and processes (across temporal and/or geographic boundaries, if necessary) through a combination of communication, computer and decision technologies (DeSanctis and Gallupe, 1987; Pinsonneault and Kraemer, 1989). The introduction of these technologies into the group decision making setting theoretically provides support by removing communication barriers, providing structure and techniques for decision analysis, and in its ultimate form, directing the pattern, timing and/or content of the exchange of information among group members (DeSanctis and Gallupe, 1987).

1.3 Power and Influence In Group Meetings

Group discussions not only provide a vehicle for organizational decision making, but also a forum for participants to acquire, maintain and exercise power (Lippit

et al., 1968). Researchers in organizational behavior have found empirical support for the model of organizational decision making in which power and politics play a key role (Pettigrew, 1973; Pfeffer and Salancik, 1974; Quinn, 1980; Dean and Sharfman, 1992). Political models suggest that individual managers often have conflicting goals and may seek to influence decision outcomes in ways that are favorable to themselves, and that in such instances, power ultimately "wins the battle of choice" (Eisenhardt and Zbaracki, 1992, p. 13). Empirical studies have shown that traditional group decisions are often not the result of rational behavior, but instead follow the preferences of the most powerful people, even when these preferences are not in the best interest of the organization (March, 1955; Hinings et al., 1974; Salancik, 1986; Eisenhardt and Zbaracki, 1992). According to DeSanctis and Gallupe (1987), to the extent that a GSS decreases the dysfunctional effects that powerful individuals impose on group meetings, power distribution and influence, as well as decision processes and outcomes, can be expected to change. Theoretically, the use of a GSS should bring about changes in the political dynamics of the group. DeSanctis and Gallupe imply that use of the GSS technology will tend to make participation in the decision making process more equal, lessening the effect that dominant individuals would otherwise play in decision making activities, and thus, effectively reducing or redistributing the amount of perceived power and influence such individuals possess. An implication for

researchers is that in order to alter traditional group decision making in a positive way through the use of GSS technologies, the manner in which GSS impacts and is impacted by power and influence in organizations needs to be better understood and included in the design and implementation of such systems.

The need to empirically investigate the relationships between GSS and power distribution has been recognized by several researchers. In a seminal paper, DeSanctis and Gallupe (1987) proposed an extensive research framework for GSS. Among the areas identified as being in need of empirical investigation is the effect of GSS on power and influence. Similarly, based on a review of the GSS literature, Pinsonneault and Kraemer (1989) found that the impacts of technology on power struggles, status establishment and hidden agendas have received very little attention despite the fact that Schwartzman (1986) and other behavioral researchers have suggested that such activities may comprise the most important dimension of group meetings. Similarly, Huber (1990) urged information systems researchers to increase the amount of effort directed at studying the effects of advanced information technologies on organizational design, intelligence and decision processes and outcomes.

In spite of these calls for research, there has been little empirical investigation of the effects of GSS technologies on the distribution of power and influence within organizations. Moreover, existing empirical research related

to the impact of GSS technologies relies largely on laboratory studies rather than field studies or field tests. This may be due to at least two factors: (1) GSS is a relatively new technology, and until recently, few organizations have had GSS capabilities; and (2) conducting field research is difficult because the number of factors that can be controlled in organizational settings is limited. Nonetheless, given the turbulence and complexity of today's business environment, group decision making is a necessity. It follows that providing technological support for group decision making activities and subsequently evaluating the impact of this support on the structure of organizations are fundamental issues for information systems researchers.

1.4 Purpose of Research

The purpose of this study is to provide empirical evidence from the field on the effects of GSS with regard to the distribution of power and influence in organizations, and to examine the relationship between GSS-induced changes in the distribution of power and decision quality. An interesting set of research questions can be framed by considering the intersection of GSS and power within the context of the political model of organizational decision making. Generally, it is theorized that group dynamics will change when technology is imposed on the process of group decision making. GSS are likely and often intended to change the patterns of communication by equalizing participation and reducing the

dominance of individual members (DeSanctis and Gallupe, 1987). To the extent that this actually occurs, the actual and/or perceived influence of powerful individuals can be expected to diminish and the use of informal mechanisms for exercising power can be expected to rise. Informal mechanisms for acquiring and exercising power include activities such as lunchroom and hallway discussions, comments made at the water fountain, etc.

The central proposition of this dissertation is that information and communication technologies that support group decision making in organizations will alter the distribution of power and the manner in which power is acquired, maintained and exercised. Specifically, the objectives of this study and a related set of questions for each, many of which are drawn from the suggestions for future research set forth by DeSanctis and Gallupe (1987), are as follows:

1. *To investigate the effects of GSS on the distribution of power and influence in organizations.*

   What is the impact of GSS on the distribution of power and influence in organizations? If changes in power and influence occur, what is their nature? How do such changes occur and why?

2. *To investigate the effects of GSS on the manner in which power and influence are acquired, maintained and exercised.*

   Do GSS change the manner in which power and influence are acquired, maintained and/or exercised? When a GSS prevents power plays from occurring in meetings, do

powerful people seek alternate means of exercising power? If so, what channels of communication and mechanisms (formal or informal) are used? If power plays are carried out in the hallways and lunchroom, then how effective are GSS at actually altering decision outcomes?

3. *To investigate the effects of GSS on the quality of decisions made by groups.*

Assuming that GSS lead to changes in power and influence, how do these changes affect the subsequent quality of group decision processes and outcomes? Previous research has yielded conflicting results concerning the effects of GSS on decision quality. An interesting question is whether the effect of GSS on decision processes and outcomes is a direct one (i.e., due to the technologies imposed) or an indirect consequence of altering the manner and extent to which influential people carry out political maneuvers.

1.5 Significance of Research

This dissertation makes a significant contribution to MIS research in several respects. First, this study considers the effect of information technology on organizational factors, and thus, attempts to link information systems (IS) research to established theories in organizational behavior. Many IS researchers have examined the effects of IS technology on group decision outcomes. The dependent variables in these studies have typically included such things as time to reach consensus, decision confidence, satisfaction with the decision

process, and decision quality (Benbasat et al, 1991; Dennis et al., 1988; Pinsonneault and Kraemer, 1989; and Gray et al., 1990). These studies have established a core body of knowledge between GSS features and decision variables, but generally fall short of investigating the impact on organizational features. Thus, while our knowledge of the relationships between information technology and decision variables is maturing, our understanding of the impact of information technology on the broader plane of organizational design and structure remains limited. Nonetheless, numerous organizational researchers have argued that the effects of the introduction of new technologies should not be considered in isolation, but rather viewed as part of the total organizational environment (Buchanan and Boddy, 1982; Agervold, 1987; Nelson, 1990). For example, Nelson (1990, p. 79) states:

> "Technological innovation is not solely a technical change; rather, it is social change affecting the behaviors of individuals and groups within the organization, and it is structural change that alters the information flows and work designs of the organization".

In addition to behavioral researchers, prominent IS researchers have identified the need for interdisciplinary research that will link IS theories and empirical work to those in organizational behavior and organizational design (Huber, 1990; DeSanctis and Gallupe, 1987; Pinsonneault and Kraemer, 1989). This study responds to these calls for research, and makes a direct contribution to knowledge in this

area.

Second, and more specifically, there are few empirical studies linking information technologies to the concepts of organizational power and influence. Although power relationships are recognized by researchers in organizational behavior as important in group decision making, a review of GSS literature reveals that the effects of GSS on power have seldom been considered. Several observations suggest that this gap in the existing literature should be addressed. First, the importance of group meetings for organizational decision making is widely recognized. Group meetings are a necessity and pervasive in most organizations (Schwartzman, 1986). At the same time, group meetings are problematic in that they occupy a disproportionately large amount of managers' time. There is, therefore, a growing desire to both reduce the time managers spend in group meetings and to provide technologies that improve the effectiveness and efficiency of group meetings. This desire, in turn, has prompted an increase in the use of GSS technologies, such as electronic mail, decision rooms, video teleconferencing, etc. When such technologies are used, information is often redistributed, channels through which information can be obtained are altered, and usual patterns of participation are disrupted. The relationships between the enabling GSS technologies, information, and power/status issues, therefore, are certain to be affected. Given the importance and pervasiveness of group meetings, the interest in technologies

which support them, and the likelihood of their impact on the distribution of organizational power and influence, empirical studies that seek to go a step beyond the examination of typical decision outcome variables and discover the relationships between GSS and power are needed.

Third, although GSS researchers are beginning to move away from the lab and into the field, the majority of the empirical research appearing in the GSS literature has been in the form of laboratory studies and involved groups with little or no history. While this has been necessary to control factors that might otherwise bias results, it has limited the generalizability of the findings. In actual organizational settings, where factors such as group history, status of group members, and power struggles between members are certain to play a role in group decision making processes, empirical evidence is lacking. There is a need to look beyond the effects of information technologies on decision outcomes and to begin to scientifically evaluate the impact of these technologies on the organization. This study, by virtue of being conducted in the field rather than the lab, provides important insights that are not possible on the basis of lab research alone.

Overall, this study represents a first attempt to develop a model of the relationship between GSS and organizational power and influence. As such, the results of this study are of interest to researchers in both MIS and organizational behavior. Additionally, this study provides insight into the

design and implementation of future GSSs. These issues are of interest not just to IS researchers, but also to IS developers, practitioners and managers.

1.6 Organization of Research

This dissertation is organized into six chapters. Chapter I introduces the problem under investigation and provides an overview of the significance of this study. In Chapter II a review of the relevant literature is presented. This review includes important theoretical and empirical issues regarding the concepts of organizational power, as well as a review of the existing body of knowledge in the area of group support systems.

Chapter III describes the research design and methodology used in this study. The propositions that guided this study are presented, along with a description of the data collection and data analysis procedures. Validity issues are also addressed.

The results of the study are presented in Chapter IV. In Chapter V, the results of the study are discussed and interpreted, and models of the effects of GSS on power and influence are proposed.

A summary of the findings of this dissertation, a discussion of the contributions and limitations of this study, and suggested directions for future research are presented in Chapter VI.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

2.1 Overview

This chapter reviews the literature that provides theoretical grounding for this study. First, the role of power and politics in organizational decision making is considered. Five well-known models of organizational decision making are briefly reviewed. It is then argued that the political model is empirically supported, and thus provides an appropriate framework for this study. Second, the conceptual bases and determinants of organizational power are examined, defined and discussed. Third, the theoretical underpinnings of and empirical findings related to the study of group support systems are reviewed.

2.2 The Role of Power and Politics in Organizational Decision Making

An implicit assumption of this study is that power and influence are important dimensions of organizational decision making. However, this perspective is not the one upon which the design and implementation of information systems have traditionally been based. The model of organizational decision making in which power and politics play a key role is

only one of several, competing schools of thought regarding organizational decision making that can be found in the literature. The most frequently mentioned models are the rational model, the satisficing model, the program model, the political model, and the garbage can model (Huber, 1981; Eisenhardt and Zbaracki, 1992). Information systems development has generally been based on the rational and satisficing paradigms, and to a lesser extent, the program model. These models and the empirical evidence supporting them will be discussed in the following sections. It will be argued that the political model, in which power and influence play a key role, is both descriptive of actual group decision making processes and empirically supported, and therefore, provides an appropriate framework upon which to base this study.

2.2.1 Models of Organizational Decision Making

The rational model is the traditional view and forms the basis for many of the analysis techniques of classical decision theory. This model views decision makers as completely rational, operating autonomously in a world where all alternatives, their consequences and probabilities of occurrence are known. The model of economic man assumes that decision makers have complete information, consistent preferences, and will make choices in a manner consistent with maximizing utility. Decision making based on this view is

methodical and systematic, and makes many assumptions about both the characteristics of the decision maker and the task. Decision analysis techniques based on these methods are essentially normative, and tell us how decision makers SHOULD make decisions. However, it has long been agreed that the rational model is not descriptive of the way in which decisions are actually made. Furthermore, it is intuitively obvious that many of the assumptions of this model are not valid. For example, humans seldom have complete information, seldom reason through every possible alternative and are often unable to measure the utility of various alternatives.

One of the biggest critics of the rational model was Simon (1976), who argued that decision making is based on the principle of "satisficing" rather than utility maximization. This view more realistically assumes that rational behavior is bounded by the capacity of the human information processing system and the fact that decision makers often operate with limited, incomplete and imperfect knowledge. This "bounded rationality" imposes cognitive constraints which cause decision makers to search heuristically for solutions that are "good enough" as opposed to optimal. The emphasis in this model of decision making is more on the processes involved that on the outcomes. The satisficing model is intuitively appealing and has provided a foundation for much of the work in the design of decision support systems. However, this model is still largely guided by boundedly rational principles.

Other less rational models have been suggested, and have important implications for information systems researchers, particularly in decision settings which involve groups rather than individual decision makers. For example, Allison (1971) suggested that decision making in organizations is guided less by rationality and analysis than by standard operating procedures, conformance to group norms, budget limitations, reinforcement of past decisions, etc. Professional training, motivational programs and organizational reward systems encourage decision makers to act a certain way. Programs such as these are hard to change, and tend to routinize decision making. The frequent result is that decision making behavior at time t is most easily predicted by what happened at time $t-1$, irrespective of the continued appropriateness of the prior approach (Huber, 1984). This model suggests that it is important to identify these programs, organizational roles, and channels of communication when attempting to support decision making. Although decision support systems intended to support either individuals or groups should not blindly mimic or encourage such practices, in order to be effective they must recognize the importance of systematic procedures, and to the extent possible, work within the limitations they impose to improve decision making.

Other researchers have argued that organizational decisions are made by people with competing, often conflicting goals. In these instances, there will be a desire to affect decisions in a direction favorable to one's own personal

agenda. Very often, power and influence, rather than rationality or standard operating procedures, determine outcomes. This suggests that more nebulous forces, such as the establishment of status, power struggles and political clout which enhance one's negotiation and bargaining position are important in the decision making process.

Finally, the garbage can model (Cohen et al., 1972) views decision making largely as a result of chance. In this view, decision making occurs in inconsistent, ambiguous settings which Cohen et al. characterized as "organized anarchies". Decisions are not the outcome of rational, procedural or political activities, but rather are "consequences of intersections of problems looking for solutions, solutions looking for problems and opportunities for decision making" (Huber, 1981). In the garbage can model, decisions are not centered on either behavioral or normative theory, but are the result of random, stochastic events. This model emphasizes the roles of chance, luck and timing in determining what gets decided.

2.2.2 Empirical Support for the Various Models

In an extensive, recent review of nearly fifty case and field studies, Eisenhardt and Zbaracki (1992) found the empirically supported conclusion is that "decision makers are boundedly rational, *power wins battles of choice*, and chance matters" (p. 17, emphasis added). Eisenhardt and Zbaracki

found little empirical support for the purely rational model. Not surprisingly, numerous limitations, such as lack of clarity with respect to goals, limited search for alternatives, and less than complete analysis of alternatives, were found. Eisenhardt and Zbaracki suggest that these and other cognitive limitations (which are associated with the "boundedly" rational model), along with standard operating procedures (which are associated with the program model) may be responsible for less than complete search and analysis. Additionally, elements of rational decision making appear to be less prevalent when conditions are unstable. The empirical evidence suggests that rationality is positively related to organizational performance when the environment is stable, but negatively related to performance when then environment is turbulent (Eisenhardt and Zbaracki, 1992). Finding some support for the "boundedly" rational and program models, Eisenhardt and Zbaracki concluded that decision makers are boundedly rational in some ways, but not so in others. Studies which support these conclusions include those by Cyert and March (1963), Allison (1971), Carter (1971), Mintzberg et al. (1976), Anderson (1983), Fredrickson (1985), Pinfield (1986), and Dean and Sharfman, (1992).

In addition to the limited empirical support found for the boundedly rational and program models, Eisenhardt and Zbaracki found convincing support for the political model, in which organizations are viewed as political systems and decisions follow the desires of the most powerful people. In

such a model, people with conflicting goals engage in political maneuvers to enhance their power to influence the outcomes of decisions facing the organization. Eisenhardt and Zbaracki claim that these ideas form a "much more coherent theory than do those of bounded rationality" and that "these observations fit both the published research and most people's day-to-day experience within organizations" (p. 27). A summary of the findings of the Eisenhardt and Zbaracki overview with respect to empirical support for the political model of decision making is provided in Table 1.

TABLE 1

EMPIRICAL SUPPORT FOR THE POLITICAL MODEL OF ORGANIZATIONAL DECISION MAKING

Author & Year	Methodology	Findings of Study
Allison (1971)	Case Study	Decision outcome is a result of bargaining among participants
Baldridge (1971)	Case Study	Power wins when conflicting interests are present
Sapolsky (1972)	Case Study	Success depends on political skills
Pettigrew (1973)	Case Study	Decision process is a political struggle; control of communications channels is critical

TABLE 1 (Continued)

Author & Year	Methodology	Findings of Study
Pfeffer & Salancik (1974) and Salancik & Pfeffer (1974)	Field Studies	Powerful departments get more resources
Hills & Mahoney (1978)	Field Study	Power affects resource allocation, especially when resources are scarce
Borum (1980)	Case Study	Power balance is important
Gandz & Murray (1980)	Field Survey	Politics are pervasive in organizations
Pfeffer & Moore (1980)	Field Study	Strong association between power and scarce resources
Quinn (1980)	Case Studies	Firm is a political system
Eisenhardt & Bourgeois (1988)	Case Studies	Politics are more prevalent when power imbalances exist
Eisenhardt & Bourgeois (1992)	Case Studies	Conflict arises from roles, interactions, and tactics
Dean & Sharfman (1992)	Field Study	Differing interests lead to political behavior

(From Eisenhardt and Bourgeois, 1992)

Interestingly, Eisenhardt and Zbaracki found the garbage can model to be less empirically robust than any of the other models. Modest support for this model can be found in studies by Cohen et al., (1972), Olsen (1976), Rommetveit (1976), Weiner (1976), Anderson and Fischer (1986), and Levitt and Nass (1989). However, Eisenhardt and Zbaracki insightfully

suggest that instances which appear to support the garbage can model may in fact represent the unexplained variance of the other models (Eisenhardt and Zbaracki, 1992).

Several key observations for the current study arise from the analysis of Eisenhardt and Zbaracki. First, individually, most decision makers behave rationally in some ways, and in other ways not. However, rationality on the part of individual decision makers does not necessarily imply collective rationality on the part of decision making groups. Secondly, most decisions contain rational, political, program and garbage can aspects, all of which need to be considered when evaluating the effects of technology. Factors such as the complexity of the task, the amount of uncertainty that is present, and various organizational factors are likely to affect the degree of rationality and/or politicization in the decision making process. It is, therefore, important to study decisions in the context of organizations, where uncertainty and environmental turbulence must be dealt with. Third, organizational decision making is essentially political, even though people may individually be "boundedly" rational. This has direct implications for GSS researchers. Most of IS has built upon rational and satisficing models of decision making, and to a lesser extent, the program model. However, the political model has little attention from IS researchers.

Given the preponderance of empirical support for the political model and the implications it poses for group decision making, there is a need to examine the power

literature from organizational behavior and organizational theory, and to link these findings and theories to IS research in general, and GSS research in particular.

2.3 The Concepts of Power, Influence and Politics

Although researchers in organizational behavior and organizational design have studied power and politics for many years, the concept of organizational power and its measurement in scientific terms remains somewhat elusive. Interestingly, although the study and measurement of organizational power poses difficulties for social scientists, most individuals in organizations have little or no difficulty recognizing who the powerful people in the workplace are (Salancik and Pfeffer, 1977). Power, influence and politics are present in virtually all organizations, and in many cases, the consequences of power are directly observable. To the extent that political or influence attempts are successful, they may result in suboptimal and inefficient allocation of organizational resources. Power and influence thus represent an "irrational" but nonetheless very real component of organizational decision making.

While it can be argued that the terms power, influence and politics are closely related and often used interchangeably (Tannenbaum, 1968), they represent slightly different concepts. As shown in Table 2, there have been many definitions of these terms. In laymen's terms, power simply

represents the ability to influence decision outcomes; influence denotes the ability to affect a change in behavior or beliefs; and politics refers to the tactics, methods and/or maneuvers used to achieve influence or power. Following a review of the relevant literature, more precise definitions of these terms will be adopted.

TABLE 2

DEFINITIONS OF POWER, INFLUENCE AND POLITICS

Power	
French & Raven (1959)	The maximum possible influence of A on B in system x.
Mechanic (1962)	Any force that results in behavior that would not have occurred if the force had not been present.
Hickson et al. (1971)	The determination of behavior of one social unit by another.
Salancik & Pfeffer (1974)	The ability to get things done the way one wants them to be done.
Pfeffer (1981, 1992)	The potential ability to influence behavior, to change the course of events, to overcome resistance, and to get people to do things that they would not otherwise do.
Cobb (1986)	A function of an individual's resources and his/her ability to use those resources effectively.

TABLE 2 (Continued)

Saunders (1981)	The capability of one subunit, either through formal position or through actual or perceived participation in organizational activities to exert influence on another subunit to act in a prescribed manner.
Influence	
Ho & Raman (1991)	The effects of action on the group's consensus.
Hinings et al. (1974)	Perceived power.
Politics	
Eisenhardt & Zbaracki (1992)	The observable, but often covert actions by which people enhance their power to influence a decision.
Cobb (1986)	How power is used to resolve uncertainty and/or dissention regarding organizational actions and objectives.

2.3.1 Theoretical Perspectives of Power

The pioneering theoretical work regarding the concept of power and social influence was conducted by French and Raven (1959), who defined power in terms of influence, and influence in terms of psychological change. The typology developed by French and Raven was framed within the broad context of structural and social relationships. Although the work of French and Raven was not specifically directed at

organizational decision making, is reviewed in some detail here because it laid the initial groundwork for much of the work that followed, and is considered a classic treatise in the organizational behavior literature.

French and Raven viewed power in terms of the influence of a social agent, *A*, on a person, *B*, within a system *x*, where *A* may be another person, a role, a norm or a group. According to French and Raven, the power of *A* is the maximum possible influence of *A* on *B* in system *x*. Formally, French and Raven defined power as a function of two opposing forces: one in the direction of the influence attempt and the other in the resisting direction, where both forces result from an act of *A*. French and Raven suggested that certain relationships between *A* and *B* give rise to the bases or sources of power, but emphasize that power is not limited to having only one source.

The classification offered by French and Raven defined five sources as being of greatest importance. These are reward power, coercive power, legitimate power, referent power and expert power. Reward power is based on the ability of *A* to obtain rewards for *B*. The strength of this power increases with the perceived magnitude of the potential reward, and with the perceived likelihood that *A* will act on the behalf of *B* to negotiate the reward. A common example is the use of piece-rate bonus incentives to increase factory production. Coercive power similarly depends on the anticipated ability of *A* to control or manipulate certain outcomes, but involves

negative rather than positive outcomes. Specifically, coercive power is based on the expectation that *A* will punish *B* if *B* does not respond in the expected manner to the influence attempt. Again, the strength of this power increases with the magnitude and likelihood of the expected punishment. An example is the ability to fire a worker who falls below a given level of performance. Legitimate power is based on the internal and cultural values held by *B* (derived from family, formal education, religious training, etc.) which in effect prescribe the legitimate right of others to influence the behavior or beliefs of *B*, and effectively obligate *B* to accept the influence. Legitimate power is often associated with the hierarchy of authority dictated by social or organizational structures and the perceived right of an individual to occupy his/her position within that hierarchy. Referent power is based on the desire of *B* to identify with or "be like" *A*. To the extent that "being like" or closely associated with *A* is attractive, *B* will tend to behave as *A* does. Although referent power implies conformity on the part of *B*, it can be differentiated from reward power and coercive power if rewards can be gained or punishment avoided by virtue of the identification of *B* with *A*, regardless of *A's* responses. Expert power stems from the knowledge which *B* perceives *A* as having, within a limited domain, relative to either *B's* own knowledge or to some absolute standard. The strength of expert power varies with the extent of the knowledge which *B* believes *A* possesses, and the degree to

which *B* believes that *A* can be trusted to tell the truth. If *B* considers the opinion of the expert to be valid and takes action accordingly, then the expert has effectively exercised expert power.

Three important aspects of the conceptualization of power put forth by French and Raven can be identified for the current study. First, power should be viewed as a property of social/structural relationships, not simply as attributes of individuals. Studying power from this perspective has been advocated by other researchers, including Perrow (1970), Emerson (1962), and Hickson et al. (1971), all of whom argue that power in organizations is a primarily a function of social relationships. For example, Hickson et al. (1971, p. 34) state:

> "when organizations are conceived as interdependent systems ... power is explained by variables that are elements of each subunit's task, its functioning, and its links with the activities of other subunits."

Second, power is tied to the perceptions of the those at whom influence attempts are directed. Each of French and Raven's sources of power has to do not just with the actual ability of an individual or subunit to bring about outcomes (with either positive or negative valences), but also with the *perceived* ability to do so. Third, coercion, which is sometimes taken as a definition of power, is one of several means of power, but is not by itself an adequate definition of power.

Mechanic (1962) defined power from a different

perspective than that of French and Raven (1959). Still viewing power in terms of relationships, Mechanic defined power as "any force that results in behavior that would not have occurred if the force had not been present" (p. 349). Mechanic suggested that power is related to dependence, in that the more dependent a person is on someone else for access to important resources (such as information, persons, and facilities) the more powerful the controlling entity becomes. Likewise, power increases with the criticality of the resources being controlled. Thus, in this view, the control of resources is the basis of organizational power. Other factors affecting power as suggested by Mechanic include expert knowledge, skills, replaceability, time (i.e., length of service), commitment, effort, interest, attractiveness, and centrality.

In the 1970s, Hickson et al. (1971) noted that power has most often been treated by researchers as an independent variable used to explain other phenomena such as decision making behavior, but that within organizations, power itself had not been explained. In an attempt to remedy this situation, Hickson et al. proposed a theoretical explanation of power with power as the dependent variable. Hickson et al. defined power as "the determination of the behavior of one social unit by another" (p. 36). Hickson et al. suggested that within the organizational context, a major task is dealing with uncertainty, where uncertainty is defined as the lack of information about future events to the extent that

outcomes are not predictable. The crux of the argument put forth by Hickson et al. is that if coping with uncertainty is a central problem in organizations, then the ability of some entity *E* (where *E* may be a person, group, department, or other subunit) within the organization to cope with the uncertainties facing other entities within the organization will contribute to the power of *E*. This coping ability confers power by creating dependencies on *E* for the removal of contingencies that would otherwise be required. Furthermore, Hickson et al. suggested that the power of *E* is related not just to *E*'s coping ability, but also to the extent to which *E*'s coping abilities cannot be obtained elsewhere --- that is, the extent to which no substitute for *E*'s activities is available. Finally, Hickson et al. suggested that power is also partially determined by a third variable, centrality, which reflects the degree to which the activities of an organizational entity are linked to the activities of other entities within the organization. In the view of Hickson et al., coping with uncertainty and substitutability cannot affect power in the absence of centrality. That is, activities between entities must be somewhat intertwined in order for power to be affected. Centrality consists of two dimensions: pervasiveness (the degree to which activities are connected with many other activities) and immediacy (the degree to which a halt or slow-down in the activities would seriously hinder the primary output of the organization). A major contribution of the theory of power set forth by Hickson

et al. was the suggestion of operationalizable variables and subvariables (which will be discussed below), and the subsequent enabling of testable hypotheses. As will be discussed in a later section of this paper, Hinings et al. (1974) later tested the theory of Hickson et al. using a multimethod, multimeasure approach.

Salancik and Pfeffer (1977) defined power as "the ability to get things done the way one wants them to be done" (p. 53). That is, those who have power are able to influence decision outcomes in the direction they desire. Salancik and Pfeffer argued that the source of power in organizations comes from the ability to take or not take actions desired by others. The three conditions suggested by Salancik and Pfeffer as likely to affect the use of power in organizations are the scarcity of resources, the criticality of resources, and uncertainty. The first condition asserts that power and influence will necessarily be exerted in an attempt to secure scarce organizational resources. The second condition, criticality, implies that an organizational subunit will use political maneuvers to obtain resources that are critical to its success, whether or not these resources are also considered scarce. The third condition, uncertainty, suggests that power and influence will affect decision making when there is uncertainty or disagreement over what to do.

In summary, there are essentially two views: the resource dependence model (Mechanic, 1962) and the strategic contingencies model (Hinings, et al., 1974, Salancik and

Pfeffer, 1977). In the former model, power is based on the ability to obtain critical resources. In the latter, power is based on the ability to cope with uncertainties facing the organization. In both models, power arises out of the dependency relationships that develop between subunits. Importantly, in either model power can be manifested in some portion of the decision making process, particularly when decisions are made sequentially. A powerful person may be able to affect some portion of the decision process. For example, individuals may use their power to affect objectives, values, decision criteria, available alternatives and/or access to critical information.

2.3.2 Theoretical Determinants of Organizational Power

From a review of the theoretical literature, several components of organizational power can be identified. These components are drawn from both the strategic contingencies models proposed by Hickson et al. (1971) and Salancik and Pfeffer (1977), and the resource dependence model proposed by Mechanic (1962). As will be discussed, there are many common and overlapping concepts. The major components of these models are discussed below.

Uncertainty. The premise that uncertainty is a catalyst for the presence of organizational power is widely accepted. Theoretically, in the absence of uncertainty there would be no disagreement about what should be done, and there would be no

rational reason to attempt to influence decision making (unless, of course, one is willing to believe that individual decision makers will still engage in political maneuvers in an attempt to "feather their own nests", even if such outcomes are not rational from the standpoint of the organization). Obviously, however, organizations do not operate in the absence of uncertainty. When uncertainty is present, disagreement as to what actions should be taken can be expected, as can the use of power to influence action in the desired direction.

Uncertainty has been defined as the degree to which outcomes are unpredictable and is related to the variability in factors such as market share, demand, supply, operations, capital availability, etc. Hinings et al. (1974) suggested that this variability can be measured by examining trend, range and regularity, and defined a 6 point scale around these dimensions. The presence or absence of a trend is key, in that if a trend is present, it should be possible to project future values. To the extent that the range of variability around the trend line is constant, a pattern becomes even more pronounced. Finally, if variations within this range display a high degree of regularity, more accurate prediction is possible.

Crozier (1964), Lawrence and Lorsch (1967), Perrow (1970), and Salancik and Pfeffer (1977) have echoed the important role of uncertainty in the study power and influence. Crozier (1964), as well as Salancik and Pfeffer

(1977), suggested that uncertainty with respect to critical resources and/or activities is a key factor in organizational power. Lawrence and Lorsch (1967) also found a positive relationship between power and uncertainty, and suggested that uncertainty is reflected by the speed and specificity with which feedback is provided within an organization. That is, the less the amount of feedback received, the more slowly it is received, and the less specific it is, the greater the amount of uncertainty or vagueness that is likely to be present.

Coping with Uncertainty. While uncertainty is considered key to the development of power, it is the ability to cope with uncertainty, not uncertainty itself, which actually gives rise to power. The ability to cope with uncertainty has repeatedly been found to have the highest correlation with power (Landsberger, 1961; Crozier, 1964; Lawrence and Lorsch, 1967; Perrow, 1970; Hinings et al., 1974). Coping with uncertainty is defined as the extent to which the unpredictability of future events can be reduced or effectively dealt with. Those organizational subunits which are best able to cope with uncertainty, both on their own behalf and on the behalf of other organizational subunits, will tend to have the most power. There are several ways in which organizational subunits may cope with uncertainty. Coping strategies include coping by prevention, coping by information, and coping by absorption (Hickson et al, 1971; Hinings et al., 1974). Coping by prevention is accomplished

by forestalling variability in organizational inputs. A common example is the undertaking of an advertising campaign to prevent a possible decline in sales. Coping by information is achieved through the use of forecasting techniques. To the extent that forecasts can provide advance warning of variability, uncertainty is reduced. Examples include forecasting demand, predicting probabilities of machine down-time, etc. Coping by absorption stems from the ability to offset the effects of variations that have already taken place. For example, utilizing new production techniques to counter difficulties with the supply or quality of raw materials, or initiating innovative selling methods to offset competitive pressures or a drop in sales. Overall, the number and type of coping strategies employed by an organizational subunit may be taken as an indication of its ability to cope with uncertainty.

Substitutability. The relationship between power and substitutability has been noted by many researchers. Substitutability can be defined as the ease with which the activities of an organizational subunit can be performed by another. Essentially, the more readily the activities of a subunit can be replaced, the less power that subunit will have (Emerson, 1962; Mechanic, 1962; Dubin, 1963; Blau, 1964). Substitutability may be due to the replaceability of a subunit by other subunits within the organization, or from the availability of alternatives that exist outside the organization (outside contractors and the labor supply, for

example). Hinings et al. (1974) considered the level of education and experience required to do the job, the nature of the current labor market, the existence of legal restrictions, and the ability to contract jobs out as indicators of the degree of substitutability.

Pervasiveness. Pervasiveness refers to the degree to which the activities of one organizational subunit are linked to the activities of other subunits. If one considers organizations as systems of interdependent activities, then by definition, all subunits must possess some amount of pervasiveness (Hickson et al., 1971). When the activities of a subunit are highly connected with many other activities in the organization, a greater amount of workflow interaction is required to accomplish organizational tasks, and a mutually dependent relationship is fostered. As the degree of dependence on another subunit increases, so does potential organizational power of the providing subunit.

Pervasiveness is closely related to the concept of centrality set forth in the Hickson et al. (1971) model of power. In fact, the definition of centrality given by Hickson et al. is "the degree to which the activities are interlinked into the system" (p. 40). However, in the Hickson et al. model, pervasiveness is only one of two separate dimensions of centrality. The other is immediacy.

Immediacy. Immediacy reflects the extent to which the activities of a subunit are essential to the primary workflow

of the organization, and can be defined as "the speed and severity with which the workflows of a subunit affect the final outputs of the organization" (Hickson et al., 1971, p. 41). Immediacy thus represents the extent to which the activities performed by a subunit are critical to the organization. For this reason, an alternate term, task criticality, has been adopted by some researchers (Saunders, 1986). Mechanic (1962) suggested that power is related to the criticalness of the resources controlled. Salancik and Pfeffer (1977) similarly argue that the control of critical resources is a key determinant of organizational power. Theoretically, the more critical the tasks performed and/or resources controlled, the more immediate would be the effects of a halt in workflows, and the greater would be the power of the subunit.

Although immediacy and pervasiveness of workflows are considered complementary dimensions of the broader centrality construct in the Hickson et al. (1971) model of organizational power, these dimensions may or may not be strongly correlated. For example, a finance department may have many workflow connections with other departments and thus score high on the pervasiveness dimension, but failure of the finance department to supply these workflows might not critically affect the ability of the organization to produce its primary output for some period of time (i.e., the score on the immediacy dimension is low). Conversely, a subunit involved in a detailed portion of the production process in a factory many

have limited connections to other departments, yet the output of that subunit may be so vital to the overall production process that cessation of the workflow from that subunit would quickly and severely halt or seriously hinder the ability of the organization to produce its primary output. Because these dimensions seems to represent very different aspects of centrality, several researchers have advocated treating them as separate constructs (Saunders, 1986). This study will adopt this position and treat pervasiveness and immediacy as separate constructs.

Criticality of Resources. As argued above, for the purposes of this study task criticality and immediacy may be considered theoretically isomorphic concepts. However, a distinction will be made between the criticality of the tasks performed by a subunit, and the criticality of the resources controlled by a subunit. Salancik and Pfeffer (1977) and Mechanic (1962) have suggested that subunits which control critical resources will have greater ability to influence decisions, and thus, greater power. Mechanic (1962) suggests that the ability to control access to information, persons and instrumentalities creates the dependencies between subunits that ultimately give rise to power. Access to information includes knowledge about the organization, procedures, norms, persons, etc. Access to persons includes individuals both inside and outside the organization (experts, for example) who possess knowledge or abilities important to either that subunit or to the organization as a whole. Access to

instrumentalities includes access to physical equipment, raw materials, etc., and perhaps most importantly, to monetary funding and the supply of capital.

Scarcity of Resources. Salancik and Pfeffer (1977) have also argued that the relative abundance or scarcity of the resources a subunit controls also contributes to the amount of power a subunit can attain. Although it can be argued that abundant resources, if they are defined as critical and their allocation can be controlled, can also form the basis for power struggles, when resources are abundant there is usually little need to engage in power struggles, since the desired amount can normally be obtained without engaging in such tactics (Salancik and Pfeffer, 1977). To the extent that resources (such as funding, expertise, and information) are scarce, the control of such resources will enhance the organizational power of the controlling subunit.

Centrality. Centrality in terms of tasks and/or workflows between subunits has already been discussed under the heading of "pervasiveness". However, Mechanic (1962) has argued that centrality in terms of physical location and/or social position within the firm is also an important factor. The argument is that physical proximity affords greater opportunity for interaction, leads to the establishment of better communication, and thus, improves access to persons, information and instrumentalities. This premise is closely related to centralization/decentralization issues in

organizational decision making, and has direct implications for the study of technologies which support group decision making in settings other than same time - same place forums. This issue will be discussed in greater detail in a later section.

Expertise. Access to persons with important knowledge or expertise represents not only the control of a scarce resource (expertise is by definition scarce), but also the ability to reduce uncertainty. Expertise can be considered both the antithesis and the ancestor of routinization. Lee (1991) and Mechanic (1962) suggest that expertise not only serves to reduce uncertainty, but over time, leads to routine procedures that ultimately reduce what once was considered expertise to common knowledge. Hinings et al. (1974) have suggested that such routinization, which often evolves from expertise, is one possible strategy for coping with uncertainty.

Summary. Power in organizations is determined largely by the ability of subunits to effectively deal with the uncertainties that face the organization. Organizational subunits may attempt to cope with uncertainty by adopting strategies intended to prevent, forecast, or reduce the impact of the negative outcomes that uncertainty may bring. In the presence of uncertainty, power and influence are likely to affect decision making. All other things being equal, the greater the extent to which the activities performed by a subunit are irreplaceable (non-substitutable), the greater the

degree to which those activities are interlinked with the rest of the organization (pervasive), and the greater the degree to which those activities are crucial to the success of the organization (criticality/immediacy), the greater will be the power of the subunit. Subunits which can effectively control critical and/or scarce resources, access to information, persons and/or instrumentalities will generally possess greater power than their counterparts who cannot do so. A summary of these components and sample items used to measure them are presented in Table 3 on the following page.

2.3.3 Perceived, Position and Participation Power

The above components are commonly theorized to be factors that give rise to power in organizations. Many researchers have suggested that power has multiple dimensions, and that its effects are observable in different ways. Kaplan (1964) described three dimensions of power: weight, scope, and domain. Weight is the extent to which one subunit affects the decision process, and therefore, the likelihood of other subunits behaving in the desired manner. Scope refers to the range of behaviors or decision areas that are affected, while domain is the number of subunits whose behaviors are involved. Saunders (1981) identified four elements that should be considered when defining power: potentiality, intention, degree of acceptance, and position of the power holder. Potentiality refers to the potential to exert influence. Such

TABLE 3

POSSIBLE MEASURES OF THE THEORETICAL DETERMINANTS OF ORGANIZATIONAL POWER

Dimension	Subdimension	Studies	Sample Item
Uncertainty	Perceived Variability	Hickson et al. Hinings et al. Saunders	How many uncertainties does Dept. x face?
		Salancik & Pfeffer	Do inputs vary from normal previous levels?
Coping with Uncertainty	Prevention, Information, Absorption	Hickson et al.	To what extent is Dept. x able to deal with uncertainty?
Pervasiveness	Perceived	Hinings et al.	How far is the flow of work of Dept. x connected to the work of other departments?
	Workflow	Hinings et al. Hickson et al. Saunders	Where does subunit input and output go to/come from?
Immediacy	Perceived	Hinings et al.	How important are the following functions?
	Workflows	Hickson et al.	How quickly would the closing of Dept. x affect the shipping of finished goods?

TABLE 3 (Continued)

Dimension	Subdimension	Studies	Sample Item
Substitutability	Perception	Hinings et al. Lee, Blau, Dubin, Emerson	How easy would it be to replace a closed dept.?
	Availability of Alternatives	Hickson et al. Mechanic	Are internal or external substitutes available?
	Replaceability of Personnel	Hickson et al.	How easy is it to obtain people for this job?
Scarcity	Resources	Salancik & Pfeffer	How abundant are the following resources?
Criticality	Perceived	Mechanic, Saunders, Salancik & Pfeffer	How important are the following resources to the success of the organization?
Centrality	Physical Location	Mechanic, Lee	How accessible are people/resources?
Resource Control	Perceived	Salancik & Pfeffer, Lee	How able is Dept. x to obtain resources that are critical to its own activities? To the activities of other departments?

TABLE 3 (Continued)

Dimension	Subdimension	Studies	Sample Item
Expertise	Perceived	Mechanic	Does Dept. x have expert knowledge upon which other subunits are dependent?
Routinization	Perceived	Mechanic	To what extent do standardized rules direct the activities of Dept. x?
Committees	Membership	Salancik & Pfeffer	Membership on important committees.
Funding	Actual	Salancik & Pfeffer	Measure of actual power.
Effort	Perceived	Mechanic	How much effort does Dept. x exert with respect to (specific problem area)?
Access to Information	Perceived	Piercy, Mechanic	To what extent does Dept. x have access to information about other subunits? To what extent does Dept. x deny access to information about its own activities to other subunits?

potential, by definition, may or may not be exercised. Intention refers to the willful use of power by the power holder. Researchers do not all agree as to whether the exertion of power must be a conscious, intended act of the power holder. Although it is possible that power can be exercised without willful intent to do so (Cartwright, 1965), it is normally assumed that the exertion of power is intentional. Acceptance of power is a cognitive acknowledgement of the dependence relationship by the subunit whose behavior is determined. Depending on the definition of power one adopts, acceptance may or may not be required. For example, in the classification of French and Raven (1959) acceptance by the subunits being influenced is necessary to exert expert power or referent power, but is not required in the case of coercive power. In a coercive power situation, the power holder is able to influence decisions in the desired direction with or without such acceptance. Position of the power holder refers to the hierarchical position of the subunit on a formal organization chart. Taken together, these items (weight, scope, domain, potentiality, degree of acceptance, intention and position) can be used to describe three types of power: perceived power, participation power, and position power.

Perceived Power. Perceived power can be defined as the influence attributed to the subunit by members of the organization. As such, perceived power may or may not equate with actual power. Measures based on such perceptions are

subject to a number of biases on the part of the respondents, and may or may not be accurate. However, in the case of power, it could be argued that subunits that are perceived as having power, at least to some extent, acquire or enhance power by virtue of the perception, even if the perception is false. Perceived power may be measured using questionnaires or through interviews, and normally consists of asking respondents to rate the influence of given subunits on a wide number of specific organizational issues.

Participation Power. Participation power is based on the involvement and scope of influence a given subunit has in decision making across the organization. It reflects the extent to which a subunit participates in the decision making processes. Participation power can be judged in terms of the total number of decision issues in which the subunit participates, and by the number of decisions the subunit is involved with which represent issues outside the subunit's own functional area. A further indication of participation power is reflected by the stages of the decision making process in which the subunit takes part (i.e., intelligence, design, choice, or implementation). That is, the subunit may be actively involved in initiating action, providing information, making choices or implementing actions. The stage in the decision making process is important, since participation in the choice and implementation phases may bestow more influence than participation in other stages. Participation power may be assessed using interview or questionnaire techniques, and

somewhat more objectively, by counting the number of interdepartmental committees on which the subunit actively serves.

Position Power. Position power is based on the formal, legitimate position of the subunit within the organization. A primary indicator is the level the subunit occupies on a formal organization chart. A secondary indicator of position power is the number of issues/activities for which the subunit is held primarily responsible.

Table 4, which is given on the following page, summarizes these possible operationalizations of the power construct.

2.3.4 Definitions of Power, Influence and Politics

Based on the above review and discussion, definitions of power, influence and politics will now be adopted. For purposes of this study, the definitions of power provided by Saunders and Scamell (1986) and Pfeffer (1992) are modified and "power" is defined as:

> The potential ability of an organizational subunit, either through formal position, or through actual or perceived participation in organizational activities, to influence decision outcomes when there is uncertainty or dissension as to what action should be taken.

In keeping with the definitions provided by Hinings et al (1974), Cobb (1986), Eisenhardt and Zbaracki (1992), and Pfeffer (1992), influence and politics are defined as:

TABLE 4

POSSIBLE OPERATIONALIZATIONS
OF THE POWER VARIABLE

Dimension	Subdimension	Studies	Sample Item
Power	Perceived	Hickson et al. Hinings et al. Tannenbaum & Kahn	How much influence does Dept. x have about (specific subject)?
	Participation	Hickson et al. Eisenhardt & Bourgeois, Hinings et al. Saunders	Does Dept. x initiate discussion, provide information, choose course of action, carry out decisions?
	Position (duties)	Hickson et al. Hinings et al.	Which dept. has formal authority for this problem?
	Position (status)	Hickson et al. Hinings et al.	Where is this dept. on the organization chart?

The formal and informal mechanisms, tactics, processes and behaviors through which potential power is acquired, maintained, and exercised.

2.4 Group Support Systems

The purpose of this study is to investigate how power and influence in organizations are affected by the use of group support system (GSS) technologies. Having laid the theoretical groundwork necessary for the study of power and influence, attention will now be focused on the theoretical and empirical issues surrounding the study of GSS.

Many studies have shown that managers spend an excessive amount of time in meetings (Hymowits, 1988; Argyris and Schon, 1974; Hoffman, 1979; Mintzberg, 1973). Yet for many, meetings are often viewed as little more than a waste of time (Goldhaber, 1974; Hymowits, 1988; Mosvick and Nelson, 1987; Tubbs, 1984). Meetings have in fact been characterized as "cul-de-sacs down which promising young ideas are lured and quietly strangled" (Poole and DeSanctis, 1990). Given the inordinate amount of time spent in meetings, the less than productive outcomes of most meetings, and the ever increasing environmental turbulence that makes meetings necessary, it is not surprising that efforts to provide computer support for meetings have received increasing attention from IS researchers as advances in information and communication technologies have made the enhancement of group activities possible. In the following sections, a definition for GSS is provided, then the theoretical and empirical GSS literature

that is pertinent to this study is reviewed.

2.4.1 Definition of GSS

In 1984, Huber defined a group decision support system as a set of software, hardware, a language component and procedures that support a group of people engaged in a decision-related meeting. Since that time, a number of definitions of GSS have appeared in the literature, along with a variety of terms that emphasize various aspects of the technologies and capabilities of systems that support group work. Part of the difficulty in conducting GSS research and a limiting factor in drawing conclusions from existing GSS research is the lack of agreement as to what exactly constitutes a GSS. A summary of the definitions and terminology suggested in the literature is given in Tables 5 and 6, on the following pages.

Although none of these definitions or terms has been universally accepted, several common threads among the various definitions can be identified. First, GSS can be seen as a merger of computer, decision, and communications technologies. However, the mix of these technologies varies from system to system, making systems labelled "GSS" qualitatively different. For example, some systems may provide extensive decision support and only limited communication support, while other systems provide just the opposite mix. Some link decision makers in geographically separate locations, while others support decision makers in a conference room or board room setting.

TABLE 5

DEFINITIONS OF GSS

Author & Year	Definition
Huber (1984)	A set of software, hardware, a language component, and procedures that support a group of people engaged in a decision-related meeting.
DeSanctis & Gallupe (1985)	An interactive, computer-based system which facilitates the solution of unstructured problems by a set of decision makers working together as a group.
DeSanctis & Gallupe (1987)	GSS combine communication, computing and decision support technologies to facilitate formulation and solution of unstructured problems by a group of people.
Gallupe et al. (1988)	GSS combine computer, communications and decision technologies to support problem-finding, formulation and solution in group meetings.
Zigurs et al. (1988)	GSS are computer-based systems concerned with group communications and how to improve it.
Dennis et al. (1988)	Task oriented systems that provide the means for a group to work on and complete a task, such as reaching a decision, planning or solving problems.
Pinsonneault & Kraemer (1990)	Systems that attempt to structure group decision processes in some way.
Beauclair & Straub (1990)	Any technology used to enhance or support group decision making.

TABLE 6

TERMINOLOGY SUGGESTED FOR VARIOUS KINDS OF GSS

Decision/Task Orientation	
Dennis et al. (1988)	GSS are *task-oriented*, providing the means for a group to work on and complete a task.
Communication Orientation	
Dennis et al. (1988)	CSCW (Computer Supported Collaborative Work) are driven by *communication* needs, providing the means for groups to communicate more efficiently, enabling them to jointly create a document, for example.
Pinsonneault & Kraemer (1990)	GCSS (Group Communication Support Systems) are information aids that primarily support the communication process between group members, although they may do other things as well.
"Umbrella" Terms	
Dennis et al. (1988)	EMS (Electronic Meeting Systems) are information technology-based environments that support group meetings, which may be distributed geographically and temporally. The IT environment includes, but is not limited to, distributed facilities, computer hardware and software, audio and video technology, procedures, methodologies, facilitation, and applicable group data. Group tasks include, but are not limited to, communication, planning, idea generation, problem solving, issue discussion, negotiation, conflict resolution, systems analysis and design, and collaborative group activities such as document preparation and sharing.

Therefore, a GSS can mean anything from electronic mail to sophisticated electronic decision rooms, and just about anything in between. Second, GSS are intended to reduce the process losses (intolerance of minority opinions, reluctance to participate, domination by powerful individuals, extensive socializing, etc.) and to increase the process gains (consideration of more alternatives, more complete evaluation, synergy, etc.) that can occur in group settings. GSS attempt to do this by reducing barriers to communication that might otherwise be present and/or structuring group activities, altering group processes in a positive way. GSS is, therefore, a *social technology*, and as such the study of GSS is complicated by the nature of social relationships and interpersonal behavior. As noted by Poole and DeSanctis (1990, p. 177):

> "Traditionally, technology has been thought of as something independent of the user, as an object or tool. But an important school of thought, represented by Heidegger (1977) and Ong (1982) claims otherwise. These thinkers regard technologies as inherently "social" in nature. Social processes create the conditions for the evolution of technology. Society is the matrix in which the technology and its application are embedded. There is a mutual determinism in that technologies also sustain and change society. As Heim (1987) notes, modern society and technology are so bound together that it is impossible to sort out which causes which."

Third, GSS in the broad sense, can support virtually any type of intellectual group activity. While the original systems envisioned by Huber and others cited decision-related activities as the major emphasis, GSS has more recently been

conceptualized as addressing planning, brainstorming, negotiating, problem solving, and creative tasks as well decision making activities. While this change in emphasis has prompted some researchers to drop the "D" out of the term "GSS" and adopt the term "GSS" instead, it can be argued that planning, brainstorming, negotiating, problem solving and creative tasks all involve some type of decision making. Because decision making by a group implicitly requires communication between group members, and because the newer term (GSS) encompasses both the spirit and the functionality of systems that support groups, this newer term is adopted for use in this dissertation.

Based on the preceding discussion, the definition of Electronic Meeting Systems suggested by Dennis et al. (1988) is modified, and for purposes of this study Group Support Systems (GSS) are defined as:

> GSS are social, information technology-based environments that support intellectual group activities either within or across geographical and temporal boundaries. Information technology environments encompass communication, computing and decision support technologies, and include, but are not limited to, distributed facilities, computer hardware and software, audio and video technology, procedures, methodologies, facilitation, and applicable group data. Intellectual group activities include, but are not limited to, planning, idea generation, problem solving, decision making, issue discussion, negotiation, conflict resolution, and creative or collaborative group activities such as document preparation and sharing.

2.4.2 Models for GSS Research

Perhaps because GSS is a relatively new stream of research within the young discipline of MIS, there is no "theory of GSS" *per se*. However, in comparison to other areas of MIS, GSS research has evolved fairly systematically, and drawn successfully from more established ideas in communication theory and group development. Specifically, the work of DeSanctis and Gallupe (1985, 1987), which takes essentially an information exchange theory view, has been instrumental in laying a foundation and setting forth an agenda for GSS research. Thanks in great part to their work, there exists a fairly well agreed upon set of variables that define GSS research, and there has been a reasonably methodical progression of empirical investigations aimed at determining the appropriate features and effects of use of GSS.

A number of important variables for GSS research and development have been identified. DeSanctis and Gallupe (1985) initially proposed a taxonomy for GSS research based on member proximity and duration of the group session. This is shown in Figure 1 on the following page.

FIGURE 1

A TAXONOMY FOR GSS SETTINGS
(From DeSanctis and Gallupe, 1985)

		GROUP SIZE	
		Smaller	Larger
MEMBER PROXIMITY	Face to Face	Decision Room	Legislative Session
	Dispersed	Local Area Decision Network	Computer-Mediated Conference

In 1987, DeSanctis and Gallupe proposed an extended, three dimensional version of this framework based on member proximity, group size and task type. The research cube formed by these three parameters has formed the basis of a great deal of GSS research, and is shown in Figure 2.

In their seminal framework, DeSanctis and Gallupe (1987) also proposed segmenting GSS research on the basis of three levels of technological support that can be provided. By combining two of the dimensions of the original research cube, member proximity (dispersed, face-to-face) and group size (small, large) into a single dimension, the original research cube suggested by DeSanctis and Gallupe (1987) can be restructured, as shown in Figure 3.

FIGURE 2

TAXONOMY FOR GSS RESEARCH
(Proposed by DeSanctis and Gallupe, 1987)

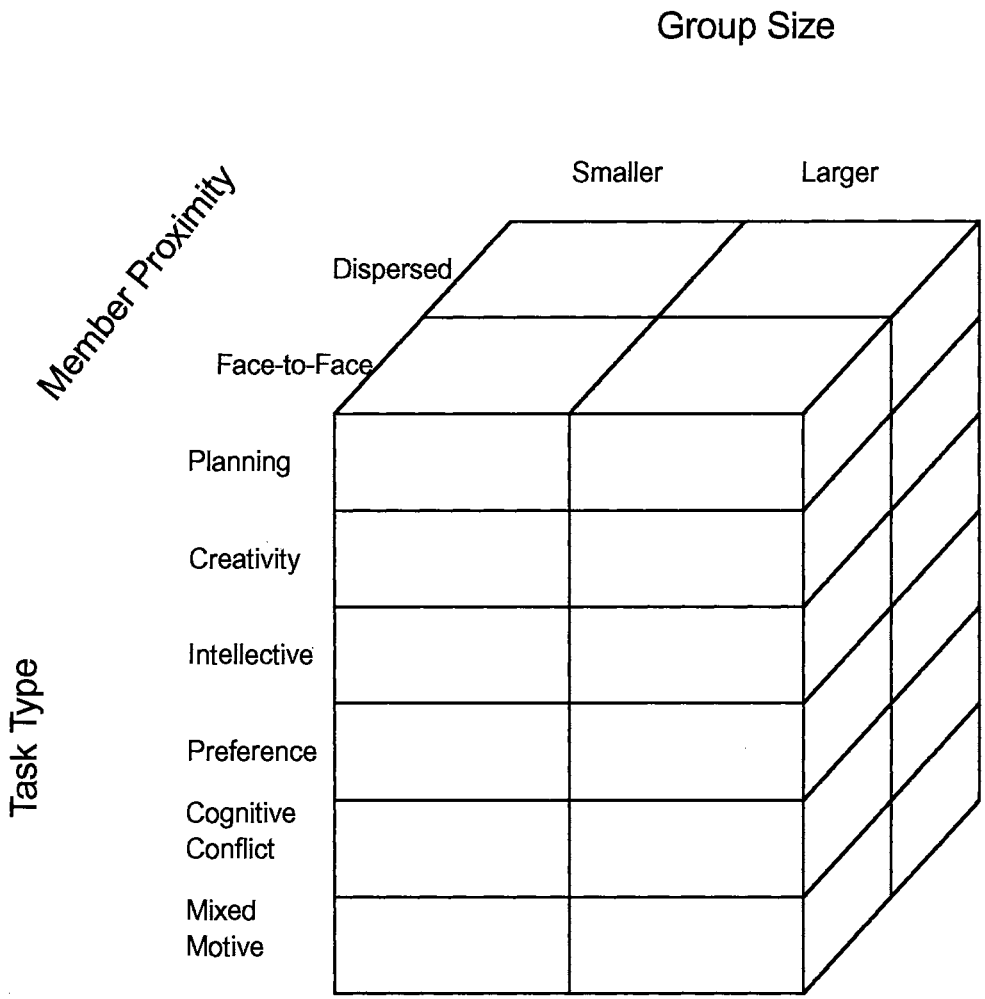
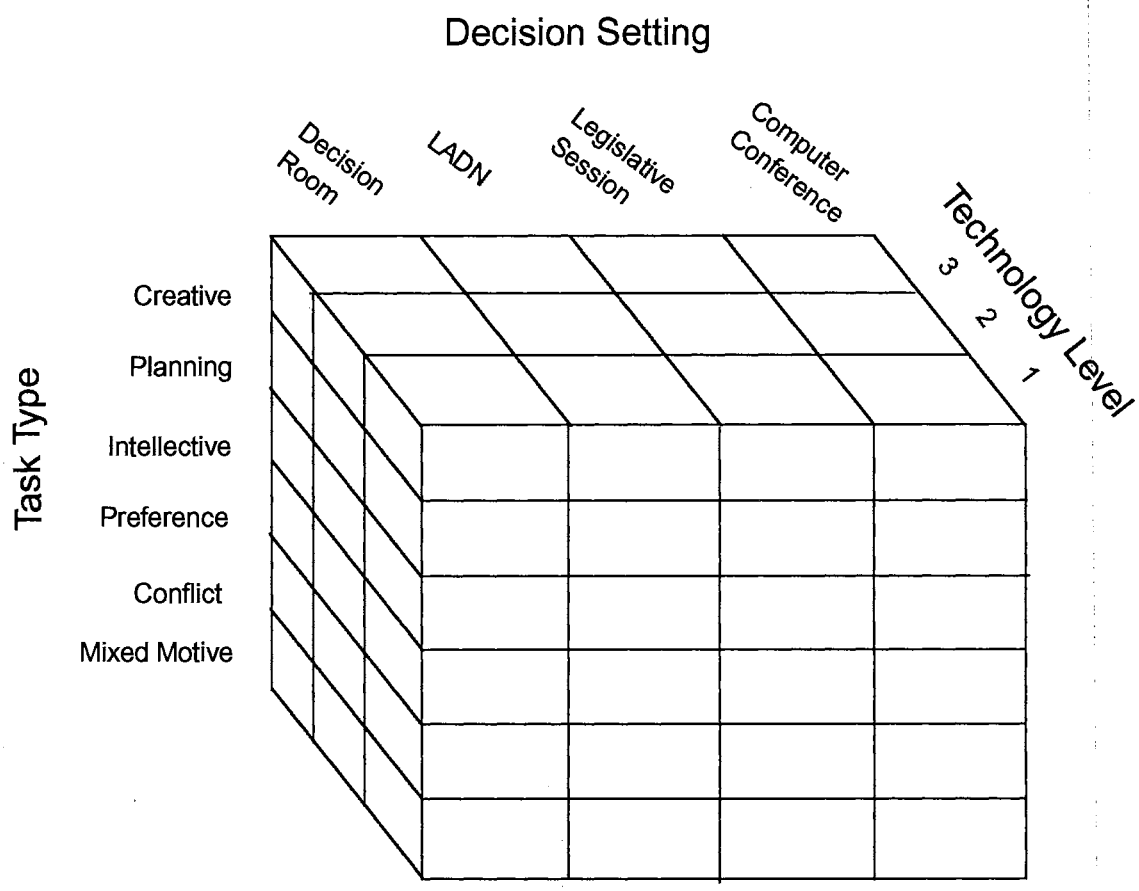


FIGURE 3

MODIFIED TAXONOMY FOR GSS RESEARCH
(Adapted from DeSanctis and Gallupe, 1987)



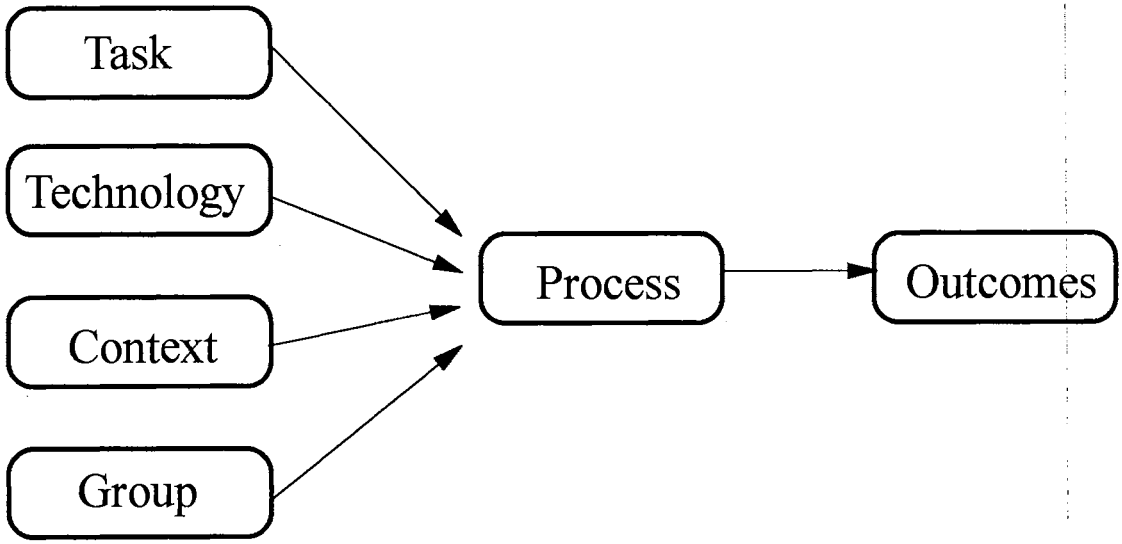
In keeping with terminology suggested by DeSanctis and Gallupe (1987), the term "Decision Room" refers to small groups in face-to-face settings, "Local Area Decision Network" (LADN) refers to small groups in dispersed settings, "Legislative Session" refers to large groups in face-to-face settings, and "Computer-Mediated Conference" refers to large groups in dispersed settings. The remaining two dimensions,

task type and technology level, refer to the type of task undertaken by groups using a GSS, and the level of technological support (where Level 1 primarily removes communication barriers, Level 2 provides decision modeling and analysis techniques, and Level 3 controls communication patterns and provides expert advice.)

Other researchers, including Gray (1987), Dennis et al. (1988), and Pinsonneault and Kraemer (1990), have complemented the work of DeSanctis and Gallupe by proposing more extensive lists of independent, mediating and control variables. Similar to the research cube shown above, these variables can generally be segmented into four categories: group characteristics, task characteristics, context, and level of technology. Dependent variables in GSS research have typically been classified into one of two types: outcome variables and process variables. GSS outcome variables include decision outcomes (decision quality, time to reach consensus, number of alternatives generated, etc.), and group outcomes (satisfaction with the decision, willingness of group members to work together again, etc.). Process outcomes include factors such as evenness of participation and influence behavior. A general model for GSS research, as suggested by Dennis et al. (1988), and Pinsonneault and Kraemer (1990) which incorporates these variables is shown in Figure 4 on the following page. Each of these sets of variables is discussed below.

FIGURE 4

GSS RESEARCH MODEL
(From Pinsonneault and Kraemer, 1990)



Group Characteristics. Group characteristics include, but are not limited to, group size, proximity of members, group history, cohesiveness, experience, presence or absence of a group leader, and power/status relationships among members. Member proximity reflects whether group members are in physically and/or temporally dispersed settings, or in same-time, same-place (i.e., face-to-face) environments. Group size may be either small or large, typically ranging

from as few as three to as many as twenty members. Group history reflects the amount of time or number of situations in which a given group has previously functioned as a group. From a historical perspective, groups may range from newly formed to well established. Cohesiveness is indicative of the degree of "oneness" that develops within a group. Experience reflects differences in the experience levels and backgrounds of individual group members. Groups may or may not have an appointed or formal leader, and power and status relationships among group members can also be expected to vary widely.

It is important to recognize that many of these group factors will not be "controllable" by the researcher, particularly when conducting field studies. It is equally important to realize that differences in these variables can account for major differences in results, and in some cases, may restrict the range of expected results. For example, the effects of anonymity may be different in dispersed versus face-to-face settings, and different for groups of size three than for groups of size ten. Likewise, GSS-induced effects on participation may be different for newly formed groups than for well established ones, etc. The implication for this study, is that group characteristics, while not controllable, must be well-documented and carefully considered in the interpretation of the results.

Task Characteristics. Task characteristics include task type, complexity, and degree of uncertainty. Task type is most often classified in accordance with the task typology

suggested by McGrath (1984). This typology, adopted by DeSanctis and Gallupe (1987), suggests that the task facing a group may be one of GENERATING ideas and actions, CHOOSING alternatives, or NEGOTIATING solutions. GENERATING tasks include planning and creative activities, and require the generation of plans and/or novel ideas. Tasks which involve CHOOSING alternatives require the selection of a "best" alternative when standards for determining correctness exist, or a "preferred" course of action when such standards do not exist. NEGOTIATING solutions are tasks which involve resolving conflicting points of view or conflicting motives. Task complexity and degree of uncertainty are also important factors that can affect the work of the group.

All of the caveats mentioned with respect to the controllability and impact of group characteristics certainly hold for task characteristics as well, and perhaps to an even greater degree. Researchers have demonstrated that the group task type may account for as much as 50% of the variance in group performance (Poole et al., 1985). Therefore, great care must be taken in selecting and documenting the tasks used in GSS studies. Tasks that are highly structured or have little significance to group members (routine scheduling, routine hiring, etc.) may not allow the benefits of GSS to be seen. On the other hand, decisions of a strategic nature, which have a potentially significant impact on group members, are much more likely to yield significant results.

Context. Context includes organizational factors such as

culture and incentive and reward systems, as well as group factors, such as reasons for membership in the group, and group norms. Organizational culture, environment, and incentive systems may affect group interactions. Similarly, reasons for group membership, which are typically classified as either voluntary or nonvoluntary, can impact group processes. Group norms refer to patterns of expected behavior, particularly in well established groups, that shape group communication and interpersonal dynamics.

Level of Technology. DeSanctis and Gallupe (1987) described three levels of technology that can be provided by a GSS. Level 1 systems are intended to remove communication barriers. The features provided by Level 1 GSS's typically include large public screens for display of ideas, voting activities, and electronic messaging. Such capabilities are usually available in electronic conference rooms and in some electronic mail systems. Level 2 systems provide additional capabilities intended to structure or support group decision processes in some way. Level 2 systems usually include all the capabilities of a Level 1 system, but are enhanced with decision modeling and group decision techniques. For example, Level 2 systems might include tools for resource allocation models, probability assessment models, and social judgment techniques, such as the Nominal Group Technique or Delphi Method (Poole and DeSanctis, 1990). Level 3 systems go a step beyond Level 2 systems, and direct the timing and order of communications among group members. Level 3 systems may have

embedded expert systems that suggest and enforce rules for interpersonal communication.

Process Variables. Group processes are likely to be affected by the task, technology level, context and characteristics of the group. The nature of group processes, will in turn, likely affect group decision outcomes. Although there is not an agreed upon set of process variables, factors such if and how a formal or informal group leader emerges, the degree of conflict that is present or arises among group members, the level of equality of participation, the desirability and usefulness of anonymity, the amount of socializing or "non-task" behavior, etc., all need to be considered (Dennis, et al., 1988). Influence behavior and power struggles can be considered as process variables within the framework of the general GSS research model.

Outcome Variables. Unlike process variables, there is a fairly well agreed upon set of outcome variables in GSS research (Benbasat et al., 1991). Outcome variables refer to items such as decision quality, the ability of the group to reach consensus (and the time needed to do so), the number of alternatives considered, the satisfaction of the group with both the decision outcome and the decision process, the confidence of the group in the decision, the willingness of the group to work together again in the future, etc. Most GSS empirical studies include one or more of these outcome variables as dependent variables. There remains, however,

disagreement as to how to measure many of these outcomes (Benbasat et al., 1991).

Summary. The study of GSS technology and its impact on individuals, groups, and organizations involves a large number of variables, many of which present control and measurement problems for researchers. Additionally, many elements of group tasks, organizational context, existing social networks, patterns of interpersonal communication, and the imposition of structure play potentially important roles in group work, with or without the intervention of information technologies, making it difficult to "tease out" the effects of GSS. The differences in group performance that can accrue from these factors, coupled with the difficulties in measurement, have made drawing generalizations across the growing number of GSS empirical studies difficult, and the design of experiments challenging.

2.4.3 Review of Empirical GSS Research

Extensive reviews of empirical GSS studies have been provided by Pinsonneault and Kraemer (1990), Gray et al. (1990), and Benbasat et al. (1991). Most of the empirical GSS research can be classified into one of two research streams: (1) design and evaluation of features, and (2) effects of use, where effects of use can be further subdivided into decision outcomes and group processes as described above. Table 7, presented on the following pages, summarizes the results of a number of these studies. Three key points can be observed

from this summary: (1) empirical results of GSS studies have been inconsistent; (2) few GSS studies have examined power and influence processes; and (3) the primary research methodologies have been single case studies and lab studies.

As Table 7 further illustrates, empirical results from GSS studies have been inconsistent. This is problematic because conflicting results make it difficult to generalize findings across studies. Several researchers have suggested possible reasons for these inconsistencies. For example, Pinsonneault and Kraemer (1990) suggested that when GSS studies are segmented according to whether the primary purpose of the GSS is to provide communication support or group decision modeling, many of the inconsistencies are resolved. Specifically, Pinsonneault and Kraemer (1990) found the following pattern of results when studies based on communication support technologies and decision support technologies are viewed separately:

	Communication Support	Decision Support
Depth of Analysis	↑	↑
Task-oriented Communication		↑
Decision Time		↑↓
Decision Quality	↑	↑
Decision Confidence	↓	↑
Participation	↑	↑
Cooperation	↓	
Satisfaction with Process	↓	↑

TABLE 7

SUMMARY OF REPRESENTATIVE GSS RESEARCH

Study	Task	Decision Setting	Tech. Level	Research Method	Results
Steeb & Johnson (1981)	Planning	Dec.Room	2	Lab study	Breadth & quality of decision improved. Satisfaction, consensus, & decision time increased. No report on participation or influence.
Lewis (1982)	Generate	Dec.Room	1	Lab study	Individual dominance decreased. No effect on satisfaction. Decision quality increased.
Turoff & Hiltz (1982)	Generate & Choose	LADN	1	Lab study	No effect on quality or participation.
Siegel et al. (1986)	Varied	LADN	1	Lab study	Participation is more equal in GSS groups. Decision time increases.
Beauclair (1987)	Generate & Choose	Dec.Room	1	Lab study	No effects on participation, satisfaction, decision time or quality.
Bui & Sivasankaran (1987)	Choose	Dec.Room vs. LADN	1	Lab study	GSS improved quality on complex task. Increased time & decreased satisfaction on less complex task.
George et al. (1987)	Generate & Choose	Dec.Room	1	Lab study	Decision quality increased.
Nunamaker et al. (1987)	Generate & Plan	Varied	Varied	Field study	GSS improved participation & satisfaction.

TABLE 7 (Continued)

Study	Task	Decision Setting	Tech. Level	Research Method	Results
Dennis et al. (1988)	Generate	Dec.Room	1	Case & field Studies	GSS improved effectiveness & satisfaction.
Gallupe et al. (1988)	Generate & Choose	Dec.Room	1	Lab study	GSS improved decision quality. No effect on participation. Decreased satisfaction.
Jessup et al. (1988)	Generate	Dec.Room vs. LADN	1	Lab study	GSS improved satisfaction.
Easton, A. (1988)	Generate	Dec.Room	2	Lab study	GSS improved satisfaction with the decision outcome but not the process, participation nor quality.
Easton G. (1988)	Generate & Choose	Dec.Room	1	Lab study	GSS improved participation. Did not improve decision time, quality or satisfaction.
McLeod & Liker (1989)	Varied	Dec.Room	1	Lab study	GSS improved performance but did not affect participation.
Vogel et al. (1988)	Generate	Dec.Room	1	Case study	GSS increased user satisfaction.
Watson et al. (1988)	Choose	Dec.Room	1	Lab study	No effects on equality of influence. No improvement in consensus.
Zigurs et al. (1988)	Choose	Dec.Room	1	Lab study	GSS affects pattern, but not total amount of influence behavior.

TABLE 7 (Continued)

Study	Task	Decision Setting	Tech. Level	Research Method	Results
Ellis et al. (1989)	Generate & Choose	Dec.Room	1	Field study	GSS improves efficiency and quality.
Nunamaker et al. (1989)	Varied	Dec.Room	1	Field study	GSS improved participation, quality & time.
Bui & Sivasankaran (1990)	Choose	Dec.Room	1	Lab study	GSS improved quality & satisfaction, but not time.
Chidambaram et al. (1990)	Generate & Choose	Dec.Room	1	Lab study	Cohesiveness is less in GSS groups, but improved with repeated use.
George et al. (1990)	Varied	Dec.Room	1	Lab study	GSS improved participation, but not quality or time. GSS tends to reduce the emergence of a leader.
Jessup et al. (1990)	Generate	Dec.Room	2	Lab study	Anonymity features in the GSS improve outcomes.
Lim et al. (1990)	Choose	Dec.Room	1	Lab study	GSS equalized influence in groups with no leaders, but not in groups with leaders
Lu et al. (1990)	Varied	Dec.Room	1	Lab study	GSS reduced influence of "best" members and increased influence of poor members. GSS groups did not perform as well as their "best" member.
McGoff et al. (1990)	Varied	Dec.Room	1	Case study	GSS improved effectiveness, efficiency & satisfaction, particularly with repeated use.

TABLE 7 (Continued)

Study	Task	Decision Setting	Tech. Level	Research Method	Results
Gallupe et al. (1992)	Generate	Dec.Room	1	Lab study	GSS improved performance in brainstorming tasks.
Martz et al. (1992)	Varied	Dec.Room	2	Field study	GSS improved satisfaction and decision quality.
Tyran et al. (1992)	Varied	Dec.Room	2	Multiple Case Study	GSS can address strategic management issues.
Gopal et al. (1992)	Generate & Choose	Dec.Room	2	GSS adoption process is influenced by attitudes prevailing prior to use.	

This pattern of results suggests that differences in results may be due to fundamental differences in the level and type of support provided by the information technologies in the GSS.

As previously discussed, other researchers have argued that differences in the task, organizational context, and group characteristics may account for the inconsistencies. More recently, researchers have attempted to explain differences in GSS results using the Adaptive Structuration Theory (AST) (Gopal et al, 1992). AST is an emerging theory in the GSS literature, first proposed by Poole and DeSanctis (1990). AST posits that group outcomes are primarily due to the way in which groups *appropriate the structures* of the technology, and are only indirectly affected by factors such as task and technology. Within the framework of the AST, the key to explaining inconsistencies in GSS research and to understanding how GSS influence group behaviors is through an analysis of the structures and the way in which they are adapted for use by the group. That is, the primary focus is *how* the group adapts to the situation when technology is made available, and is based on the observation that individual groups adopt and use the technology in fundamentally different ways. Poole and DeSanctis (1990, pp. 9-10) define *structures* as "the rules and resources which actors use to generate and sustain [the group entity]". Technological structures consist of the structural features afforded by the GSS and the "spirit", or goals, that the technology is intended to provide. GSS technologies provide varying kinds and degrees

of structural features -- voting and communication rules, and data and decision modeling resources, for example. The "spirit" of a GSS is typically based on the goal of reducing communication barriers, promoting consensus, reducing group process losses, and increasing group process gains. The AST further stipulates that the appropriation of these structures by the group consists of three dimensions: (1) the *faithfulness* of the appropriation (i.e., the degree to which the use of the GSS by the group heeds the spirit in which it was intended to be used); (2) the *attitudes* of the group toward the GSS (i.e., the comfort level of the group with the technology, and the amount of respect they have for it); and (3) the *level of consensus* of the group with respect to the how the GSS should be appropriated (Gopal et al., 1992). In this view, task and technology, rather than having a direct effect on group processes and outcomes, essentially form the context for the use of the GSS. Poole and DeSanctis (1990) argue that when a GSS is faithfully appropriated by the group, the level of consensus on the appropriation should be high, and the group's attitudes toward the GSS should be positive. Under such conditions, the intended effects of the GSS (increased decision quality, more equal participation, greater depth of analysis, etc.) are likely to be achieved.

The Adaptive Structuration Theory has at least two important implications for the current study. First, in an investigation of the effects of GSS, it is the structures that are appropriated by the group and the manner in which they are

appropriated, rather than the specifics of the technology and task, that are important (Gopal et al., 1992). Second, it is likely that changes in power and influence occur as a direct result of the adaptation and appropriation of GSS structures by the group, rather than as a direct result of the technology *per se*.

Table 7 also reveals that empirical studies of the impacts of use of GSS have largely concentrated on the effects on decision outcomes. Process outcomes, with the exception of participation, have received much less attention. Furthermore, questions as to how changes in organizational factors (such as leadership, power, influence, politics, use of informal communication channels, etc.) are related to the use of a GSS have largely been ignored. Zigurs et al. (1988) conducted a lab study to investigate influence behavior in computer-mediated, decision making groups. Using student groups with relatively little history, and an intellective task, Zigurs et al. found that while there was no significant difference in the total amount of influence behavior in computer supported and manual groups, the pattern of influence behavior and the types of behaviors displayed were significantly different. Specifically, Zigurs et al. found that the distribution of influence behavior, as measured by the number and type of influence attempts, was more even in GSS groups. Ho and Raman (1991) conducted a study of the effects of GSS on leadership in small groups. In a controlled lab experiment using student groups and a preference task, Ho

and Raman found (1) that consensus was higher for manual groups than for GSS groups, and that leadership did not increase consensus; (2) that equality of influence was negatively correlated with the degree of premeeting consensus (i.e., groups with high premeeting consensus were more likely to allow a few members to dominate the decision); and (3) that the structure provided by GSS may reduce the potential influence of, and possibly the need for, a group leader. Chidambaram et al. (1991) conducted a longitudinal study, framed within the context of the Adaptive Structuration Theory, to examine the impact of GSS on group development. Chidambaram et al. found that while the ability to manage conflict and the degree of cohesiveness were initially higher for manual groups, this trend reversed itself over time. Finally, in a study related to personal power and influence (but not involving GSS), Lee (1991) investigated the impact of office information systems (OIS) on the potential power and influence of individuals in an organization. The research model adopted by Lee examined the relationships between resource provision, irreplaceability, authority, network centrality, expertise and the potential for an individual to have influence in an organization. Based on interviews and surveys with users of office information systems (OIS), Lee found that of these factors, network centrality is the most important for personal influence of administrative personnel, and resource provision is the most important for technical personnel.

Lastly, Table 7 also demonstrates that the majority of empirical work in the GSS area has taken the form of lab and individual case studies. Researchers are beginning to move into the field as GSS facilities become more popular and available in organizations. Because the nature of groups and their interactions within actual organizations are intuitively likely to be very different than the interactions between newly formed student groups (as is typical in most lab studies), the continuation and progression of field research is needed. Of the four studies cited in the previous paragraphs that deal with the impact of information systems on organizational factors, only the study by Lee (1991) was conducted in the field. At the present time, there appear to be no published field studies investigating the effects of GSS on power and influence in organizations.

2.5 Summary

This chapter has reviewed the organizational power and GSS literature that provides theoretical grounding for this study. As stated in Chapter I, the primary purpose of this study was to investigate how the distribution of power and influence in organizations, and the methods by which they are attained and exercised, are affected by GSS technologies. As such, the majority of this chapter has been devoted to: (1) identifying the theoretical determinants of power and influence; and (2) identifying the important variables and emerging theories in existing GSS research. Based on these

reviews, definitions of power and GSS which will be used in this study were developed. Additionally, empirical studies which have investigated the use of power and politics in organizational decision making, as well as those that have investigated the effects of GSS use, were reviewed.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Overview

The review of the literature has demonstrated that there has been no systematic investigation of the changes in organizational power and politics that follow from the use of GSS technologies. Although "models of information technology implementation do exist (Ginzberg, 1981; Lucas, 1978; Markus, 1983) these deal largely with the development stages of IS implementation and focus extensively on user involvement and user relations" (Orlikowski, 1993, p. 311). As such, these models fall short of addressing issues related to *organizational* change in general, and GSS adoption and use in particular.

GSS research has focused primarily on outcomes (time to consensus, number of alternatives considered, etc.). Although some GSS researchers have recently begun to address issues related to the process of adoption and use (e.g., Poole and DeSanctis, 1990; Gopal et al., 1992), factors such as intentions, political behaviors, and organizational context remain largely neglected. The fact that outcomes from GSS research are conflicting and confusing may suggest that there is a need to move away from the study of outcomes alone and

shift the emphasis to also include the processual and contextual variables so that these inconsistencies may be better interpreted. This dissertation, in examining the relationships between GSS use and changes in organizational power, focuses on gaining insights into the processes and behaviors that underly changes in power.

The purpose of this chapter is to describe the research design and the methods that were used to investigate these relationships and processes. First, important elements of the research design, its appropriateness, and benefits are discussed. This is followed by a description of the data collection procedures used to carry out the study. The data analysis techniques used to analyze the data are then described. Finally, issues of validity and reliability are addressed.

3.2 Research Design

Simply stated, a research design is a "plan for getting from here to there" (Yin, 1984, p. 28), i.e., a way to move from the set of questions to be answered to a set of conclusions about the answers. It is essentially a blueprint for "what questions to study, what data are relevant, what data to collect, and how to analyze the results" (Yin, 1984, p. 29). The research design guides the investigator in the process of collecting, analyzing, and interpreting observations (Nachmias and Nachmias, 1976).

The primary research questions to be addressed in this

study are of the form "*what*" is the relationship between GSS use and organizational power, "*how*" and "*why*" do GSS affect power and influence, and "*what*" is the impact of such changes on organizational decision making.

The ultimate goal of this study is to develop a conceptual model depicting the relationships between GSS and power and influence in an organization. Whyte (1984) suggested that the most complete understanding of human behavior is gained by studying behavior in its context. Because organizational context is likely to interact with GSS in important ways where issues related to power and politics are concerned, context needs to be considered explicitly in the analysis rather than simply assumed away.

For these reasons, a research strategy based on a laboratory design was deemed inappropriate. Although laboratory designs allow for greater control and, arguably, a higher degree of internal validity, the degree of control which can be exercised over many contextual factors in the lab is simply not available to researchers working in the field. Research designs which attempt to "control" the context in order to focus on a few variables necessarily divorce the phenomena of interest from the context in which it occurs, and as a result often miss the true nature of the problems and outcomes. Similarly, survey techniques, which have the advantage of enabling data to be gathered from a large number of firms and/or individuals, when used as the sole source of data collection are unlikely to adequately capture the

dynamics of complex relationships such as power and politics in organizations.

This study seeks to acquire knowledge of the interplay between GSS and power by extending the line of inquiry into the field, while explicitly preserving contextual factors. Therefore, the methodology used to investigate the research questions posed in this dissertation is the case study approach. The case study approach has been defined as:

> "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and multiple sources of evidence are used". (Yin, 1984, p. 23)

Case studies provide for an in-depth investigation of the research questions in an organization setting. This research strategy is appropriate when the purpose of a study is to develop an understanding of the dynamics of a problem, to provide an in-depth description of a situation, or to generate theory (Eisenhardt, 1989). Furthermore, a case study strategy is favored when: (1) the type of question being asked is *what*, *why* or *how*, (2) the degree of control the researcher has over behaviors is slight, and (3) the focus is on contemporary rather than historical issues (Yin, 1984).

3.2.1 A Typology of Case Study Designs

In general, case study designs as a method of scientific inquiry are not as well defined and categorized as other methods of research, such as laboratory studies. For example,

it is somewhat rare to find catalogs detailing possible case study designs and analysis methods. Toward that end, Yin (1984, 1989) has developed a typology of designs for case studies. This typology is illustrated in Figure 5.

FIGURE 5

A TYPOLOGY OF CASE STUDY DESIGNS
(From Yin, 1984)

	Single Case Designs	Multiple Case Designs
Holistic (single unit of analysis)	Type 1	Type 3
Embedded (multiple units of analysis	Type 2	Type 4

As illustrated in Figure 5, case studies may take one of four possible forms, depending on whether there are single or multiple units of analysis, and whether single or multiple cases are used.

The choice between single case or multiple cases depends on the purpose of the research. A single case study design is appropriate when the study involves representing a critical, extreme, unique, or relevatory case. In such instances, a single case may effectively be used to confirm, challenge or extend existing theory (Yin, 1984). Multiple cases are

appropriate when the intention is to build a body of evidence through an iterative process of comparing and contrasting the phenomena of interest and the context in which it occurs both within and across cases.

The choice between holistic or embedded designs depends on whether more than one unit of analysis is involved. A holistic design (based on a single unit of analysis) is used when no logical subunits can be identified. Holistic designs suffer from two potential problems: (1) the study may be overly abstract, lacking necessary detail, and (2) the questions being addressed may inadvertently shift during the course of the study (Yin, 1984). Embedded designs help to avoid these problems. The use of subunits serves to more clearly focus the inquiry, making "slippage" in orientation less likely, and provide clearer measures and data (Yin, 1984).

In this dissertation, an embedded, single case study (or Type 2) design was used. Multiple units of analysis (the organization, and individuals within the organization) are clearly of interest. The single case approach is favored in this instance because this study represents an initial attempt to describe the phenomena of interest as they occur in the field. In such instances, Whyte (1984) suggests that studies focus on individuals within groups, before attempts are made to compare between groups or between organizations. This study is viewed as a first step in extending theory and integrating findings of GSS and power and influence in

organizations. Future replications will provide evidence from multiple units in multiple cases, and thus build a more extensive body of evidence.

3.2.2 Benefits of the Case Study Approach

There are a number of benefits from the use of a case study approach. First, case studies can be used to provide description, as well as to test, or generate theory (Yin, 1984; Eisenhardt, 1989). One major benefit of the case study approach is the increased likelihood of generating novel theory (Eisenhardt, 1989). As the researcher works to reconcile differences that appear across units of analysis, new theory or incremental theory that may explain what previously appeared to be inconsistent findings in GSS research may be identified. The iterative comparison of conflicting evidence tends to "unfreeze" thinking, enabling the researcher to form a new gestalt. That is, working inductively facilitates "the generation of theories of process, sequence, and change pertaining to organizations, positions, and social interaction" (Glaser and Strauss, 1967, p. 114). This is considered important in this instance, since no theory of GSS use and organization power yet exists.

A second benefit is that theory that emerges from case study research is "likely to be testable with constructs that can be readily measured and hypotheses that can be proven false" (Eisenhardt, 1989, p. 547), since both will have been repeatedly verified during the theory building process.

Third, the resultant theory is generated from a process that intimately ties the theory with the data. As a result, the theory is likely to be highly consistent with empirical observation and, therefore, likely to be empirically valid (Eisenhardt, 1989).

Fourth, the case study design is contextual, incorporating rather than simplifying or ignoring contextual variables (Orlikowski, 1993). This enables organizational changes to be explained in terms of the interactions of the conditions and actions that exist within the organizational context. Organizational complexities that shape the relationships between GSS use and power in organizations are of key interest in this study.

Finally, the case study approach allows for a *processual* orientation (Orlikowski, 1993). Thus, the researcher will be able to focus not just on objective outcomes of GSS use, but also on the processes of GSS adoption and use (as it relates to the distribution of organizational power).

Evidence of the benefits and the effectiveness of the case study approach is demonstrated in the literature. The case study approach has been used successfully by a number of organizational researchers, including Ancona (1990), Burgelman (1983), Eisenhardt and Bourgeois (1988), Elsbach and Sutton (1992), Gersick (1988), Harris and Sutton (1986), Isabella (1990), Kahn (1990), Leonard-Barton (1990), Mintzberg and McHugh (1985), Pettigrew, (1988, 1990), Sutton (1987), and Campbell (1992). A recent application of the case study

methodology appeared in the MIS literature in a study by Orlikowski (1993) which investigated the relationships between organizational change and the adoption and use of CASE tools in systems development projects.

3.3 Data Collection Procedures

The following section describes the data collection activities and field procedures employed in this study. This includes a description of the research site and participants, as well as a description of the interview procedures. The techniques and processes used to analyze the verbal data are also presented.

3.3.1 Research Site

Potential research sites for this study were evaluated on the basis of the GSS technologies employed and accessibility to the researcher. Initially, attempts were made to find an organization which (1) utilized electronic meeting room technologies, and (2) was located within a reasonable geographic radius of the researcher. However, organizations meeting these criteria could not be identified. Therefore, organizations using other forms of GSS (such as electronic mail and video teleconferencing) were considered. Numerous firms meeting these revised criteria were found. From a list of several potential research sites, a relatively large telecommunications company (approximately 4600 employees) which utilized both group communication and video

teleconferencing technologies was selected, and efforts were undertaken to secure the organization's permission to carry out this research.

After establishing a contact person at the organization (the Human Resources Manager), information about the study, including the list of planned interview questions, was provided for the organization to review. After a series of phone conversations and on-site meetings, permission to conduct the study was granted. However, due to unanticipated delays in obtaining this permission and the impending relocation of the researcher from a midwestern to a southeastern state, permission was obtained too late to enable the study to be completed. Given this turn of events, a decision was made to conduct only one interview at this site. This interview served as an additional pilot interview beyond those originally planned.

Using procedures similar to those described above, permission to conduct this research was then sought from an Atlanta-based division of a large, international organization. Following an initial telephone contact, the researcher visited the organization. The purposes of this visit were: (1) to discuss the nature and objectives of the study; (2) to identify and revise any interview questions deemed inappropriate by the organization; (3) to provide to the organization any and all information required by them in order to grant permission to conduct the study; (4) to determine the output documents that the organization would want as a result

of its willingness to participate; (5) to enable the researcher to become acquainted with the organization and some of its members; and (6) to obtain permission to conduct the study. This visit enabled the researcher to meet with members of management and answer questions and concerns. It also provided the researcher with an opportunity to become familiar with several members of the organization, to learn the physical layout of the facilities, and to get an initial feel for some of the cultural characteristics of the organization. Shortly after this visit, the organization granted permission to conduct the study, and dates and schedules for the first round of interviews were established.

The Firm. The organization, referred to in this report as The Firm, is a software development company, specializing in the development of business software tools for desktop PCs, such as word processors, spreadsheets, business graphics, database management systems, etc. One of the offerings included in The Firm's product line is a "groupware" product. This was considered advantageous, given the exploratory nature of this research, for the following reasons. First, the level of adoption of the groupware technology within The Firm is high. Most organizational members are exposed to and use the technology on a regular basis. Second, experience with the technology is also high. Spurious effects which may be associated with the adoption of new technologies and innovations, such as overcoming learning curves and/or unbridled enthusiasm for a new "toy", should be minimized.

Third, within the framework of case study designs, The Firm represents an "extreme" case, i.e., one where an effect is considered likely (or unlikely) to be found (Yin, 1984). If no relationships between power and the use of GSS technologies are suggested in an organization where the level of adoption and experience are high, and where the company has a vested interest in the technology, then an argument can be made against the existence of such relationships. On the other hand, relationships suggested by this "extreme" case may be exaggerated by biases introduced by this vested interest. In this case, the potential biases need to be considered in the interpretation of the findings of this study. Despite the potential difficulties imposed, it is believed that the advantages afforded by this "extreme" case outweigh the potential disadvantages, and that an up-front awareness of the potential bias enabled the researcher to deal with it in a fair and effective manner. It should be noted that the groupware product marketed by The Firm is only one of several group support technologies currently used on a regular basis within the organization. These technologies will be discussed in more detail below.

The Firm employs more than 5500 people worldwide. Of these, approximately 250 individuals are employed in the Atlanta division (hereafter referred to as The Division). The Firm has been in business for thirteen years, and is considered a leader in its industry, grossing over one billion dollars in revenues during the last fiscal year. Market share

for its products varies by product line, ranging from as low as 5% to as high as 90%. The Firm's market share is relatively stable for most products, but is growing with respect to both the word processing product and a newly introduced product which integrates a set of five business software tools. Like many organizations, The Firm is slowly reducing the number of employees in response to changes in organizational structure and competitive pressures to keep costs as low as possible.

The Firm is headquartered in Boston, Massachusetts. Numerous offices and facilities are located across the United States and around the world. At the highest level, The Firm is organized around functional lines. That is, there is a world-wide sales and marketing division, a world-wide research and development division, and a world-wide finance division. Within each of these three major groups, there is segmentation by product line (word processing, spreadsheet, communication software, etc.). In order to ensure that each of the product offerings has a similar "look and feel", many activities require collaboration across and within divisions.

Decision making within the firm is highly distributed and best characterized as following a matrix structure. Work groups are formed and dissolved as needed to deal with situations as they arise. Due to the constant state of flux created by this approach, formal organization charts are not maintained by either The Firm or the Division. Within the matrix framework, The Firm strives to maintain a relatively

flat structure. The current goal is that "dotted lines" will be no more than five levels deep, with no more than eight people reporting to any one person at a given time.

The Division. As mentioned above, the Atlanta-based division was the research site for this study. This division is responsible for the development, sales and support of The Firm's word processing product. The Division is *not* responsible for the development of The Firm's groupware product. Similarly, the Division's outside sales group is responsible for selling The Firm's word processing product, and is not directly involved in sales of The Product. However, The Product is one of several desk top products telemarketed by The Firm's inside sales group. Technical specialists at The Division primarily provide telephone support for word processing customers, but occasionally assist in supporting The Firm's other products if needed. This assistance primarily takes the form of handling customer inquiries which are routed to The Division from other support centers.

The Division is composed of six major groups: Research and Development, Sales and Marketing, Customer Support, Quality Assurance, Documentation, and Human Resources. Like The Firm, The Division in practice operates in a matrix-like fashion. Work groups are formed and dissolved across department lines as needed in response to the changing nature and fast pace of the software industry. These work groups change very frequently and on short notice. For these

reasons, the primary unit of analysis for this study is the individual employee. In keeping with Yin's (1984) typology of case study designs presented earlier, this "individual" unit of analysis is considered embedded within the "organizational" unit of analysis.

GSS Technologies Used. The Division utilizes three distinct technologies that can be classified as group support systems: voice mail, video teleconferencing, and The Firm's own groupware product (hereafter referred to as The Product). The voice mail system provides traditional voice mail technology features. Its primary purpose is to enable different-time, different-place communication. Voice mail is available to all employees in The Division. The video teleconferencing system enables same-time, different-place communication and is used to enable individuals in the Atlanta division to participate in meetings and executive briefings occurring at the headquarters in Boston. The video teleconferencing system is used primarily by higher level managers. However, members of the sales and marketing staff occasionally use the video facilities to make sales presentations to potential customers. Other individuals in The Division normally do not have access to or experience with the video teleconferencing technology.

The Product is a PC network-based GSS which supports different-time, different-place communication and activities. The Product includes a full-featured electronic mail system, but is distinguished as a groupware product by virtue of

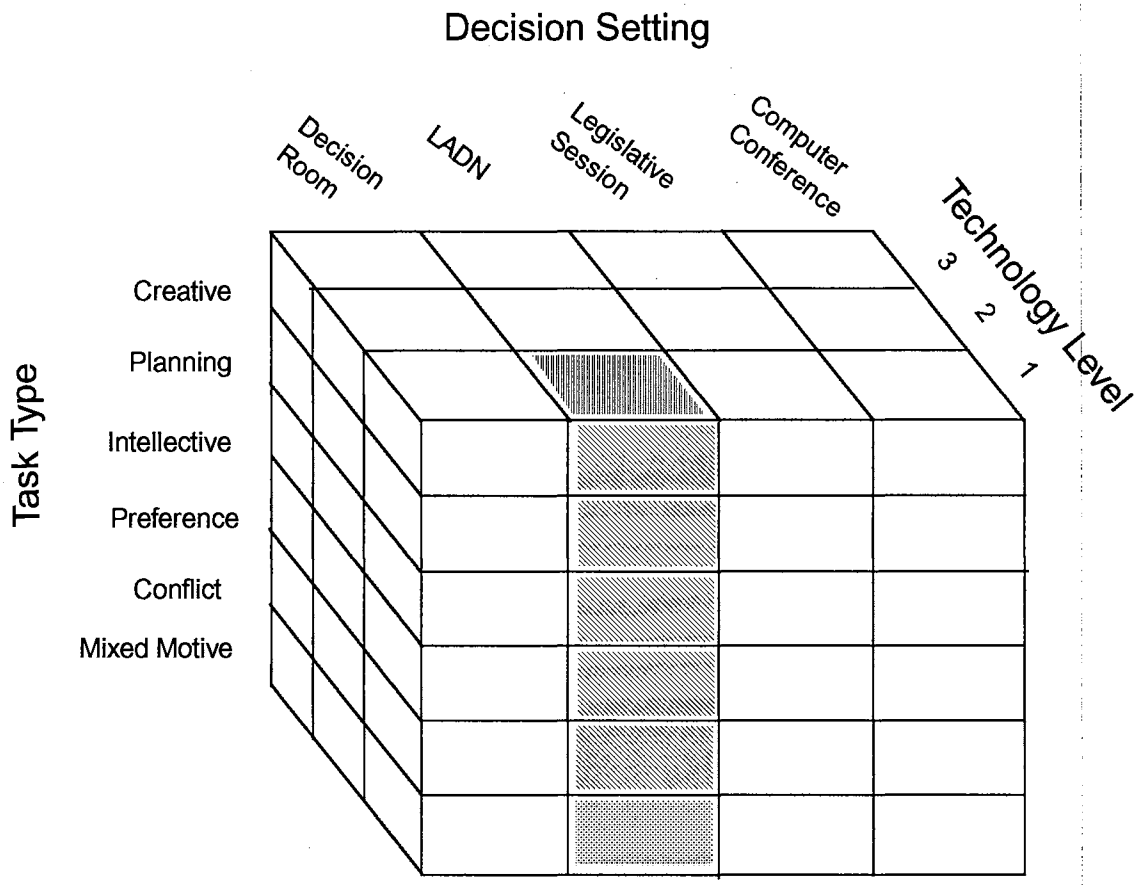
additional features which are not found in traditional electronic mail systems. Paramount among these are database features which enable the sharing of information across departments, across divisions, and across enterprises. This system supports communication across time and place dimensions. It is used for everything from simple information storage and retrieval, to collaborative work (such as joint authorship of documents), to group discussions and decision making. The Product is available to and used by every member of The Division, and has been in place for a little more than 4 years. The portions of the GSS research cube occupied by each of these technologies are illustrated in Figure 6 on the following page.

3.3.2 The Participants

The researcher solicited the help of a contact person (an upper level manager) to identify knowledgeable members of the organization and request their participation in the study. Participants were recruited on the basis of their position within the company, their familiarity with the group technologies, and the length of time they have been employed at the organization. Both managers and non-managers from various functional areas were sought to provide varying perspectives regarding (1) the use of the technologies, and (2) the perceived relationship of the technologies to power

FIGURE 6

POSITION OF THE FIRM'S GROUP SUPPORT TECHNOLOGIES ON THE GSS RESEARCH CUBE



and influence in the decision making process. An attempt was be made to assure that both middle-level and top-level managers are represented.

To minimize learning curve effects, the contact person was also asked to confirm that each person on the list had a reasonable level of experience with at least two of the group technologies (The Product, video teleconferencing and/or voice

mail) and a reasonable length of service with The Firm. Generally, this meant that only those employees who had been with the organization for approximately six months or more were considered. It was believed that employees who had been with the organization for a shorter time might have an incomplete understanding of the power relationships and decision making processes within the organization, as well as insufficient experience with the group technologies.

After reviewing the list of potential interview candidates with the researcher, the contact person talked with each of the potential participants and informed them of the researcher's request to interview them about their experiences with the GSS technologies. They were informed that their participation was being sought on a purely voluntary basis, that participation was not being mandated by The Firm, and that their decision to participate or not participate would in no way affect job performance ratings. Prospective participants were also advised that information disclosed during the interviews would be kept confidential.

All of those who were asked to participate in this study agreed to do so. The participants ultimately included nine managers (the CEO of The Division, a Product Manager, three Sales Managers, the Quality Assurance Manager, the Documentation Manager, the IS Manager, and the HR Manager), and six non-managers (a Senior Support Specialist, an Administrative Assistant, an Inside Sales Coordinator, a Product Sales Specialist, a Public Relations Specialist, and

a Financial Analyst). The job responsibilities of each of the participants are briefly summarized below.

The CEO. The CEO of The Division, who is also a Vice President of The Firm, is ultimately responsible for the software developed at The Division. (Recall that The Division develops the word processing component of The Firm's integrated suite of business applications.) The CEO provides leadership and direction for The Division's 250 employees, and is instrumental in establishing and monitoring alpha and beta test dates, product roll-out dates, and delivery dates for new products and/or version releases. While the CEO is not directly involved in sales, he has assumed joint responsibility for dealing with one of The Division's largest customer accounts. As a Vice President of The Firm, the CEO is also involved in a number of activities that involve other divisions, on both a domestic and international basis.

The Product Manager. The Product Manager is responsible at an operational level for seeing that products are developed according to specifications and delivered on schedule. As such, the Product Manager acts as a "hub" of communication for those involved in software development, testing, documentation, marketing, and customer support. The Product Manager who participated in this study is responsible for the development of The Firm's word processing product.

Sales Managers. Two of the three Sales Managers who participated in this study are responsible for the North

American sales of The Division's product. They are considered "outside" sales managers primarily because they manage a number of sales representatives who sell "out" in the field. Each is responsible for sales in different territories within North America. The outside Sales Managers travel frequently. The third Sales Manager who participated in this study is the Inside Sales Manager.

The Inside Sales Manager is responsible for telemarketing The Division's product. The Inside Sales Manager supervises approximately fifty telemarketers and four Inside Sales Coordinators. The telemarketing activities are geared toward the development of new customers, as well as toward upselling existing customers who may wish to upgrade to newer versions.

Quality Assurance Manager. The Quality Assurance Manager is responsible for the testing and final debugging of the word processing software developed at The Division. The Quality Assurance (QA) Manger works closely with the Product Manager to assure that products will meet quality standards, and that as many "bugs" as possible are found and fixed prior to release. The QA Manager is instrumental in establishing test plans, quality standards, and measurement techniques which can be used to monitor "bug" identification and fix rates. The QA Manager ultimately determines the "readiness" of the software for delivery to customers.

Documentation Manager. The Documentation Manager is responsible for the development of end-user documentation for

the word processing product. Because the product is sold world-wide, the Documentation Manager must deal with international contractors to develop translated versions of end-user materials, including both printed manuals and on-line help facilities. Additionally, the Documentation Manager is responsible for seeing that the documentation for the word processing product conforms to the documentation standards for the other components of the integrated business applications package. The Documentation Manager is responsible for everything from estimating word counts to creating and revising documentation standards.

IS Manager. The IS Manager is responsible for providing the infrastructure of computers, networks, and telecommunication devices needed within The Division. The IS Manager is called upon to solve hardware problems, to manage security for the computer systems, and to manage access privileges for databases used internally within The Division. The IS Manager is also responsible for seeing that the long term strategic IS plans for The Firm are carried out within The Division. Compatibility with the hardware and software used at other divisions is a key concern, as is planning for the future IS needs of The Division.

Human Resources Manager. The Human Resources (HR) Manager is responsible for handling employee relations within The Division. Job responsibilities include keeping all employees informed of changes in company policies, benefits,

job opportunities, etc. The HR Manager assists with completing the paperwork (payroll, insurance, taxes, etc.) necessary to hire and/or fire employees.

Senior Support Specialist. Senior Support Specialists are responsible for providing telephone support to customers who experience difficulties using the software. The Firm provides customers with an 800 number through which they can obtain help when needed. Support technicians log all such calls into a database, and either provide immediate solutions based on their product knowledge, or escalate the problem to more senior support technicians who specialize in solving particular types of problems. Senior Support Specialists are responsible not only for providing on-line support, but also for supervising a small group of other support technicians. Senior Support Technicians act as a "buffer" between potentially irate customers and higher level managers, and are successful in most instances, in fixing customers' problems. In those instances where the customer has uncovered a true, previously undetected "bug" in the software, Support Specialists are responsible for seeing that this information is fed back to the Product Manager and QA Manager so that it can be fixed in the next release of the software.

Administrative Assistant. Administrative Assistants provide clerical and administrative support to various work groups and managers within The Division. The Administrative Assistant (AA) who participated in this study is the AA for

the North American Sales Group. The activities of the AA vary widely, but primarily include providing secretarial support for seventeen sales people, coordinating schedules, and providing requested administrative services.

Inside Sales Coordinator and Product Sales Specialist. The Inside Sales Coordinator reports to the Inside Sales Manager, and is responsible for coordinating the efforts of ten to twelve telemarketers. Product Sales Specialists report to the Inside Sales Coordinators, and actually perform the telemarketing activities.

Public Relations Specialist. The Public Relations (PR) Specialist who participated in this study is responsible for preparing press releases and dealing with media issues and media personnel (as related to the word processing product). The PR Specialist coordinates press releases with other divisions of The Firm, and works closely with the PR Specialists of the other divisions to see that the timing and wording of the press releases are appropriate.

Financial Analyst. The Financial Analyst interviewed in this study reports directly to the CEO of The Division. Responsibilities of the Financial Analyst are primarily to prepare financial reports, budgets, projected income statements, etc., and to identify and explain variations in actual versus projected financial expenditures. The Financial Analyst works with Financial Analysts in other divisions in the preparation of monthly, quarterly, and annual financial

statements.

3.3.3 Interview Procedures

Interviews were the primary data collection technique utilized in this study. Interviews, as a data collection procedure, have been described as one of the most important data gathering techniques in qualitative research (Fetterman, 1989; McCracken, 1988), and one of the most important sources of case study information (Yin, 1989), principally because it provides a direct method of assessing insiders' perspectives. The purpose of the interviews in this study was to obtain an in-depth description of the respondents' perceptions and feelings regarding their organizational experiences with GSS technologies.

Interviews for this study were somewhat structured, but allowed for open-ended responses. Interviews were guided by the set of case study questions given in Appendix A, to ensure that the researcher asked this same set of questions of each respondent. However, because responses were open-ended, questions were not asked of each respondent in exactly the same way or the same order, and some instances, additional questions surfaced. All interview questions (detailed in Appendix A) were guided by the following propositions:

Proposition 1: The use of GSS technologies will alter the perceived distribution of power and influence in organizations.

Proposition 2: The use of GSS technologies will alter the perceived manner in which

power and influence are acquired, maintained and exercised.

Proposition 3: The use of GSS technologies will alter the perceived quality of group decision making.

In keeping with the arguments set forth by Eisenhardt (1989) no attempt was made in this study to further specify relationships or testable hypotheses. The purpose of these propositions was simply to guide the development of the case study questions that were asked during the interview process. In addition to being guided by these propositions, specific interview questions were, of course, grounded in the constructs which have previously been identified in the review of the literature.

Several of the interview questions asked respondents to describe their experiences without being prompted to "fit" their answers to any particular set of dimensions. In the event that respondents were unable to provide a detailed answer, the researcher followed-up with probes such as "Could you give me an example?" or "Could you elaborate?". A primary advantage of using free-form, open-ended responses was that respondents were not limited in the descriptions of their experiences to constructs imposed by the researcher. Thus, free-form responses helped to minimize the biases and preconceptions of the researcher (Yin, 1985; Eisenhardt, 1989).

In addition to the interview data, field notes were used to capture the impressions of the researcher regarding a

number of contextual factors, such as the setting, the participant, and non-verbal responses. Field notes and memos also captured the researcher's thoughts, emerging insights, and questions as the research proceeded. The field notes, thus formed a very valuable, secondary source of data.

Pretests. Interview questions were reviewed by and pretested with individuals from various backgrounds. The interview questions were first reviewed by a fellow graduate student, and then by members of the researcher's dissertation committee. After incorporating minor changes suggested by these reviewers, the planned interview questions were pretested with former industry co-workers of the researcher. Because each of these former co-workers was still employed full time, they provided feedback from the practitioner's point of view. The pretest suggested that (1) some questions were unclear, leading to unfocused responses, and (2) a few questions were redundant and therefore unnecessary. These questions were revised (or omitted) accordingly. The pretest also demonstrated that several of the initially planned questions were difficult to answer or simply not applicable when electronic decision room technologies were not available. Because a research site utilizing electronic meeting room technologies had not been found, these questions were subsequently omitted from the list of interview questions. Finally, following the pretest, a pilot interview was conducted in the field at the originally planned research site. No modifications to the interview questions were

identified as a result of the pilot interview, suggesting that face validity had been achieved.

Site Interviews. In total, fifteen interviews were conducted on site at The Division. In keeping with advice of the case study experts (Yin, 1984; Eisenhardt, 1989) interviews were conducted in "waves" or "rounds". The first round of interviews was conducted approximately one month after the preliminary site visit. Nine interviews were conducted during this round over a two-day time period. The second round of six interviews was conducted approximately one month after the first round. All interviews were scheduled two hours apart to allow the researcher time to record field notes, revise questions (if necessary), and to identify new ideas and insights. The time between rounds enabled the researcher to consider preliminary findings and insights from the first round explicitly in the second round of interviews.

Interviews were conducted privately in conference rooms within the building where the participants worked. The researcher informed each participant about the purpose of the interview, assured confidentiality and anonymity, and requested the participant's permission to tape record the interview. It was explained that the tape recorder was being used simply for the convenience of the researcher, and would not be used if the participant felt uncomfortable with it. However, none of the participants objected to the use of the tape recorder, and it was thus used to record each interview. The researcher assured each participant that his/her responses

would be held in strict confidentiality, and that all tape recordings of the conversation would remain in the sole possession of the researcher. Participants were also informed that while excerpts of the interviews might appear in the printed results of the study, their anonymity would be protected.

The tape recorder failed only one time. Unfortunately, this was not discovered until the end of the interview. Upon discovery of the malfunction, time was taken immediately (and prior to subsequently planned interviews) to document as much of the interview as possible. All interview tapes were transcribed by the researcher.

In an attempt to develop an initial sense of rapport with the participant and to put the participant at ease with the interview process, each participant was first asked to describe his/her job duties, work history, and experience with The Firm. The responses to these questions also provided the researcher with a better sense of the job responsibilities of each of the participants. Following these preliminary questions, each participant was asked a standard set of questions regarding which of the GSS's they used, how often they used them, and the primary purposes for which they used them. This then led to a series of open-ended questions regarding the respondents' perceptions of whether and how these technologies affected factors related to power and influence -- e.g., accessibility to individuals and information, participation in decision making activities,

changes in decision making roles, etc. An effort was made to follow-up on ideas suggested by the respondents rather than to restrict questions and/or elicit responses based solely on a set of dimensions held by the researcher. The purpose of the interviews was to gain an emic view of the relationship of the technologies to power and influence factors through the respondents' perceptions and feelings. Thus while the planned set of questions served as a guide to bound the interviews, each interview proceeded in a slightly different fashion from the others. That is, questions were not read verbatim, nor in exactly the same order, to each participant. This enabled a more natural flow of information and an ability to probe more deeply into the more striking responses given by the participants.

Most interviews lasted forty-five minutes to one hour (the shortest interview was approximately thirty-five minutes, and the longest approximately seventy-five minutes). The time between interviews (approximately one hour) was used by the researcher to record additional field notes, write memos regarding insights and patterns which seemed to be emerging, and to prepare for the next interview.

The research design for this study called for rounds of interviews to continue until the data gathered offered little additional insight. The pattern of responses at the conclusion of the second round of interviews appeared to be stable, and no new or emerging patterns could be identified. Thus, the marginal benefit to be obtained from a third round

of interviews at The Firm was deemed minimal, and no further interviews were conducted.

3.4 Validity and Reliability Issues

One of the difficulties in conducting case study research is demonstrating that established standards of quality experimentation have been met. The criteria for judging the quality of research involve demonstrating that several forms of validity (construct, internal, and external) as well as reliability have been achieved (Cook and Campbell, 1979; Yin, 1984). Although this task is never simple, it is particularly difficult in case study research because this methodology does not lend itself readily to standard statistical methods and tests. A major contribution of the work of Yin (1984) was the provision of a set of guidelines for dealing with these issues in case study research. These guidelines are summarized in the following paragraphs.

3.4.1 Construct Validity

Construct validity is concerned with demonstrating that operational measures for the concepts being studied are correct (Yin, 1984). As such, construct validity indicates how closely the operationalization of a variable captures the concept it is intended to measure. Developing a set of operational measures is especially important in case study research because it helps to establish that the data collected are not just the subjective impressions of the researcher.

Yin (1984) suggests three tactics for increasing construct validity in case study research. These are: (1) using multiple sources of evidence, (2) establishing a "chain of evidence", and (3) involving key informants in a review of the case study report. Using multiple sources of evidence (interviews, observations, surveys, archival records, etc.) to examine a single phenomenon is a cornerstone of the case study method. This process is also known as *triangulation*. The strength of this approach is that if when approached from different angles (i.e., sources of evidence), convergent lines of inquiry are found, construct validity is enhanced (Yin, 1984; Eisenhardt, 1989). Establishing a "chain of evidence" involves creating careful citations and cross-references between the data collected, the procedures used, and the interpretation and reporting of the results (Yin, 1984). Yin (1984) likens this to the chain of evidence that detectives must present in court. This chain of evidence enables others to precisely follow the steps taken in getting from the questions to the answers, or conversely, to trace the research process backwards when attempting to understand how certain conclusions were reached (Yin, 1984). Involving key participants (in addition to peers) in a review of the case study draft serves to enhance the accuracy of the study, and thus increases construct validity. This provides an opportunity for key informants to comment on the interpretations and conclusions reached by the investigator, and thus an opportunity to correct misconceptions (Yin, 1984).

3.4.2 Internal Validity

Internal validity reflects the extent to which causality can be inferred and rival plausible explanations ruled out (Cook and Campbell, 1979). As such, internal validity is of concern primarily in explanatory case studies. Because this study is descriptive and exploratory in nature, rather than explanatory, internal validity, in the traditional sense, is not a primary issue. However, Yin (1984) noted that issues of internal validity in case study research are broader than they are in other forms of research, and include the general notion of making inferences based on interviews and other case study data. In determining whether such inferences are correct, the investigator must convince himself/herself and others that rival explanations have been considered, and that the evidence converges. Yin (1984) suggests that evidence of internal validity in case studies can be obtained through the use of certain data analysis methods. Specifically, Yin (1984) suggests a tactic of pattern-matching. This involves establishing both an "effects" and a "no effects" pattern, then comparing the results of the study back to the anticipated patterns to see which is the better fit. Rival explanations can be ruled out if the pattern of results that is obtained can be demonstrated not to match the pattern of results that would be expected if those alternate explanations were true. This pattern-matching technique has also been suggested by Cook and Campbell (1979).

3.4.3 External Validity

External validity has to with determining the extent to which the results of a study can be generalized (Cook and Campbell, 1979). This is, on the surface, problematic for a single case study. However, case studies are concerned with analytical generalization (generalization from results to theory) rather than statistical generalization (generalization from samples to populations). Thus, external validity in case study research is rooted not in sampling logic, but in replication logic and triangulation. Case study designs offer an opportunity to build compelling evidence through a set of replications, based on convergent lines of inquiry from multiple sources of evidence and multiple methods.

3.4.4 Reliability

Reliability reflects the degree to which instruments and/or experiments are repeatable. In this study, the free-form responses of the interviewees were coded in order to enable data analysis. Measures of both the intra-rater and inter-rater reliabilities were assessed. Intra-rater reliabilities were measured by comparing the codings initially assigned by the researcher to codings of the same interviews assigned several weeks later. Inter-rater reliabilities were measured by comparing codings assigned by a research assistant with those assigned by the principal researcher. Additional information regarding the calculation of intra-rater and inter-rater reliabilities is provided in Section 3.5

Experiments are reliable if, when the same procedures are followed, the same (or similar) patterns of results are obtained. The reliability of a case study is bolstered through the extensiveness with which the design, data collection procedures and data analysis are documented. The case study protocol and case study data base provide documentation to help assure that operations are repeatable, and thus increase the reliability of the case study design.

3.5 Data Analysis Procedures

Analysis of case study data involves iterative movement between data and concepts. Data collection and data analysis proceeded iteratively and simultaneously, rather than sequentially. That is, the data obtained from multiple individuals was continuously contextualized within the broader setting of the organization. Data obtained from each round of interviews was viewed within the theoretical framework of the study to derive new insights before the data collection from the next round was begun.

The analysis of verbal data in this study was based primarily on the iterative content analysis and open coding techniques developed by Glaser and Strauss (1967), Yin (1984) and Miles and Huberman (1994).

3.5.1 Content Analysis Procedures

A content analysis technique known as open coding was used to identify the themes and patterns that emerged from the

interview data. This technique has been described by Glaser (1978) and Glaser and Strauss (1967), as well as by Miles and Huberman (1994), who assert that "coding is analysis" (p. 56). Codes were developed by repeatedly going through the verbal data and assigning codes to identifiable themes and recurrent patterns of responses. The process of developing the codes began with a line by line review of the data. Categories or labels were written in the margin next to the "chunk" captured by the label, and a list of these categories, or codes was developed. These codes were modified as each subsequent set of interview data was analyzed and new insights emerged. Throughout the code development and refinement process, an effort was made to group individual codes into more abstract categories, which could then used to organize the content of the verbal data. The movement between specific and general level codes continued iteratively as patterns previously unclassified emerged across respondents.

After several iterations of this process (involving numerous passes through the entire data set), the researcher established a preliminary set of codes which could be applied across the entire data set. A research assistant was asked to code several pages of interview data using this coding scheme as a guideline. The researcher provided the assistant with background material, explained the purpose of the study, and provided written descriptions of each of the codes. The research assistant was asked to code the verbal data independently, and was invited to suggest additional and/or

alternate codes if she encountered situations for which none of the codes provided seemed adequate.

Upon completion of the research assistant's coding assignment, inter-rater reliability was assessed. Inter-rater reliability was calculated using the formula, suggested by Miles and Huberman (1994):

$$reliability = \frac{number\ of\ agreements}{total\ number\ of\ agreements + disagreements}$$

Upon this first attempt, inter-rater reliability was unacceptably low (less than 30%). The low rate of agreement was attributable to two problems. First, as expected, the researcher and research assistant interpreted some responses differently. Second, the researcher and research assistant assigned codes to "chunks" of very different sizes. Instances in which one rater assigned a code and the other did not were counted as "disagreements". Interestingly, this second problem accounted for a larger number of the disagreements than did the first. An analysis of the differences quickly revealed that while the researcher had assigned codes to linguistic units as large or larger than a "phrase", the assistant had frequently assigned codes at the individual word level, and in some instances, had assigned multiple codes to individual words to account for several different ways in which the word could be interpreted.

The researcher and research assistant discussed at length how big a "chunk" should be, then worked jointly back through several examples from the interview data until a reasonable

level of agreement on "chunk" size was reached. Generally, it was agreed that while a "chunk" could be as small as an individual word, it would more likely consist of a group of words that expressed a complete thought and had a reasonably clear meaning within the context of the entire response to the interview question. The researcher and research assistant agreed that "chunks" identified in this manner could receive multiple codes, but that multiple codes should reflect different ideas expressed by the respondent, rather than all possible interpretations that could be read in to the "chunk" by the coder. Further, it was agreed that in those instances when multiple codes were possible, the code which reflected the most meaning should be assigned. For example, if a respondent described a situation in which a particular feature of the technology enabled him/her to participate in decision making, the code for "participation" (and not the code for "characteristic of the technology") would be used.

Before attempting a second test of inter-rater reliability, the researcher and research assistant together compared codes, discussed indicators of various codes, and refined categories. The research assistant suggested revisions to the original coding scheme. These revisions primarily involved combining several lower level codes (which in some cases were difficult for the research assistant to distinguish between) into higher level codes. A few additions to the list of codes being used were also proposed by the research assistant.

Following these discussions, the researcher revised the list of codes, and developed a set of accompanying examples to illustrate the assignment of codes to segments of the interview data. The researcher and research assistant then used the revised coding to scheme and examples to independently code additional portions of the interview data. Following the second round of coding, inter-rater reliability was again assessed. Although it had improved, it remained well short of the 90% target level suggested by Miles and Huberman (1994). As before, the researcher and research assistant identified and discussed differences in "chunk" size and interpretations of the verbal data. The list of codes was again modified to incorporate the suggestions that resulted from these discussions. The researcher and researcher assistant then independently coded additional portions of interview data. At the end of this third round of code refinement, inter-rater reliability reached an acceptable level of 91%.

Upon achieving an acceptable level of inter-rater reliability, the researcher used the refined list of codes to re-code the interview data. The research assistant was asked to code additional interviews as the researcher progressed through the data set (one in the middle and one at the end of the re-coding process). As illustrated in Table 8, inter-rater reliability remained acceptably high.

TABLE 8

INTER-RATER RELIABILITIES

Test #1	.91
Test #2	.93
Test #3	.91

Similarly, internal consistency was checked by examining intra-rater reliability. This reliability measure was calculated using the same formula given above, where the "agreements" and "disagreements" arise from the codes initially assigned by the researcher and codes assigned to the same segment of the data several weeks later. As with inter-rater reliability, Miles and Huberman (1994) suggest that inter-rater reliability should eventually increase to the 90% range. Intra-rater reliabilities are provided in Table 9.

TABLE 9

INTRA-RATER RELIABILITIES

Test #1	.95
Test #2	.90
Test #3	.92

3.5.2 Coding Manual

The final version of the coding manual and accompanying examples are presented in full in Appendix B. An abbreviated outline of the coding scheme is given below.

Outline of Coding Manual.

I. Technology Characteristics

A. Features and limitations
B. Differences between this technology and others

II. Organization Characteristics

III. User Characteristics

A. Preference for written or oral communication
B. Skills and abilities needed to use the technology effectively.
C. User-developed rules and techniques for managing the system.

IV. Communication Patterns

A. Frequency of use of the technology
B. Number of people with whom the technology enables communication
C. Amount of information exchanged
D. Responsiveness

V. Changes in Work Practices and Output

A. General changes in how work is done
B. Efficiency
C. Effectiveness/Quality

VI. Purpose for Which the System is Used

A. Provide an organizational memory
B. Disseminate/share information
C. Gain attention or visibility
D. Influence decision outcomes and/or the opinions of others

E. Motivate someone to take action

VII. Issues Related to Perceived Power and Influence

A. Accessibility to information and/or persons
B. Participation in the decision making process
C. Opportunities to learn and/or develop skills
D. Ability to exercise control in performing job duties

VIII. Problems Associated with Use

A. Loss of interpersonal communication
B. Negative connotations
C. Information overload
D. Inappropriate use
E. Situations for which the technology can not be used effectively

3.5.3 Memoing

A second form of content analysis, known as memoing, was used in conjunction with the open coding technique. For purposes of qualitative analysis, Glaser (1978, p. 83-84) defines a memo as:

> "the theorizing write-up of ideas about codes and their relationships as they strike the analyst while coding.... it can be a sentence, a paragraph, or a few pages....it exhausts the analyst's momentary ideation based on data with perhaps a little conceptual elaboration."

Memos are written to and for the researcher. They record the more elaborate thoughts and impressions of the researcher that "jump out" as the coding process is carried out. Along with field notes, memos aid the researcher in forming a more cohesive and coherent sense of what is happening (Miles and Huberman, 1994).

3.6 Summary

This chapter has presented an overview of the research strategy used in this dissertation. Propositions which guided the collection of data for this study have been provided, along with a detailed description of the data collection procedures used. The specific interview questions used in the data collection process are provided in Appendix A.

Issues of validity and reliability were addressed, and procedures for evaluating the quality of this case study research have been provided. Additionally, the procedures and techniques that were used to analyze the data have been identified and discussed. The coding manual that was developed and used to analyze the data is presented in full in Appendix B.

CHAPTER IV

RESULTS

4.1 Overview

This chapter presents the results of this study. Patterns and themes that emerged from the interview data are identified, and the findings of this study are summarized.

4.2 Common Themes

A number of common themes appeared in the interview data. At a general level, these include a shared perspective of the organizational context, changes in communication patterns, user preferences for and skills in written or oral communication, and a perceived need for training and standards. Patterns also emerged with respect to the purposes for which these technologies are used, as well as with respect to their perceived ability to reduce uncertainty, increase participation in the decision making process, improve access to information and persons, and to decreased the perceived power distance to individuals at higher levels of the organization. Most respondents indicated that the group technologies contributed to changes in their work practices, leading in many cases to improved efficiency, effectiveness, and quality of communication and work output. Additionally,

participants suggested that group technologies enhanced their ability to learn and provided a sense of control in their dealings with other organizational members. Common problems and difficulties associated with use of the technologies, such as loss of interpersonal communication and information overload, were also identified.

These and other commonalities are presented in the remainder of this chapter. Excerpts which exemplify the patterns that emerged from the interview data are included. Within these excerpts a series of dots (e.g., "...") indicates that one or more words have been omitted. Words contained within angle brackets (i.e., < >) have been paraphrased or edited slightly to ensure clarity and brevity. A full discussion and interpretation of the results presented in the remainder of this chapter will be given in Chapter V.

4.2.1 View of the Workplace

Although none of the interview questions was intended to assess the respondents' views of the workplace, the responses given suggested that the participants viewed The Division as a positive place to work. Most respondents described the organizational environment as open and friendly. Comments such as the following (the first from a high level manager and the second from a non-manager) were common:

> "It's an open door. You can probably stop me in the hall and say anything you want. And anyone can say anything to anyone, without any repercussions."

> "I don't think people hesitate to put controversial points of view out there and let them fly around for a while... People <at The Division> don't hold back."

Only two of the fifteen respondents offered any comments regarding the workplace that could be construed in a negative manner. Both of these respondents suggested that their departments were overworked. One of them also expressed concern at having been passed over for a promotion. Nonetheless, the overall perception of the workplace expressed by the participants can be characterized as positive. This view of the workplace supported observations made by the researcher during site visits.

4.2.2 Communication Patterns

Several identifiable themes regarding communication patterns emerged from the interview data. Respondents indicated that organizational dependence on group technologies for purposes of communicating between individuals, work groups and locations is high. The group technologies are relied upon as a primary means of communication and source of information. This is particularly true of The Product, both in terms of its electronic mail and database facilities. Statements such as the following were typical:

> "We rely heavily on <The Product> as an information source and to communicate between groups and departments, within the whole corporation."

> "<The Product> really is kind of our primary method of communicating with each other. It's virtually replaced the fax machine."

Preferred Channels of Communication. In addition to being primary channels of communication, many respondents indicated that the group communication technologies were also the *preferred* channels of communication. This was especially true of the electronic mail facility embedded within The Product. For example, respondents made the following types of comments:

> "I rely on <The Product> to be my communication. I always tell people I work with that, whether they are in Cambridge or wherever, the easiest way to get in touch with me, or the most efficient, or the way to get the best response is to go through e-mail. Because I'm hardly ever at my phone."
>
> "A lot of the people that I'm dealing with I would have a hard time getting a hold of in person, or even on the phone, or sometimes voice mail."

Respondents suggested that the convenience and reliability of e-mail contribute to it being their communication medium of choice. Several respondents suggested that other features of The Product also affect their propensity to utilize it. For example, the quasi-anonymous or "removed" nature of communications via the electronic mail facility was seen as being an advantage by several respondents. The following examples illustrate this perception.

> "I think in some cases people like the anonymous nature of it where they can do that without having to come up and deal with you directly. I mean you know where it came from, but it's not where they have to come up to you face-to-face with a problem or something."
>
> "<People are less inhibited> because it's not so much person to person. You've got this thing in between you."
>
> "It's just so much easier to send a note. Just kind of

like sending condolences -- it's easier to send a sympathy card."

Preferences for communication via e-mail were partially attributed to the features afforded by the technology (convenience, reliability, partial anonymity, etc.). However, these preferences also appeared to be related to individual preferences for written or oral communication. The preference for written or oral communication surfaced as a very salient issue during the analysis of the interview data, and will be treated separately, and in more detail later in this chapter.

Type of Information Exchanged. Given the high level of dependence upon and preference for communication through group technologies, it is not surprising that respondents indicated that a great deal (and diverse variety) of information is exchanged through the group support systems. Respondents suggested that all types of information, from general announcements, to detailed directives, to collaborative planning and writing projects, to discussions of non-work related issues, are exchanged via The Product and the video teleconferencing facilities. Respondents indicated that group technologies enable dialog, preliminary negotiations, and consensus-building regarding matters of both minor and major importance. The spectrum of topics discussed over electronic mail appeared to be virtually unbounded. The only exception was a degree of reluctance on the behalf of some respondents to discuss sensitive matters (particularly those related to personnel issues) through electronic channels of

communication. Several examples of these perceptions are given below.

> "All the preliminary types of interactions and decisions are done via e-mail."
>
> "You sort of dialog through e-mail."
>
> "We use <The Product> for a lot of important things, but sensitive issues maybe not as much."

Reach, Frequency, Amount, Depth and Responsiveness. The interview data suggested that the availability of group technologies has produced changes in: (1) the number and location of people with whom communication occurs; (2) the frequency of communication; (3) the amount and depth of information exchanged; and, (4) the level of responsiveness. Respondents confirmed that different time, different place group support systems enable communication with people located in geographically and/or temporally dispersed regions. This is true both intra-organizationally (within The Division and between The Division and other portions of The Firm) and inter-organizationally (between The Division and its customers). One of the respondents viewed the inter-organizational link as the most valuable and felt that it offered the greatest return on investment. The following comments illustrate the respondents perceptions:

> "Most of the decisions we make using <The Product> is with people in Cambridge and our offices overseas."
>
> "With me it's to the point because I deal with other locations, that's just the most accessible, easiest, quickest way to get to the bottom line."

> "So we're not just talking in a building here. We're talking across the world to not just our internal people, but to our customers."

Within the organization, respondents suggested that the technology has "created a bridge" between their remote site and corporate headquarters. This theme was echoed in a number of responses, and may suggest that these technologies do more than simply provide a convenient and reliable mechanism for the exchange of information. Respondents suggested that the technologies have fostered feelings of "connectedness" and enabled the development of working relationships which would otherwise not exist. For example:

> "Being a division of a company headquartered in Cambridge, Mass, at times I felt like we were on an island and they would fly over once in a while and drop off a crate, and we would wave to them. I think <the Product> has helped us build more of a land bridge from the island back to the mainland."

> "I do feel like I have a relationship with a lot of people that I wouldn't otherwise, that I would never even know, maybe never even talk to even though we work for the same company."

The convenience of group support technologies also appears to encourage more frequent communication among organizational members. Several respondents echoed the following sentiment:

> "Somehow it seems easier to jot off two or three <e>mails to the same person in one day, whereas if I had to call them, I'd probably save those things up and make one phone call."

The interview data suggested that this increase in the frequency of communication may indirectly contribute to improvements in organizational effectiveness. Respondents

expressed that without technologies such as e-mail, items which they intend to "save up" for phone calls or person-to-person conversations, would sometimes be forgotten and "fall through the cracks". For example, the following comment was typical:

> "I have no doubt that a lot of very valuable information would fall through the cracks because it's very convenient to use <The Product> when you think about things, or when you hear feedback or anything like that. You can just pound it out and send it off..... Before, I would probably wait until it was convenient, until I ran into him in a meeting, or until I happened to have time. Or it may never get transmitted at all -- the message may never get to him."

Similarly, respondents perceived that the amount of information exchanged through the group support systems was relatively high, and greater than it would be without the technologies. Respondents made comments such as the following:

> "You get a lot more information than I think you would otherwise because it's so easy to include more people in the distribution."

Interestingly, all respondents held a common perception that they receive more messages than they send. The estimated number of messages sent and received, however, varied greatly among respondents. One respondent indicated that she received (on average) two or three messages a day, while at the other extreme, one respondent indicated that he receives more than 200 messages per day. Most respondents estimated that they receive between twenty and forty messages per day, and send

about half that many. In most instances, managers indicated that they send and receive more messages than non-managers, and the number of messages exchanged seemed to increase with higher levels of management.

Beyond the amount and frequency of information exchanged, respondents also perceived that the depth of the information they receive and/or have access to is greater as a result of the technologies. Respondents indicated that greater detail is available to them, and that they have greater control over the amount and type of information that they can obtain. For example, one of the respondents stated:

> "The depth of the information I would have otherwise, the details I would have gotten the old way, wouldn't really compare to the information I have through <The Product>. ... You're kind of limited if you walk over and ask one question. That person is deciding how much information you are going to get. Are they going to answer your question and tell you more, or just answer your question. I feel like I know a lot more about our products now."

Finally, respondents perceived that communicating via the group support technologies results in a better and more prompt response. The reasons suggested for this varied from the "convenience" factor, to the notification, categorization and "tracking" features of the technology. As shown below, one of the respondents suggested that the technology simply makes it more difficult to ignore messages because the sender has a mechanism for proving when messages were both sent and received.

> "I find that I get a much better response from an e-mail than I do from a voice mail. Much better."

"I find that people respond with <The Product>, quicker than they do to phone messages."

"I think you get a more detailed response a lot of times in e-mail because a lot of times we'll be clearer over e-mail about what we're looking for. Because you may spell it out a lot clearer over e-mail than you do over voice mail."

"There are occasions when people don't respond to <The Product> messages, but they can't be as blatant about it, because you have a record of it. It's not like losing a phone message. You know they got <it>. You can set it up so you get a receipt when they open it."

The themes related to communication patterns are summarized in Table 10.

TABLE 10

FREQUENCY OF COMMUNICATION PATTERN THEMES

Item	# of Interviews
Increased volume of information	15
Preferred channel of communication	14
Increased locus of communication	13
High level of dependence	13
Increased responsiveness	7
Increased frequency of communication	3
Increased depth of information	3

4.2.3 Differences in User Preferences and Skills

One prevalent theme in the interview data stems from the

respondents' expressed preferences for written or oral communication. In describing their use of the group technologies, each of the respondents identified themselves (and sometimes others) as being either "email-centric " (i.e., having a strong preference for written communication) or "voicemail-centric" (i.e., having a strong preference for oral communication).

Only one of the fifteen respondents expressed an overall preference for verbal communication. However, this respondent expressed dissatisfaction with both e-mail and voice mail, indicating that he would rather "press the flesh" in almost every instance. In those instances where face-to-face communication is not possible, he indicated that voice mail is preferable to e-mail because there are at least some personal touches involved in hearing a voice.

While concerns for the potential loss of interpersonal communication were expressed to a lesser degree by other participants, fourteen out of the fifteen participants in this study indicated that they preferred written communication to oral communication, both as senders and as receivers of information. For example, the following statements were typical:

> "I'm more comfortable writing out my thoughts than speaking about them."
>
> "I like to see things. This may sound archaic, but I like to see things that I can print out."

The respondents who favored written communication stated

two primary reasons for their preferences. First, most perceived that their written communication skills were stronger than their oral communication skills. Participants felt that they were able to express their thoughts in a more organized, cohesive way, and better able to "say what they meant to say" when putting their thoughts in written form. For example:

> "I think everyone is different, but for me personally, I think I am more of a written. I can capture my thoughts, and spend a little bit more time fine-tuning what I'm trying to get to. Verbally, I have a hard time. "
>
> "I tend to get stuck on my words when I'm trying to sit there and present something, whereas if I'm writing it down it can be clear and concise and I can remember everything and get it all in there. ... When you go face-to-face with someone you tend to not remember everything that you meant to say as to why this would be good. It helps. I think I do better in writing than in talking."
>
> "When I'm writing, the speed it comes out is about the same speed I can put thoughts together in a real good, logical manner. And of course, you re-read after you've said it, tweak a few things, and you know when you've sent that message that you've said exactly what you want to say."

Secondly, respondents suggested that written communication (through the e-mail facility of The Product) offers advantages of specificity, clarity and manageability that are not readily available in oral forms of communication. Specifically, respondents indicated that e-mail is advantageous when many details are involved. They also felt that e-mail enables improved clarity of thought, and provides a degree of "richness" through the availability of technological features, such as color, graphics and sound.

> "I enjoy using <e>mail because I think your message is certainly more thought out and clear when you put it in writing."

> "I find that I use <the Product> more than voice mail for most of these things, because then there's no questions. Everything can be very specific. I can attach documents if I need to, reference other documents, and it's just very clear."

> "A lot of times we get <e>mail announcing products or programs and they'll have beautiful graphics which I think make an impact which you can't get over the telephone. .... There are advantages to doing it across the e-mail system because you can attach the information, you can put the graphics in it, you can add the colors and the red text and really jazz it up so that people see the information and see where your emphasis is."

Furthermore, respondents found the "paper trail" provided by e-mail to be a distinct advantage.

> "A lot of times you want to document it and save it ... and it's a paper trail, in the sense that it helps you manage it, and remembering exactly what you said, and going back to that point, getting detailed information."

The ability of e-mail to provide this paper trail, or organizational memory, surfaced as an important factor in the interview data, and is addressed in more detail later in this chapter.

The preference for written communication was, in some instances, unequivocal. Several respondents indicated that they prefer written communication to verbal communication in almost every instance. Others, however, qualified their preference as being somewhat situation dependent. For example, several participants noted other factors (such as type of information, personality of the receiver, and physical distance) that affect the tool they select as a communication

vehicle.

> "<The Product> is preferable when there's details to be involved or when I need to think something through that I'm trying to say. Phone is better when I'm trying to gauge emotions or things that I can't get through the written tool. I can listen to a voice on the other end and try to pick up things that I can't get the other way. But the phone suffers to get detailed information."

> "I think it depends on the type of information you are communicating and the message you are trying to get across."

> "I think it's just a difference in people. Some people just prefer the phone, others prefer computer messages. And when you work with people for a while, you know which person is which type and you gear it to that. I pretty much know the personalities of the people I'm working with and if I want to make sure I get to them I know which type of message to send to which person."

> "So I think <my preference is> a combination of ways depending on first of all, the personality type <of the receiver> and, secondly, I think the remoteness plays a big role in my situation."

The themes related to user preferences for written or verbal communication are summarized in Table 11. As will be discussed later, perceived skill as a written communicator appears to be related to the level of influence participants feel they are able to exert within the organization. Generally, those who believe they have strong written skills feel that e-mail provides an effective mechanism to exercise power and influence.

TABLE 11

FREQUENCY OF USER PREFERENCE THEMES

Item	# of Interviews
Preference for written communication	14
Perceived higher skill in written communication	9

4.2.4 Need for Training and Standards

Although the majority of those interviewed perceived their written communication skills to be stronger than their verbal skills, many also felt that training in how to use e-mail effectively is needed. As illustrated by the following comment, several of those who perceived that they were effective at using e-mail felt that their level of competence was a result of a great deal of work on their part.

> "Clearly there are some people that use e-mail pretty effectively. In fact, I think that I'm pretty effective at it, after LOTS of work."

Most participants viewed e-mail as a "different" form of communication, and suggested that an understanding of the differences between e-mail and other forms of communication is necessary in order to use it effectively. For example, respondents stated:

> "You write differently for e-mail than you do for a paper memo or a letter."

> "You have to understand how to use e-mail in addition to knowing how to write a memo. It's a different form of communication and you have to understand how it's different."

Additionally, respondents indicated that many employees do not understand these differences and/or possess the skills necessary to communicate effectively via e-mail. The following comments were typical:

> "A lot of people just don't get it, and they send off messages real quick, without thinking about them. They don't organize them. They just sit down and type, and transmit."

> "Not everyone is a typist or a keyboard-oriented person. It takes a good while to make someone if you're not inclined that way. If you're a bad writer it has a pretty big impact on how well they can use it."

Overall, participants suggested that while some members of the organization used e-mail very effectively, others do not know how to use it correctly, effectively and efficiently. The general consensus is that training is a very sorely needed component that is missing from the organizational adoption and implementation of e-mail at present.

Closely related to the need for training is the need for the development of organizational standards for e-mail communication. A common theme throughout the interview data was that each respondent had developed (1) his/her own individual rules or standards for composing e-mail messages, and (2) his/her own mechanism for dealing with the volume of messages received via e-mail. As shown in Table 12, a number of respondents offered simple rules for developing effective

e-mail messages. For example, participants suggested the following:

> "You kind of have to craft your messages, so that they will first of all be read. Keep them short, simple and I always put who to contact, who's the follow up person."
>
> "I always try to tell people what their action is in the first sentence. You write differently for e-mail than you do for a paper memo or a letter. And you need to kind of do 'what, who, when, where'. You ought to always put 'Action Required By whenever' and put a title."
>
> "I'll try to make the headline explicit, so that they'll know going into the <e>mail what it's all about. I think one of the most common mistakes is when everybody gets into sending all these replies, so that you get fifteen <e>mails and all of them say 'regarding so-and-so'. That gets confusing, and that's where I think people need to start using it differently."

Similarly, on the receiving end, those interviewed described self-developed mechanisms for dealing with the (sometimes large) number of messages that they receive. A common problem reported by the participants is the inability to identify important e-mail messages, and distinguish them from those that are not. One respondent suggested that the development of standards, either within the software itself or within the adopting organization, could help to alleviate this problem. He stated:

> "I'll be glad when we have some conventions either in the software or as corporate standards -- where it's maybe 'blue' -- you know color-coded. Something to help people identify what's important."

Because such standards are lacking, respondents must devise their own mechanisms for dealing with the abundance of information they receive via e-mail. Several participants

indicated that they open all messages in the order in which they are received (i.e., chronologically). However, those respondents who receive greater numbers of messages had developed other mechanisms to determine which messages deserved the most immediate attention. Generally, these respondents indicated that they "scan" their messages by looking at who sent the message, how many people the message was sent to, and what the subject of the message was. For example:

> "Usually I just open my mail as I get it, in chronological order and that's how I open it."
>
> "You can usually tell, actually, by the person who's sending it whether it's a 'needs to be read right away' or just general information."
>
> "If a message is just directed to one or two people, it's probably much more important and is much more likely to require action than all this 'cover your ass' kind of copying."
>
> "I also have a field set up that tells me whether it was to me, or if I'm just in the 'carbon copy'. The ones that are to me I open first, and the ones that are from people who are recognized or who I've got current hot topics going with get read first."

Several participants expressed a desire to have an intelligent component within e-mail which would filter and scan incoming messages --- in other words, an "intelligent agent" to look through the messages and prioritize them according to the user's needs and objectives.

TABLE 12

FREQUENCY OF TRAINING AND STANDARDS THEMES

Item	# of Interviews
User-developed, self-imposed rules	12
Need for training	6
Need for standards	4

4.2.5 Purposes for Which Used

In describing their experiences with the group technologies, respondents identified a number of reasons for adopting and utilizing the technology. In general, those interviewed suggested that they select the group technologies (particularly The Product) as their primary means of communication because: (1) it provides an organization memory; (2) it is a convenient and effective way to deal with decisions that span multiple time periods; (3) it is an effective and efficient way to disseminate and share information; (4) it is an effective way to get the attention and action of others; and, (5) it enables participation in the decision making process and provides and opportunity to influence decision outcomes. The first four of these are discussed below. The fifth is discussed as a separate issue in the next section of this chapter.

Organizational Memory. The provision an organizational memory was regarded by nearly every respondent as a major

benefit of adoption and use of the groupware product. Participants clearly viewed the groupware product as more than simply a vehicle for communication. Respondents indicated that the "memory" afforded by the technology, together with the ability to organize the information within that memory in accordance with their own individual needs, is a vital organizational resource. Most respondents suggested that their level of dependence upon the organizational memory provided by the groupware product is high. Further, organizational memory is one of the features which distinguishes the groupware product (i.e., The Product) from the other group technologies (voice mail and video teleconferencing). For instance:

> "I'm in a support role, where I'm almost an information bureau. I'm giving information about a lot of different things, and it's my security blanket. It is my memory."
>
> "It allows you to review back. Like two months ago we had a meeting, and somebody put something in here, and I can scroll back through that discussion and find out -- I just don't know how you would do that without <The Product>."
>
> "It's definitely a great way to organize the information that you have. And the fact that you can customize it, makes it reflect the types of things that you are trying to keep track of."

The extent to which respondents used The Product to retain organizational correspondence varied greatly. Some respondents indicated that they keep virtually all e-mail correspondence for a period of six months to a year, while others indicated that they delete most messages immediately after they have been read.

> "I save everything because it's a resource and I can go back to it."
>
> "I know that sounds like a lot, but I keep usually about a year's worth of e-mail."
>
> "Unlike most of the people here, I delete it almost immediately."

Interestingly, one respondent suggested that keeping a large number of messages is somewhat of "status thing" -- the implication being that for some individuals, keeping a large number of messages contributes to a heightened sense of self-importance.

While some of those interviewed stated that they keep everything and some keep nothing, most respondents indicated that they retain a portion of their e-mail messages on a selective basis in order to track those items and discussions that they deem to be important. In some instances, events and discussions are tracked simply for record keeping purposes. For example, the following comments were typical in this regard:

> "I almost always prefer e-mail over voice mail... because then I have a way of tracking."
>
> "<Using the Product>, I've got a record that I sent it. And, which is time and date stamped, so it's more half record keeping than anything else. I can pick up the phone and call the Product Manager and say I need the files for the Productivity Pack, and then three days later she can say, 'I never got that call' or 'I forgot' or something. But whereas with mail, I've got it. Half the time that's for my own use, just to make sure I actually did it."

In other cases, the organizational memory feature was seen as going a step beyond record keeping, in providing a mechanism

to "cover your behind". This theme was especially prevalent in employee-supervisor relationships, and with those who disperse information to large groups of people. For example:

> "I keep those that I need to cover my butt. That I need to prove that, yes, I did have instructions from someone to do this."
>
> "It's great because you can store e-mail for years if you want. You can archive it and keep them, and really cover yourself if someone says 'you didn't tell me that', or if your boss did tell you something that they don't remember telling you."
>
> "If someone says 'you never told me' I can go back and say, 'yes, we did, here it is on such and such date'. I use it ... to say, 'Yes, we discussed this. I have it right here.' It's a 'jog the memory' type of thing."
>
> "If you are trying to put out a piece of information to 230 people, and in the old days you had to print out a memo and then have it passed out on everyone's desk, and then people would come back and say 'I missed out on this because I didn't know about it, I didn't see it'. At least with the electronic mail, you have a tracking mechanism."

Collaborative Projects and Processes. The groupware product also enabled those interviewed to better deal with collaborative projects and "process data", i.e., those situations which encompass a number of conversations and/or events over an extended time period. A number of respondents indicated that such projects would be difficult to manage and accomplish using other forms of group communication.

> "All in <The Product> you can see the chain of events, you can see the date that things happened, whereas with the phone you can't do that.
>
> "You want to take into account a lot of people into a conversation like that over a period of months. That's not something you can sit down and decide in a matter of a conference call in an hour."

"For example, when you do a budget, or a head count proposal for next year, which we roll up, each group will do one, then roll up to the next level, and roll up to senior management. So it goes up, then it comes back down, for reiterations if necessary. There's only one meeting, which is off-site, when the whole thing is discussed, but the process is done through <e>mail."

Disseminating/Sharing Information. The only unanimously mentioned reason for using the groupware product was to disseminate and/or share information. A number of respondents felt that one of the most valuable benefits of the group technology was being to able to conveniently and efficiently provide a large number of people with the same information at the same time.

"I think they are most valuable in disseminating information. It removes the question of 'Did you get the information? Did you have access to the information?'"

"<The Product> to me is my savior. If I need information to go out immediately, I send it out via <e>mail high priority, and within minutes, everybody on my team has access to the same information. For remote management, it's been marvelous."

"The information is typically shared more, in other words, if I sit down and type a message to all the people that report to me, the 10 people that work for me, versus having a one-on-one meeting -- it's a way of just putting us all on the same page."

Gaining attention. In a few instances, respondents suggested that they use the groupware technology to create visibility and become known to other organizational members and subunits. One respondent suggested that the e-mail facility within The Product is sometimes used as an "internal marketing program".

> "There are still groups that send out anything. Just to get their name in front of people. It can be like an internal marketing program."

Others simply suggested that through the use of The Product, they were able to establish contact with and/or gain the attention of other people.

> "I have a large group, and trying to get them together would be impossible without it. So yes, I have their attention in <the Product>."

> "You do have a little bit more contact -- you are maybe a little bit more in their face, otherwise you wouldn't really have that contact."

Table 13 summarizes the themes that surfaced with respect to the purposes for which the group technologies are used.

TABLE 13

FREQUENCY OF PURPOSE OF USE THEMES

Item	# of Interviews
Sharing/disseminating information	15
Organizational memory	13
Collaborative projects and processes	11
Gaining attention	3

4.2.6 Power and Influence

Many of the responses given by participants in this study suggested that the use of group technologies affects several

of the theoretical determinants of power and influence. Specifically, the interview data indicated that use of these technologies helped to (1) increase participation in the decision making process, (2) improve access to information, thus reducing uncertainty, (3) improve access to persons, (4) reduce the perceived "power distance" (Hofstede, 1980) to key individuals within the organization, and (5) provide increased opportunities to influence the opinions of others. Additionally, respondents suggested that a heightened sense of empowerment results from the use of the group technologies.

Participation. Nearly every participant in this study indicated that their participation in organizational decision making is greater and broader in scope as a result of the group technology. Almost universally, respondents perceived that they and others would not be participating at the same level nor in the same types of decisions that they currently are if the technology were not in place. Reasons cited for this stem from the difficulties otherwise imposed by both time distance, such as the inability to conveniently and efficiently be included in decision making activities.

> "It does make it easier to get other people in the loop, especially those in a remote office."
>
> "If this were on paper, the chances of someone in marketing, or R&D putting my name on it and having the secretary forward it to me as well as others is much less. There's much more effort involved in that. Here, you just add a name and that's it. It's in there."
>
> "<Without The Product> I probably would not have any participation, little if any <with Cambridge and overseas> because, just the distance factor."

> "I think it is inclusionary. In other words, it brings more people into the process."

Participants in this study indicated that they felt more included (i.e., "in the loop", "tied in", etc.) and perceived a greater opportunity to contribute to and participate in the decision making process. For example, the following comments were typical:

> "It helps you feel tied in, in the loop. It helps you know what's going on with your company, an integral part. Simply because someone has elected to include me, to put me on this routing list, I'm important to someone."
>
> "You feel more a part of it. If you're included in a decision, you feel like the opportunity is there to put your two cents in, if you have a view about a certain topic."

Overall, participants perceived that the technologies have an equalizing effect on participation.

> "I think <participation is> more equal. You have the same sort of forum, regardless of your position."

Access to Information. All respondents indicated that the groupware product enables them to have extensive access to information. Respondents unanimously agreed that information (about the industry, the company, their job duties, etc.) is more readily available through the group technology than it would be otherwise. However, two respondents stated that although they know the information is available, they have difficulty sorting through, filtering, and finding the information they want, and in that sense, perceive that information may be less accessible than it was before.

A number of respondents stated that the group technologies are helpful in reducing some of the uncertainties that they must deal with and/or providing a mechanism for coping with those uncertainties. Coping mechanisms provided by the technologies include the ability to look things up easily and the ability to access information on the industry newswires.

> "We use it in decision making by looking things up you're not quite sure about."
>
> "I feel like it does help you cope, it really becomes your lifeline to the company and the industry."
>
> "If you are uncertain about something you are doing, you can put your feelers out to people you know and ask for guidance or assistance. As far as uncertainty in the industry, I use <The Product> everyday to log in to the industry newswire so that gives me the latest and greatest about what's going on. I always know corporate-wide what is happening. So in a sense it does because it's a communication tool that links you to the outside. So you're not in a box. You know what's going on."
>
> "I look at for example, we daily, there's a database available to us that shows the major industry trends, the major decisions, or major moves that the companies like Microsoft, and IBM are making. ... I wouldn't have that on fax or any other way. I probably couldn't afford to."

Similarly, several of those interviewed suggested that in addition to helping them cope with uncertainty, the information that is available to them also imparts feelings of comfort.

> "I do feel comforted knowing that if I did need an answer <from the external newswires, etc.> I could find it."
>
> "It's comforting to have some of the databases."

<u>Access to Persons</u>. Similarly, many of those interviewed

perceived that access to persons was improved through the use of the groupware product. Participants cited a number of difficulties in reaching people that are alleviated by the use the group technologies. For example:

> "It's a very fast moving business, and it's very hard to get personal contact with people. So I think with this business particularly, computers probably make that better."

Some respondents suggested, however, that while "virtual" access to people may be improved by the technologies, physical access to people is reduced due to the fact that dependence upon the computer for communication is high.

> "I would guess that <access to people> is not as good because people just tend to depend on the computer and they make themselves less accessible."

Overall, respondents suggested that in spite of the potential difficulties access to persons is generally improved by virtue of having e-mail and group technologies. Comments such as the following were typical:

> "My first response is to say <that access to persons is> better. I can reach anybody in this company that I want. ... I have a feeling people tend to correspond better through <The Product> than they do through phone mail because it's just easier. It's easier to respond to my <e>mail with a quick reply than it is for you to call me and answer my questions, so I think, better."

Power Distance. Additionally, respondents perceived that the technology helped to lessen the gap, or the "power distance" (Hofstede, 1980) to those at higher levels of the organization. For instance, those interviewed frequently made

comments such as the following:

> "If there were an executive or someone higher up, if they were to see an e-mail from me, see the chain of events, I think they would respond quicker if they were to see the importance of it versus if I were to leave a voice mail saying, 'My name is _____, you don't know me, but I've got something very important to talk about, please call me'. I think it does open up doors to higher levels, both ways. I think higher levels see the importance of some functions that they normally wouldn't be exposed to, via <The Product>."

> "Our VP, who's pretty busy - I'll call him and his secretary always answers the phone to screen his calls. And I'll say 'Is _____ in?' and she'll say 'Yes, he's in but he's busy', and I'll say 'Will you tell him I need to ask him a question - or ask him what's our budget for blah-blah-blah', and I don't here back from him. Or I can sit here and write him and say '_____, what's our budget for whatever for 3rd quarter 94?' and an hour later I'll have an answer. Well, I never heard from him with the voice mail or the message to his secretary."

> "There's so much more a sense of knowing who the players are in the company when you at least see their name on <e>mail several times a day -- whether you've met them or not you feel like you know them."

The perception that the technologies helped to decrease the power distance to key decision makers was not shared unanimously by all respondents, however. Two of the fifteen participants in this study suggested that while they initially found e-mail a very effective way to reach key individuals, those higher up in the organization now receive such large numbers of messages that they no longer are responsive to it, and/or have found ways to insulate themselves by establishing systems to screen their messages. For example, one respondent stated:

> "Somebody told me last week that one of our executives has an agent that goes through and if there's more than

> two people copied on the e-mail he never reads it. He may ask a staff member to read it."

Comments such as this were, however, in the minority, and the general consensus was that the perceived power distance to key decision makers was improved through the availability and use of the group technologies.

Opportunities to Exert Influence. Respondents who perceived that they possess good written communication skills also perceived that the group technologies provided them with improved opportunities to influence the opinions of others within the organization, including those at higher levels. As stated earlier, fourteen out of the fifteen respondents in this study perceived that they possessed stronger written communication skills than oral ones, and believed that they were able to make a stronger and more cohesive argument through written channels of communication than they could orally. Most also perceived that the groupware product encourages the contribution of ideas and elicits higher levels of responsiveness from management. A number of respondents expressed a belief that the groupware product enables them to have more of a voice in decision making and a greater opportunity to influence outcomes than they would otherwise have.

> "I'm stronger in writing, so I think you can influence people with a computer. I think I'm more effective that way."

> "I probably use e-mail heavier than my counterparts to express concern about something or to sell them on an

> idea, because me personally, I can verbalize better in writing."
>
> "I think it is easier to do than it would be over a phone call. Because a lot of times in a phone call it's hard to organize your thoughts. ... You can stop and organize your thoughts, maybe research something, look something up from a prior meeting, you can create a more cohesive point that somebody can even print out and read it. And I think that people absorb a lot more when they read something."
>
> "<The Product> has allowed me to provide supporting information to management on decisions that are made."

Several respondents also suggested that their ability to influence others was enhanced by the groupware product because the technology allows them to express their opinions without being interrupted by others with conflicting viewpoints. For example:

> "It's easier to come across with your own opinion, because you know nobody's going to interrupt you, and you can get everything out at once, and then just kind of wait on a reply."
>
> "Since you can't interrupt, you have full leeway to write however you want to to influence people."

Most respondents also acknowledged that the ability to influence other and to be influenced by them depends on the written communication skills of the user. For those with strong skills, the groupware product affords a significant opportunity to exert influence. For those with weak skills, the technology can impose a barrier which limits the ability to influence others.

> "I know for some people who have really strong written communication skills and are just really very eloquent on paper, <The Product> is a great way for them to get their

point across."

> "But some people can't write, and you read it and you're not necessarily informed or influenced. It's a tool, but it's not always effective for everyone."

Overall, participants perceived that the group technology provided a good way to get their point across, and to make their opinion known to those who ultimately make decisions. However, several of those interviewed also acknowledged that informal communication (i.e., conversations in hallways, lunchrooms, etc.) is still a very important part of the decision making process, and remains a vehicle through which viewpoints are exchanged and influencing behaviors occur. In those situations where distance prohibits such personal interactions, the use of the groupware product is heavily relied upon for the exchange of viewpoints.

> "For people in this division, for viewpoints, I still hear most of it verbally .... For people outside of this division, however, it's primarily e-mail and <The Product>. Because the phone doesn't always work. You can't be guaranteed to find someone at their desk."

Empowerment Issues. Several participants suggested that the adoption and use of the groupware technology has not only had an effect on participation, influence and perceived power distance, but has also been empowering in a number of ways. For example, several respondents (even the one who expressed the most skepticism about the technology) felt that the opportunity to respond and feed input into the decision making process, and to be able to do so in a convenient manner, is empowering. Additionally, respondents stated that the group

technology (1) gives them a greater sense of control in carrying out their job responsibilities, (2) provides them with increased opportunities to learn.

Respondents perceived that the group technology gives them more control in carrying out their job duties in two ways. First, it enables them to readily confirm that others have been informed and that the responsibility for action has been shifted. This imparted a feeling of having the "right" to expect a response, and established a basis for follow-up actions and/or escalation when responses are not forthcoming. For example, respondents frequently made comments like the following:

> "It removes that 'check is in the mail' stuff. When you get a confirmed receipt that somebody got your message, the responsibility is now theirs."
>
> "You can do a return receipt request, and then that way I <u>know</u> when that person has read it, so I know when to start expecting a response, whereas if you leave a telephone message you don't know if you didn't push the button right and it didn't record, or they didn't listen to it, or did they listen to it and are just ignoring you."
>
> "You know when you get a receipt that Mike read your message at 1 o'clock and it's 5 o'clock and you haven't heard from him and you put on it that it's urgent, please respond immediately, that you have the right now to call him and say, 'What's going on? This is really important'".

Participants also indicated that the technology enables them to deal with issues when they choose, i.e., that they have a greater sense of control regarding when they do certain tasks and are less subject to interruption by others.

"<You are able to decide> I'll read all those at once or I'm not ready to read them now --- don't interrupt me now --- let me go back and I'll go back and read all those at once, when I feel like I have time to respond to what everyone else has responded to."

"The reason why I like to do it that way <use e-mail> is I that I can be very protective of my time. And if you pick up the phone, you're captive, regardless of who it is. But if it's e-mail, you can respond to it when you have the time to respond. You're not held for that amount of time that you may have been on the phone."

"I almost always prefer e-mail over voice mail ... because it comes to me when I want to deal with it."

"I think ... <bullies> are more easily ignored. You don't have to <listen to them>. If you get tired of reading it you can just go on to the next message, or whatever. "

"I look to see at the end of the day at 4:30 if I have any new messages. If I've had a rough day and I don't think I can cope with them, I don't look at them until morning."

Secondly, participants in this study also suggested that the technology has provided them with opportunities to learn and to improve their own personal skills.

"My communication skills improved 200% doing that."

"I've developed better communication skills that way -- written communication skills. And it's improved my phone skills by being able to react to things at the spur of the moment -- learning what to say and when to say it. The 'politically correct' stuff."

"You just get used to seeing how other people handle things, address things, or discuss things. Saying things or wording things."

"It helps you in both writing and in interpreting what others are saying. I took English twice <in college>. I struggled to write three pages. Now I feel comfortable writing technical documentation and everything else."

TABLE 14

FREQUENCY OF POWER AND INFLUENCE THEMES

Item	# of Interviews
Access to information/reduced uncertainty	15
Participation in decision making	13
Opportunity to exert influence	11
Ability to exercise control	8
Access to persons/reduced power distance	6
Opportunities to learn	6

4.2.7 Work Practices and Output

Respondents identified numerous ways in which they felt the group technologies have changed the way they work, several of which have already been identified. In addition to changing the way people communicate with each other, the way in which they access and store information, and the manner and degree to which they participate in decision making activities, those interviewed indicated that the groupware product also increased their effectiveness and efficiency.

Effectiveness. Participants suggested that individual and/or organizational effectiveness is enhanced in the following ways. First, the group technologies bring the "right" individuals into the decision making process. Prior to having the technologies, those who participated in meetings were often those who were conveniently able to participate, rather than those most appropriate. The following comments illustrate this point:

> "Prior to having the <video> equipment here, if we had an executive briefing, and a lot of times they come up on short notice -- it typically came down to who CAN go to Cambridge on Friday, not who's the BEST person to go. Now we get the product manager, typically, to do all of those. It changed who did those."

> "It brings different people to the meeting. That's what it does. It might bring the right person."

> "Our primary usage for video conferencing is supporting executive briefings. And as opposed to getting an average presenter who might not be able to answer the questions, they talk directly to the product manager who has designed the product. So which is more effective? An average person there in person, who they're going to get more nuances, they're going to have more time to socialize before or after, but I think that having the product manager there, or the executive -- if the senior executive is on that call, then he'll be more effective than say a sales person would be."

Secondly, respondents perceived that communication carried out through the group technologies is more effective than phone conversations and "sticky notes". As discussed earlier, those interviewed found that groupware communication tends to get a better response than other forms of communication. The general perception is that e-mail gets read and is less easily ignored than traditional forms of communication.

> "It probably does save me a lot of time, and I think it's more effective. People tend to read -- some people still ignore e-mail -- but I think more people tend to at least see it, and open it up for a second and figure out if it's something that applies to them or not than they are if it's paper that just piles up and they don't really look at it at all."

Additionally, those interviewed perceived that there is less of a tendency for things to "fall through the cracks" when group technologies are used. Respondents suggested that one simple reason for this is that electronic communication,

unlike paper alternatives, is not easily lost. Comments such as the following were common:

> "Our functionality to the company grew to a point to where there were sticky notes on our computer screens, and voice mail and all that, and it always seemed just so unorganized and people were getting mad because they left a sticky note on our computer and it fell off the monitor, underneath my desk, stuck to the bottom of my shoe, and I walked into the bathroom never to be seen again - and like I don't know what you're talking about. So there's no way to dispute it if it's in the database."
>
> "All the people who are contributing had the opportunity to contribute before, but we probably lost 30% of the ideas or even more without <The Product>."

Third, respondents felt that the increased participation associated with the use of group technologies results in the development of a larger number, and sometimes more creative set of potential solutions to organizational problems. For example, one respondent noted:

> "It's really quite interesting to see what some of the solutions are that people come up with. And then you'll look at something and you'll read the problem and you'll look at what someone tried, and you'll have like seven responses to it. And someone will have a totally different approach, something you never thought about looking at."

Fourth, respondents perceived that individuals are more honest and open about their feeling and opinions when group technologies are used.

> "I've found that people tend to be really honest in this forum. Even though it is written and it's permanent, people are very vocal and very honest in this forum."
>
> "I guess ultimately you're probably very truthful about your feelings on certain subjects when you use <The Product> to communicate because sometimes where people do

> become emotional sometimes what we're saying is not really even how we feel -- when you get into a controversial subject, or an emotional issue like that. However, when you put it on paper, you rationally think through what you're saying. I think your truest feelings are more likely to emerge."
>
> "<People are less inhibited> because it's not so much person to person. You've got this thing in between you."

On the down side, however, one respondent expressed concerns that group technologies may adversely affect decision quality, and thus organizational effectiveness, by encouraging people to act too hastily. This suggested that the quick decisions facilitated by electronic communication and group technologies may not be correct, or at least not as well thought out as they could be.

Efficiency. Nearly every respondent indicated that group technologies have made them more efficient. Most stated that the technologies have made decreased the time spent trying to chase people down, as well as the time it takes to get things as a group.

> "It's really efficient that you don't have to do the alternative, and that's dial, call, call back, wait for a reply, follow-up, or have somebody chase them down."
>
> "In the old school without <the Product> it would take us a lot longer to get things done by virtue of the fact that we would all have to be available at the same time."
>
> "I have found because you can track things via <the Product>, and forward, and the person can read the sequence of events, whereas with a phone call you pretty much have to explain 'this is where we started' and spend 30 minutes trying to capture where you have gotten with the project where they can see it."

Many also suggested that the group technologies reduced the

time spent in and improved the productivity of group meetings. Respondents perceived that the group technologies encourage a higher degree of preparation prior to decision-related meetings, making such meetings more productive, and requiring them to spend less time in meetings.

> "Everybody had a chance to kind of put their two cents in, into the <e>mail system, so by the time we got on the conference call, everyone was prepared, and we were able to streamline the discussion and we were able to finalize the decision."

> "We probably do spend a little less time in meetings because there are some times when you don't need to have a meeting to get the buy-in if it's just a minor decision."

> "For me to sit in on a meeting takes a lot of time to listen to all the points. I'd rather read it. I can read it much faster than I can listen. ... I can get through the same amount of discussion in a quarter to a half of the time than I could if I was sitting in a meeting."

Relatedly, many of those interviewed perceived that the group technologies resulted in fewer meetings being necessary.

> "I've known the chairman to actually call off a meeting because we had already decided something and there wasn't anything else to discuss."

Interestingly, those who felt that the group technologies had not significantly reduced the time spent in meetings perceived that the group technologies enabled much more to be accomplished (both as a group and as an organization) in those meetings.

> "So while we're still spending as much time in meetings, we're getting a hell of a lot more accomplished."

> "I would say that we're probably still in meetings as much as we were before there was <The Product>, but I think the nature of what we're trying to accomplish is much greater."

> "I think companies that use e-mail will move at a faster pace. I think companies that use <The Product> will move at an even faster pace than that. And so, that means that because they're moving faster, it's going to seem like there's more meetings, but in actuality you're accomplishing more."

Overall, the participants in this study indicated that the group technologies have significantly and dramatically changed the way they work. A number of respondents suggested that they have become so dependent upon these technologies that it would be difficult for them to continue to do their jobs without them. One respondent likened the availability of groupware to the availability of microwave ovens. While it is still possible to do things the old way, it is not as convenient, nor as efficient, and less gets accomplished. Comments such as the following were common:

> "I can't imagine what life would be like without it. I can't even begin to say. Especially in this industry. It's always changing. It's a must. It's a definite. I don't know how any company could effectively communicate without something like <The Product>."

> "When talking to people about <the Product> I always tell them that I don't think I could do my job without it."

> "It's so weird because it's so much a part of everything that we do."

TABLE 15

FREQUENCY OF WORK PRACTICES THEMES

Item	# of Interviews
Increased efficiency	13
Increased effectiveness/quality	12
General changes in work practices	8

4.2.8 Problems Associated With Use

In addition to the many positive outcomes reported by the participants, several difficulties were also reported. The most commonly cited problem associated with the use of these technologies was that of overuse, which has resulted in "information overload" for many users. A number of the respondents in this study (but not all) felt that they receive too much e-mail, and at times, were overwhelmed by the volume. As a result some of those interviewed felt that electronic communication is losing effectiveness.

> "There's some times you come in here in the morning and you're overwhelmed with the number of <e>mails that you have waiting to read."
>
> "Since you use <The Product> so much, you almost have a tendency to become brain dead to what you are reading, and you get overwhelmed."
>
> "We get so accustomed to using <The Product> and it's so convenient, that as a result maybe that information that is communicated through <it> gets less priority. It becomes less important somehow."

As noted earlier, many respondents who voiced this concern

also felt that much of the overuse was attributable to poor training and a lack of standards. Interestingly, although many complained about receiving too much mail, most also expressed that they prefer to have too much information rather than too little.

> "It's hard muddling through it -- but I would rather be over-informed than under-informed."
>
> It's very hard because I'm addicted to the amount of information that's available to me over <The Product>, but yet I know that at the same time that I'm numbed by it."

The second major problem reported by respondents is the loss of interpersonal communication that results from the use of electronic communication. Several respondents felt that the personal touch is still needed.

> "One of the big problems with using a computer is that people tend to use it almost exclusively and cut down on the communication and I think you need both."
>
> "The one down side I do recognize is less personal interaction. There are a lot of people here that I don't see for weeks because I really don't have a need to go upstairs and visit them. That may be a little bit of a down side, but then on the other hand like I said before, I do feel like I have a relationship with a lot of people that I wouldn't otherwise, that I would never even know, maybe never even talk to even though we work for the same company."

Others suggested that communication through group technologies is easily misunderstood or taken the wrong way.

> "Someone can read it and take it totally different from what you're saying."
>
> "I think what you miss out on when you do this sort of thing <video>, or even when you're doing e-mail, is the

> casual conversation you would have if you were in a meeting. There's a lot that comes out when you are in those situations that may not have come up .... when you're in conversation, or you know, as you're walking to the meeting with somebody, something may come up, if you're sitting in the meeting something may come up on the side."

Relatedly, respondents suggested that use of the group communication technologies can actually create a negative image for some users of the system, due to either the "flatness" of the system, or a lack of skill and/or training in written communication.

> "I mean when people send off a hasty rebuttal to an e-mail, they typically sound more terse. They come across as negative."

> "Just the other day I got a message from one of my employees. And he didn't put a title on his e-mail. It went to a Vice President and a lot of other people. He didn't spell-check it, it just wasn't very well organized. it was all kind of paragraphs and run-on sentences."

Several other problems which can be lumped together under the term "Inappropriate Use" (such as indiscriminate forwarding, overcopying, overuse of the return receipt feature, and inappropriate use of large distribution lists) were reported by some of those interviewed. Overall, however, respondents suggested that the benefits afforded by the system outweighed the problems.

TABLE 16

FREQUENCY OF PROBLEMS OF USE THEMES

Item	# of Interviews
Information overload	12
Loss of interpersonal communication	12
Inappropriate use	3
Conveyance of negative image	3

4.3 Summary

This chapter has presented the findings of this study. Common themes which emerged from the interview data have been identified. An interpretation of these findings will be presented in the following chapter.

CHAPTER V

INTERPRETATION AND DISCUSSION

5.1 Overview

This study was conducted to explore the relationships between the use of group support systems and power and influence in an organizational setting. An emic perspective of these issues has been gained through a case study analysis involving users of such systems in an actual organization. Common themes and patterns which emerged from the interview data have been identified in Chapter IV.

This chapter explicates the findings of this study, relating them to the theoretical depictions of power and influence presented in Chapter II, and to the propositions set forth in Chapter III. Within this framework, the implications of the results will be discussed, and a research model which can be used to guide future studies addressing these issues is presented.

5.2 Interpretation of Findings

The previous chapter has demonstrated that organizational users of group support systems attribute a number changes in communication patterns, work practices, decision making processes and organizational effectiveness to the availability

and use of group technologies. Additionally, users perceive that these technologies change factors related to power and influence, such as participation, access to persons, access to information, reduction of uncertainty, and the ability to exercise control.

Case study methodologies were employed in this study in an explicit attempt to capture user perceptions of group support technologies within the context of the organization, rather than to separate the phenomena of interest from the context or to simply assume away contextual variables. Relevant features of the organizational context described in Chapter IV include the overall organizational environment, the organizational structure, and the degree of centralization in organizational decision making.

Interpretation of the results of this study thus begins with a review of the organizational context and a discussion of its potential effects on the findings of this study. This is followed by a discussion of the general findings (those related to communication patterns, system usage, work practices, etc.), and then by a discussion of the findings related more directly to the determinants of power and influence. Throughout the discussion, emphasis will be placed on the determinants of power and influence which appear to be most salient for this study: participation, accessibility to information and persons, dependencies among subunits, centrality, the ability to cope with uncertainty, and the ability to exercise control.

5.2.1 Organizational Context

As previously noted, participants in this study viewed their workplace as a positive and open environment. Very few comments about the organization which could be construed in a negative manner surfaced during the interviews. Intuitively, this positive organizational context is likely to have contributed to the successful adoption and implementation of the group technologies, and to positive attitudes toward the technology.

The organization in this study was characterized by those interviewed as decentralized. This is evidenced by the lack of a formal organizational chart, and the matrix-like style of management. Organizational members in decentralized settings may have greater and somewhat different communication needs than those in centralized settings, and thus, may be more likely to adopt and use group technologies. Furthermore, the degree of centralization within the organization has direct implications for the primary questions related to power and influence posed by this study. Eisenhardt and Bourgeois (1988) found that power and politics were more prevalent in organizations where decision making was highly centralized, and the imbalance of power was obvious. In such cases, less powerful people were more likely to form coalitions to challenge the power of autocratic decision makers. The findings of Eisenhardt and Bourgeois (1988) were contrary to "conventional" wisdom, which holds that when power is roughly equivalent (as it may be in decentralized situations),

individuals are more likely to band together to influence outcomes. The implication for the current study is that the effects of group technologies on power and influence may be harder to detect in decentralized settings. Patterns related to power and influence which emerge in decentralized settings, therefore, should be considered particularly worthy of investigation.

5.2.2 Changes in Communication Patterns

The evidence in this study suggests that communication patterns change when group support systems are implemented within an organization. Specifically, there is an expansion in communication "reach" (i.e., the number and location of people with whom an individual communicates). The system enables individuals to communicate and establish working relationships with a wide range and number of organizational members, some of whom they would otherwise have little or no contact with due to physical distance or organizational position. Although the reach is more extensive, the form of communication changes from physical communication (e.g., face-to-face and voice communication) to "virtual" communication through electronic channels. Thus, while most participants perceived that their circle of communication widened, the amount of face-to-face contact with other individuals may be less. The transition to virtual communication appears to occur not only among individuals in geographically remote locations, but also among individuals who are located in

reasonable physical proximity to each other (i.e., down the hall or on the next floor). Despite the reduction in physical contact, users of the group support systems in this study indicated that they felt a heightened degree of connectedness to others in the organization, both within and across physical, functional and position boundaries, as a result of using the system.

The evidence further suggests that users of group support systems communicate with others more frequently, exchanging not only a greater amount of information, but also more in-depth information than they otherwise would. Possible reasons for this suggested by the participants include the ease of use and convenience afforded by the technology, the reliability of the system (i.e., reduced risks of "lost" messages), the quasi-anonymous or "removed" nature of the electronic medium, and the perception that electronic communication is more difficult to ignore than paper or voice messages.

The perception that email is more difficult to ignore than paper and voice equivalents is a potentially significant finding. Several possible reasons for this perception were suggested by the participants. First, many users prefer email, like to use it, and as a result, check their email often. Participants in this study indicated that they check their email several times each day (or more often). Secondly, the convenience and reliability of the system may encourage a greater degree of responsiveness by reducing the need to play "phone tag" as well as reducing the risk of lost messages.

Third, the groupware product utilized at the research site includes a "return receipt" feature which can be invoked by senders of messages. When this feature is activated, the sender is notified when recipients receive and open their messages. This feature has made it more difficult for recipients to ignore sender requests, and has virtually eliminated the excuse "I didn't get the message".

A related finding is that users perceive that they get a better, faster response to email than they do to alternative forms of communication. The perception that there is greater responsiveness to email, in terms of both speed and content, is another interesting and potentially significant finding. Additional studies will be needed to determine if there is in fact a responsiveness differential.

Overall these changes in communication patterns suggest that group technologies widen the user's sphere of communication, enhance accessibility to information and persons, and improve communication response rates.

5.2.3 User Factors

Participants in this study attributed a number of changes in communication patterns to features of the technology. However, the evidence in this study also suggests that individual preferences for and skills in written or oral communication are important factors. All but one of those interviewed expressed a personal preference for communicating (as both a sender and a receiver of information) in written

rather than oral form. The preference for written communication was consistent across managerial levels and functional areas. Furthermore, preferences and self-perceptions of skill level seem to be correlated. Nearly all of those who preferred written forms of communication also perceived that they possessed stronger written than oral communication skills. Interestingly, those who perceived that they possess strong written skills, also perceived that e-mail technologies provide them with increased opportunities to participate in and influence decision outcomes.

The pattern of responses that emerged in this study also suggests that differences in written communication skill levels exist among work groups. This may be due to factors such as educational background and functional orientation. For instance, by the nature of what they do, those in sales-related positions may be likely to possess stronger oral communication skills than written communication skills. Similarly, those higher up in the organization (who are likely to be more highly educated) may possess stronger written communication skills than those at lower levels.

Overall, users perceive group communication systems as an effective vehicle for communication. This may be at least partially due to their ability to provide a forum for written communication. Those who possess strong written communication skills perceive that the technology provides increased opportunities to exert influence in decision making processes.

5.2.4 Need for Training and Standards

Nearly all respondents (even those who perceived that they have strong written communication skills) expressed that there is a need for training and for the development of organizational standards. A number of users described email and other group communication technologies as being a "different" form of communication. The participants in this study suggested that users are initially likely to lack an understanding of *how* this form of communication is different, and also lack the skills to use it effectively. This suggests that organizations planning to adopt groupware systems could benefit from the development of specialized training programs, and from the development of instruments which could determine *a priori* user preferences and skill levels with respect to written and oral communication. Such instruments could be helpful in smoothing the implementation process by identifying those who may be resistant to adopting the technology and those who need special training in business writing skills.

Training that centers on how to use the software (i.e., which buttons to push), however, is likely to fall short of developing (1) the underlying skills necessary to communicate effectively in written form, and (2) an understanding of how the structure and content of email messages should differ from messages sent through traditional, non-electronic media. Organizations should not assume that individuals either possess or can easily acquire the skills needed to utilize group communication systems effectively. Individuals who are

well-educated and capable of putting together effective written materials on paper may have difficulty adjusting to electronic media.

In addition to training, organizations may also benefit from the development of standards implemented through a combination of software controls and/or organizational guidelines. Data gathered in this study suggests two areas in which software controls and/or organizational standards would be helpful: (1) to aid in the identification of important messages; and (2) to provide guidelines for the structuring and formatting of effective email messages. For example, software could incorporate the use of color, sound, graphics, and so forth to help identify critical messages. Intelligent agents, which would scan messages looking for key words, specific senders, critical topics, dates, etc., would also be helpful. Similarly, expert systems could be embedded to monitor the use of proper headings, formatting, message length, grammar, spelling, etc. In the absence of such software controls, simple organizational standards regarding the number of people to copy, message formats (e.g., bullet versus text), the number of screens a message should occupy, etc., may prove to be beneficial. Interestingly, in the absence of such standards, users in this study developed their own individual, self-imposed sets of standards to govern their own use of the systems.

5.2.5 System Usage

Participants in this study identified many reasons for using the system. The most common of these was to disseminate and share information. Clearly, the system was viewed as a way of equalizing both the content and the timing of the information dispersed to organizational members. Several users described the system as a way to "put everyone on the same page at the same time". The ability to make sure the word is out in a consistent and timely manner, and to assure that all appropriate organizational members have access to the information was perceived as a valuable attribute of the system. Value is derived not only through the provision of a convenient and effective tool for the sender of information, but also from the sense of being "included" that is imparted to the receivers of information.

Another major advantage afforded by group technologies is the provision of an organizational memory. Although group communication systems are primarily intended to enable communication between group members, their ability to provide an "audit trail" is equally important to most organizational members. The evidence in this study suggests that the ability of the system to track and organize correspondence, to follow a chain of events, and to demonstrate that particular directives were or were not issued is one of the key reasons that organizational members favor this form of communication. Among other things, the ability to track information in this manner provides users with a degree of control by establishing

a clear, indisputable way to go back and check previous activities and decisions.

Additionally, collaborative decision making is supported by the availability of group communication systems. Process decisions involving a number of people in physically different locations, who are engaged in discussions over a number of weeks or months, would be hampered without such systems. The ability to include individuals in diverse locations in on-going efforts which span multiple time periods, and to be able to do so without playing "phone tag" was perceived as valuable.

Finally, the use of group support systems can be an effective way to gain attention and/or visibility within the organization. Organizational members are aware that they can reach anyone (and everyone) in the organization quickly and easily through electronic mail. The evidence in this study suggests that electronic mail messages are more likely to be read and responded to than their paper or voice equivalents. Therefore, the electronic medium is likely to be an effective way to increase one's visibility in the organization, and to get the attention of others.

5.2.6 Changes in Work Practices

The participants in this study perceived that the organization had a high level of dependence on the various group technologies. As a result, the technology changes the way people communicate and the way they work. For many of the

reasons noted above, group technologies enable individuals to be more effective and more efficient. As a result of improved communication, fewer things are able to "fall through the cracks", and in many instances, the technologies enable the "right" person (rather than the most available one) to be included. Organizational members felt more informed, perceived that they have a higher degree of control, and are more involved in organizational activities. Additionally, users perceived that use of the technologies has increased both the pace and the nature of what they are able to accomplish.

The perceived impact on the quality of organizational decision making is unclear. While more people become involved in providing input and evaluating alternatives, some participants felt that the technology encourages people to move too quickly and jump to decisions that are not well thought out. Overall, however, the evidence in this study suggests that group support technologies can lead to many positive changes for the organization and for the users of the system.

5.2.7 Problems Arising from Use

For all its potential benefits, the adoption and use of group support systems is not without problems. While the convenience and reliability of such systems provides the benefit of increased participation and sharing of information, it also can lead to information overload. The participants in

this study found the sheer volume of information available to them sometimes overwhelming. One participant reported feeling both "addicted to" and "numbed by" the amount of information that is available. While a few of those interviewed felt information overload severely, most participants perceived that having too much information was better than having too little. Several also suggested that the development of standards (software controls or organizational guidelines) could limit these negative effects. Another problem which contributes directly to information overload is the inappropriate use of the system, particularly the practice of indiscriminately copying messages to large numbers of people. At the research site for this study, indiscriminate copying (dubbed "CYA" copying) was perceived as one of the biggest problems, contributing not only to information overload, but making it difficult to distinguish important messages from unimportant ones, and requiring unnecessary time to deal with such messages. Once again, the development of intelligent agents and filtering mechanisms may provide future solutions to this problem.

Another problem arising from the use of group support systems is the loss of interpersonal communication. Group communication systems are a double-edged sword; more communication with more people is enabled, but it is "virtual" rather than physical. With the loss of interpersonal cues, misunderstandings become more likely. While this is a well known problem with all forms of electronic communication, it

may be particularly problematic for some users of electronic mail. In addition to the creation of misunderstandings, inappropriate and/or ineffective use electronic mail can create a negative image, particularly for those who are undertrained and/or possess poor written communication skills. In some instances, there appears to be a failure to recognize that many people in the organization may see poorly written or emotionally charged messages, and that such messages can negatively affect one's image in the organization.

5.2.8 Changes in Participation

DeSanctis and Gallupe (1987) theorized that group support systems would increase participation in the decision making process, and suggested that this increase in participation might impact the distribution of power in organizations. The evidence in this study supports this theory. Specifically, the data gathered suggest that the use of group support systems increases the opportunities for individuals throughout the organization to be heard, and to participate in the decision making process.

The increase in participation is noteworthy in several aspects. First, the breadth of the decision areas in which individuals have an opportunity to participate expands. Participants reported that the technology enabled them to participate in decision areas in which they would otherwise not be involved, many of which fall outside their own immediate functional area or managerial level. The reason

most often cited for this by the informants in this study was that in the absence of the group technologies, it would be too time consuming for others to include them in the process and for them to respond. The breadth or scope of participation thus increases as input from individuals from diverse departments is more easily sought and obtained. Similarly, those at lower levels of the organization perceive increased opportunities to participate as their opinions and input are solicited. Participation in decision making, thus, becomes less dependent on functional and position boundaries.

Secondly, as the opportunities to participate increase, so too does the actual frequency of participation. In other words, individuals appear to be responsive to these opportunities afforded by the technology and to capitalize on them.

Thirdly, increased participation is most visible in the information gathering and alternative evaluation stages of the decision making process, and to a lesser extent, in the implementation stage. The system enables full and extensive input and exchange of ideas, as well as free flowing discussions regarding organizational matters. The impact of group support systems upon the choice stage of the decision making process is less obvious. Ultimately, important organizational decisions will made by an elite few. However, group support systems enable those decisions to be made on the basis of knowledge drawn from the ideas of a much larger set of people, enabling a more participative than autocratic style

of management. Overall, increased participation is perceived as an equalizing force. Because individuals have an opportunity to provide input and a mechanism through which they can attempt to influence decision outcomes, the distribution of power is perceived as becoming more equal.

5.2.9 Changes in Accessibility to Persons and Perceived Power Distance

The use of group support systems encourages cross-level and cross-functional discourse. As a result, virtual access to persons increases. Participants in this study perceived that accessibility to others in the organization, particularly to those at higher managerial levels, improved as a result of the group support system. Users perceive that their messages not only get through and are read, but also receive higher levels of responsiveness. Additionally, they felt much more comfortable, willing and likely to send electronic messages to higher level managers than to try to contact them in other ways. Although several respondents felt that the increased reliance on electronic communication has made it more difficult to obtain physical access to organizational members, the majority of respondents perceived that access to persons is better as result of the group technologies.

Virtual accessibility to persons, however, may be threatened in the future as higher level managers begin to rely on intelligent agents and filters to sort and prioritize the volume of email messages they receive. If users at lower

levels of the organization begin to sense that their messages are not being read by the intended recipient, they may begin to perceive the system as a hindering rather than an enabling technology. This suggests that it will be important for managers to evaluate their electronic accessibility and the effect that limiting this accessibility may have on others in the organization.

Within managerial levels and functional areas, those located physically near each other often find it easier to simply talk face-to-face. However, in some instances when individuals could easily meet face-to-face, virtual access is still preferred. The primary reasons for this given by the informants are (1) the tracking mechanisms afforded by the technology, and (2) the ability of many individuals to express themselves more clearly in writing.

5.2.10 Changes in Accessibility to Information

Participants in this study perceived that group support systems provide them with improved access to information. More information is available, both within and external to the organization. Users perceived that they have access not only to more information than before, but also to *different* information. Specifically, information available is (1) more in-depth and detailed, and (2) more process-oriented, enabling a course of events to be followed. Much like increased participation, improved access to information imparts a sense of being included, as well as a sense of well-being and

comfort. Organizational members described feeling more in control as a result of being able to find the information they need without having to rely as heavily on others.

Logically and theoretically, improved access to the right kinds of information increases one's ability to deal with uncertainty. Participants in this study felt better able to cope with uncertainty through the information provided in internal and external databases. The groupware product enabled them to find the information needed to do their jobs, and to keep a finger on the pulse of the industry and their organization.

5.2.11 Changes in Dependencies and Centrality

Individuals within virtually every subunit of the organization appeared to be dependent on the group technologies for communication, and highly linked to other organizational members and subunits through the technologies. Additionally, organizational subunits appeared to be mutually dependent on information held in shared databases.

Although linkages to the work output of other subunits exist, timely and convenient access to shared databases enabled participants to get the information needed without being dependent on others to get the information for them. Evidence in this study suggests that when group support technologies are available, dependencies among subunits become very intertwined as information is increasingly shared. Further, group technologies reduce the need for physical

centrality, by creating a type of virtual centrality for each subunit. That is, through the electronic communication channels, each organizational subunit is centrally located. Thus, physical centrality may become much less of a factor in organizational power when these technologies are adopted.

5.2.12 Empowerment Issues

An unexpected finding in this study is that group technologies empower those who utilize them. Outcomes identified as empowering include increased participation, improved access to information, improved access to persons, increased ability to exercise control, and increased opportunities to learn.

Individuals within the organization perceive that they have a direct line to the decision makers through which they can attempt to exert influence on decision outcomes. Along with greater opportunities to participate in this manner, users also have access to a wealth of organizational and external information. Having these capabilities at the fingertips of employees, giving them an opportunity to respond to and feed in their input, and to be able to do it in a convenient manner is empowering.

Additional empowerment issues stem from two aspects of control. First, group technologies enable users to have increased control over the execution of some job duties. Participants reported that the groupware product enabled them to deal with problems, issues, and persons when they wanted

and were ready to do so. This allows them to be more protective of their time, to avoid unnecessary interruptions, and to exercise control over when certain job duties would be carried out.

A second aspect of control associated with the use of group technologies is the ability to escalate problems. The groupware product imparted to the participants in this study a sense of having legitimate "rights" to expect a timely response, and provided an effective and convenient way to escalate matters (with the complete sequence of events, if necessary) when such responses were not forthcoming. This empowered individuals to take the initiative and/or to shift the responsibility when needed. The organizational memory capabilities of the groupware system support this by providing the ability to track sequences of actions and illustrate a chain of events in such instances.

A further empowering aspect of the group technologies is the learning opportunities they provide. Individuals not only have the opportunity to learn to use the technology, but also are able to learn from the information that is available to them through internal and external databases. Further, users are able to develop better written communication skills as a direct result of using the system. In addition to learning about writing and structuring messages, individuals also indicated that they are able to learn more about their organization, organizational communication patterns, professional etiquette, political correctness, and to some

extent, the personalities of others in the company simply by viewing the messages that flow through the system.

5.3 Relationships Between GSS and the Distribution of Power

The three central propositions of this study are:

Proposition 1: The use of GSS technologies will alter the perceived distribution of power and influence in organizations.

Proposition 2: The use of GSS technologies will alter the perceived manner in which power and influence are acquired, maintained and exercised.

Proposition 3: The use of GSS technologies will alter the perceived quality of group decision making.

Evidence in this study suggests that there is support for Proposition 1. Evidence with respect to Proposition 2 is limited and inconclusive. Although some of the evidence with respect to Proposition 3 is somewhat conflicting, this proposition is generally supported. The evidence as it relates to these propositions is discussed below.

5.3.1 Proposition 1

Evidence from this study suggests that group support systems alter the perceived distribution of power by equalizing, to some extent, participation in organizational decision making activities and processes. This equalizing force is attributable to several factors.

First, group support systems extend the sphere of communication, and thus the potential sphere of influence of individual users. The range, level and frequency of communication increase when such systems are adopted. With this increase in communication, come opportunities to participate in decision making activities at many levels across the organization, and to attempt to exert influence. Users are able to share ideas, provide input, negotiate, and discuss alternatives regardless of organizational status, physical location, or functional affiliation. Because many individuals perceive that they have stronger written communication skills than oral ones, they perceive group support systems as providing opportunities to exert influencing behaviors that they otherwise might not attempt.

Second, group technologies provide improved access to information and to persons. Access to and control of information, like any other organizational resource, enables organizational members to have greater power. Moreover, improved access to information enables organizational users to better cope with uncertainty. Organizational members have equal access to most databases. Thus, access to information is also more equal when group technologies are available.

Group technologies also improve access to people within work groups, across departments, and across managerial levels. Group technologies greatly reduce the need to play "phone tag" or to "chase someone down". Users perceive that they receive better and improved responses from other organizational

members when group technologies are used. Access to key people in the organization, and to their expertise, is perceived as being particularly improved. Thus, group support technologies reduce the perceived "power distance" (Hofstede, 1980) to decision makers. Decision makers are perceived as being more accessible, organizational members feel more a part of the decision making loop, and more comfortable in approaching key players with their thoughts and ideas. Thus, the perceived distance from lower levels to upper levels is reduced. The reduction in power distance is further evidence of the equalizing force that group support systems exert on the distribution of power.

Third, linkages to other organizational subunits are altered when group technologies are adopted. Linkages become more tightly interwoven in the respect that all subunits share information in organizational databases. Because information is centrally available and easily accessible, there is less dependence on someone from another subunit to provide the information needed. However, all subunits are dependent upon the information being in the databases. This co-dependence again acts as an equalizing force, as individual subunits are generally not in a position to control or limit access to organizational information (except in cases where confidentiality is mandated).

Yet another equalizing force is the "virtual" centrality provided by the technology. Physical centrality becomes less important when group technologies are adopted. Individuals

and information are easily and equally accessible regardless of their physical location.

While the bulk of evidence in this study supports Proposition 1, there is one caveat. The data also suggest that those without strong written communication skills may be unable to capitalize on the opportunities provided by the technology. Thus, the equalizing effects of group support systems on the distribution of power may not come to fruition for those with poor written skills.

5.3.2 Proposition 2

The evidence in this study is inconclusive with respect to Proposition 2. None of the respondents in this study identified instances in which group technologies were credited with altering the manner in which power is acquired, maintained or exercised. Based on their reports, however, it is possible to speculate that those who use the technology well may obtain certain advantages that would enhance the opportunity to gain, maintain or exercise power. For example, those that communicate very well in written form but possess poor oral skills may find that group support systems provide a vehicle for acquiring visibility and ultimately power that they otherwise would not have. Relatedly, group technologies may enable those with strong skills to build and enhance their organizational image, and thus position themselves for promotion and recognition within the organization. It is clear that many important issues are brought up, defined,

evaluated, and discussed through electronic channels. Those without skills may fall short in their attempts to increase organizational status and power. Those who find group technologies effective for the purpose of acquiring, maintaining and exercising power will use it as such.

5.3.3 Proposition 3

The evidence in this study is somewhat conflicting with respect to Proposition 3. The general perception among users is that decision quality is better as a result of the increased information and sharing of ideas enabled by the technology. The input provided is often believed to be more clear, succinct, honest and complete due to its written form. The more participative style of decision making enabled by the technology is likely to make decisions more easily accepted and implemented, and therefore, may enhance the perception of decision quality.

However, the faster pace enabled by the technology may be an offsetting factor with respect to decision quality. The abilities to correspond quickly and to monitor recipients' actions (or inaction) may encourage hasty and perhaps poor decision making practices. Again, additional studies will be required to evaluate these issues.

5.3.4 Empowerment Issues

Although this study was not planned to address issues of empowerment, the evidence gathered strongly suggests that

group support systems empower those who use them. This is an unexpected and potentially significant finding with practical implications for organizations adopting such technologies. Empowered individuals are generally thought to accomplish more and make greater contributions to the organization. Thus, the relationship between group technologies and empowerment issues is deserving of additional inquiry.

5.4 Proposed Research Models

The proposed research models which emerged from the preceding discussion are shown in Figures 7 and 8. Figure 7 depicts the proposed relationships between the use of group support systems and the distribution of power, while Figure 8 depicts the proposed relationships between the use of group support systems and empowerment.

Figure 7 suggests that the use of group support technologies affects the distribution of power through the changes that occur in participation, accessibility to information, accessibility to persons, dependencies among subunits, and perceived power distance. Specifically, the emergent theory that can be drawn from the model is that group support technologies increase participation in the decision making process, increase accessibility to information and persons, equalize the dependencies among subunits, and reduce the perceived power distance to decision makers. As a result, the distribution of power becomes more equal. Organizational and user factors (environment, degree of centralization, user

FIGURE 7

PROPOSED MODEL OF THE EFFECTS OF GROUP SUPPORT SYSTEMS ON THE DISTRIBUTION OF POWER

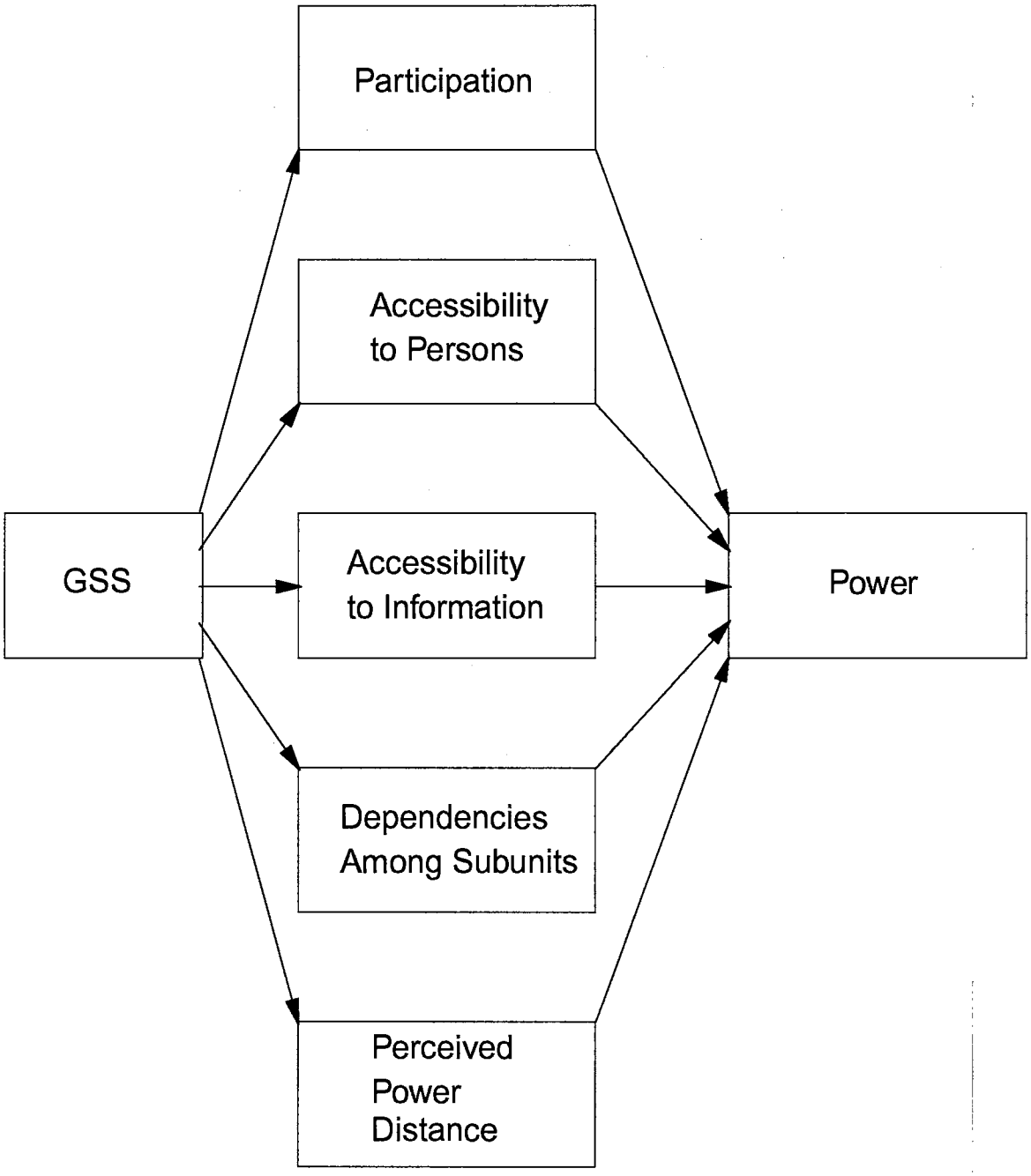
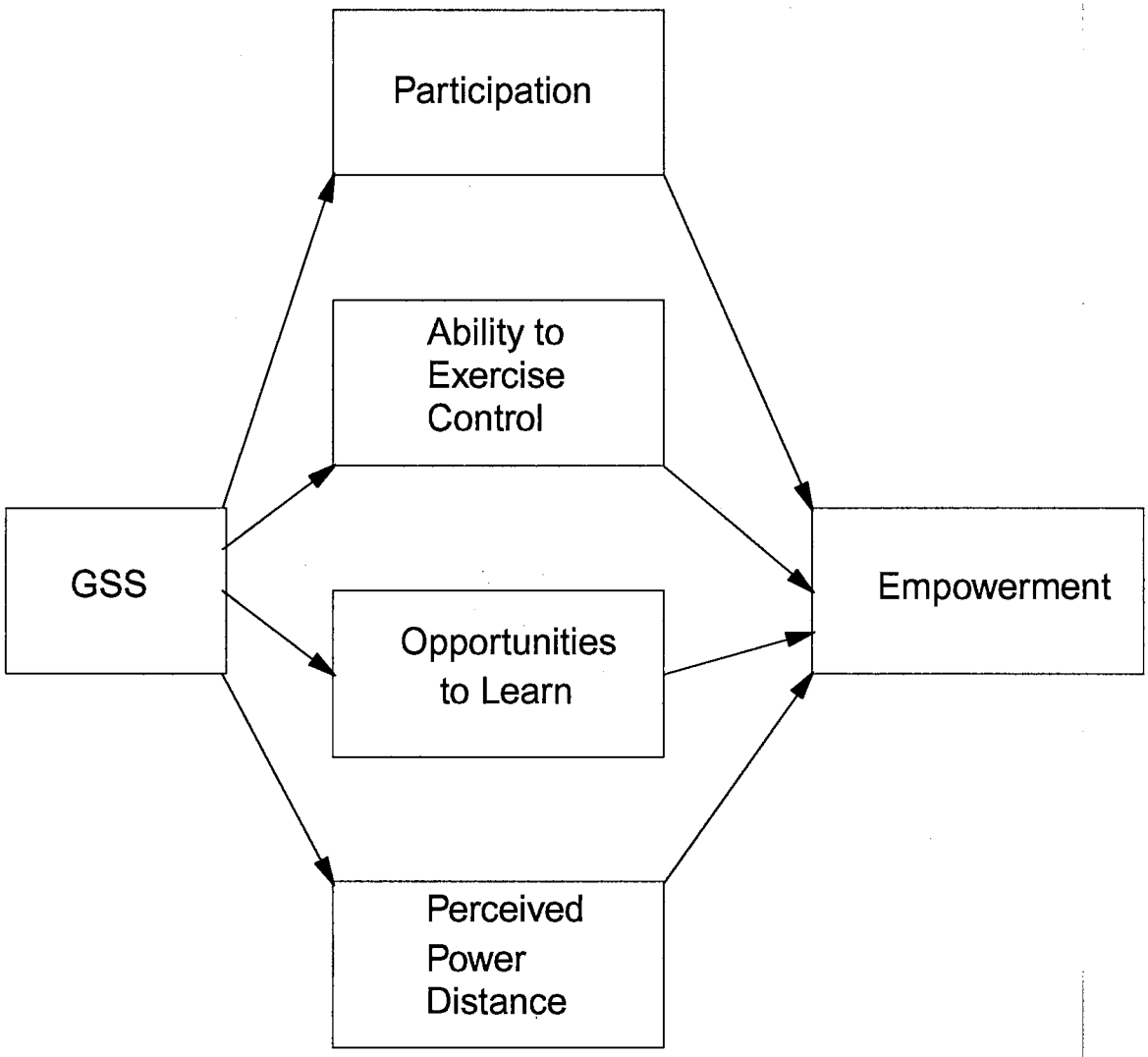


FIGURE 8

PROPOSED MODEL OF THE EFFECTS OF GROUP SUPPORT SYSTEMS ON EMPOWERMENT



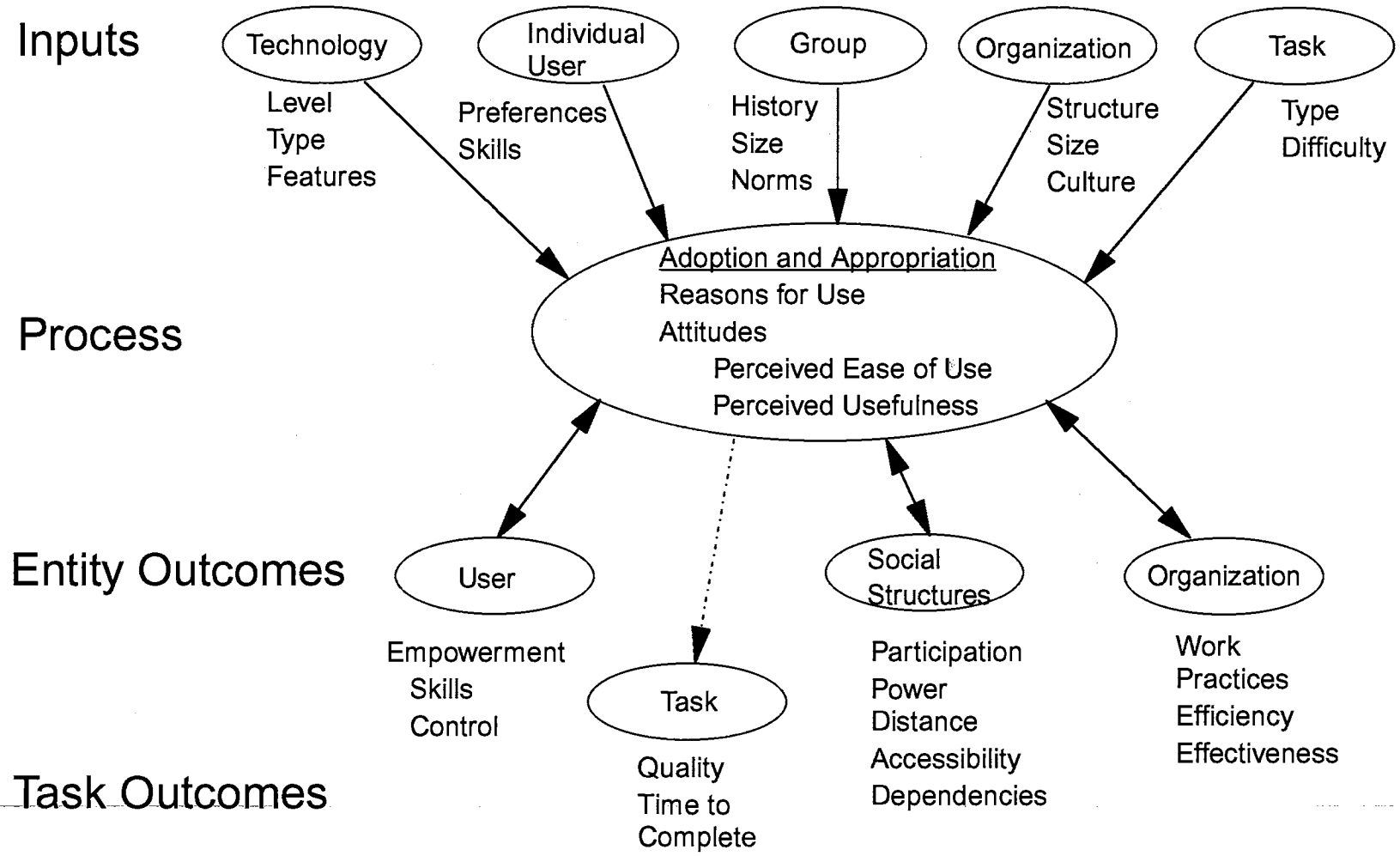
skills and preferences, etc.) form the context within which these relationships occur.

Figure 8 suggests that the use of group support technologies affects empowerment through the changes that occur in participation, the ability to exercise control over certain job duties, opportunities to learn, and perceived power distance. Specifically, the emergent theory that can be drawn from the model is that group support technologies increase participation in the decision making process, increase the ability to exercise control over one's job duties, increase the opportunities to learn, and reduce the perceived power distance to decision makers. As a result, users of group support technologies become more empowered. Once again, organizational and user factors form the context within which these relationships occur.

Figure 9 ties the relationships identified in this study to the earlier GSS research models presented in Chapter 2, building upon the Adaptive Structuration Theory (AST) of Poole and DeSanctis (1990), and the general GSS research model (Input-Process-Output) of Pinsonneault and Kraemer (1990). As discussed in Chapter 2, AST posits that different groups and individuals appropriate and use the technologies in fundamentally different ways, adapting the systems to fit their needs. As illustrated in Figure 9, the adoption and appropriation process is affected not only by the features of the technology (level, type, features, etc.) and task (type, difficulty, etc.), but also by characteristics of individual

FIGURE 9

PROPOSED INTEGRATIVE MODEL FOR GSS RESEARCH



users, work groups, and the organization. Specifically, this study suggests that factors such as user preferences for oral or written communication and user skill levels with respect to written communication affect the adoption and appropriation process. Additionally, other group and organizational factors, such as group history, group size, group norms, organizational size, organizational structure, and organizational culture feed into the appropriation process. These factors work together to shape attitudes toward the technology and to provide initial incentives for its use. The Adaptive Structuration Theory suggests that as the technology is adopted and used, attitudes evolve based on how well the technology actually meets the needs of the users (i.e., perceived usefulness and perceived ease of use of the technology), and new reasons for using the technology are found.

The patterns of appropriation and use produce a number of outcomes related to the task for which the technology is being used and to the entities involved in the adoption and appropriation process. Task outcomes have been included in most earlier GSS research models. Previously identified task and decision outcome variables include time to complete a task, time to reach consensus, number of alternatives considered, decision quality, decision confidence, etc. However, the evidence in this study suggests that adoption and appropriation also: (1) impart to individual users a sense of empowerment through increased skill levels, increased

opportunities to learn, and an increased sense of control over certain job duties; (2) alter certain group and social structures and interactions through increased participation, perceived decreases in the power distance to decision makers, increased accessibility to persons and information, and an equalization of dependencies among organizational subunits; and (3) produce organizational effects by altering the ways in which work is accomplished thereby increasing elements of organizational efficiency and effectiveness. The explicit inclusion of "entity" outcomes (i.e., those affecting individual users, social structures, and the organization as a whole) represents an extension to earlier research frameworks.

Additionally, the incorporation of feedback loops from individual users, group and social structures, and the organization back into the adoption and appropriation process (depicted with double arrows in Figure 9) represents an important extension of earlier models. Figure 9 suggests that changes that occur in individual users, group and social structures, and within the organization itself feed back into the process of appropriating and using the technology. For example, as users develop new skills, as perceived power distance decreases, and as work practices change, new reasons for adopting and using the technology are formed, and new attitudes toward the technology are developed. Through this continual and dynamic appropriation process, new and increased communication linkages are created, and new ways of performing

work, new decision paths, and new mechanisms for influence are formed (Poole and DeSanctis, 1990).

5.5 Summary

This chapter has discussed the results of this study, relating the findings to the theoretical determinants of organizational power and to the propositions set forth in Chapter III. Proposed research models derived inductively from interview data gathered in the field have been presented. Specifically, a model of the relationships between power and GSS has been proposed, as has a model of the relationships between GSS and empowerment. Additionally, an integrative model linking the relationships identified in this study to pervious GSS research models has been proposed. This model extends previous GSS research models by including a set of "entity" outcomes (i.e., those impacting individual users, group/social structures, and the organization). Together, the proposed models represent an integrative theory, parsimoniously linking outcomes of GSS use to elements of existing theories in both organizational and information systems research. Future studies will be needed to validate and refine these models.

CHAPTER VI

CONCLUSIONS

6.1 Overview

The findings of this study have been presented and discussed in Chapters IV and V. This chapter (1) summarizes the major findings of this study, (2) identifies the contributions and limitations of this study, and (3) suggests directions for future research.

6.2 Major Findings

This study has generated a number of findings with respect to the relationships between group support systems and power and influence in an organization. To recapitulate, group support systems appear to increase participation in organizational decision making and to improve accessibility to persons and information. The net effect is a reduction in the perceived power distance between those at lower and higher levels of the organization. By bringing more people into the decision making process, group support systems alter the distribution of participative power, making it more equal. However, while it appears that group support systems bring more people into the decision making process, this study provides no evidence to suggest that the key players change as

result of using the group technologies.

This study has yielded little insight into if and how group support systems alter the manner in which power is acquired, maintained and exercised. It seems logical that group support systems may be an effective forum for acquiring, maintaining and exercising power for those with strong written communication skills. However, answers to these questions will require further study.

Group support systems appear to give people at all levels of the organization a voice, allowing them to be heard and to participate in organizational decision making, and providing opportunities to exert influence over decision outcomes. Additionally, group support systems provide for increased levels of control and offer increased opportunities to learn. Together, these outcomes suggest that group support systems are empowering to those who utilize them.

The evidence in this study also suggests that group support systems may contribute to organizational effectiveness and efficiency by bringing about changes in work practices and output. The technology serves as an organizational memory, brings the "right" people into the decision making process, encourages responsiveness, appears to enable the organization to move at a faster pace, and improves the perceived quality of the decision making process.

The major findings of this study are summarized in Table 17.

TABLE 17

SUMMARY OF FINDINGS

(1) Group support technologies appear to have an equalizing effect on the perceived distribution of power and influence in organizations by

- (a) increasing the sphere and frequency of communication
- (b) increasing the scope and frequency of participation
- (c) increasing the sphere and frequency of influence
- (d) increasing accessibility to information
- (e) increasing accessibility to persons
- (f) increasing the ability to cope with uncertainty
- (g) making participation in decision making processes more equal
- (h) making dependencies among subunits more equal
- (i) reducing the perceived power distance to decision makers

(2) Group support technologies generally improve perceptions of decision quality by

- (a) increasing participation in the decision making process
- (b) bringing more information into the decision making process

(3) Group support technologies appear to empower those who use them by

- (a) increasing participation in the decision making process
- (b) increasing the ability to exercise control and take initiative
- (c) increasing opportunities to learn

(4) Group support technologies appear to alter work practices and output by

- (a) bringing the "right" people into organizational processes and activities
- (b) providing more convenient and reliable communication, thus decreasing the likelihood of things "falling through the cracks"
- (c) increasing efficiency
- (d) increasing responsiveness
- (e) providing an organizational memory

6.3 Contributions of the Study

This study has made methodological and conceptual contributions to the study of group support systems, and to the study of their potential effects on the distribution of power and influence in organizations. These contributions are discussed below.

6.3.1 Methodological Contributions

Two methodological contributions have been made by this study. First, this study has operationalized calls for triangulation by using multiple methods (interviews, documentation, and observation) and multiple data sources (respondents from different levels and different functional affiliations). Such triangulation provided multiple perspectives, strengthening and adding validity to emerging concepts as they converged across multiple measures. The process of coding the interview data required constant comparisons across data sources, checking and re-checking the emerging concepts. The resulting coding manual (presented in Appendix B) will serve as a guide for the analysis of future case studies in this area.

Secondly, this study has been conducted in the field. As noted earlier, there is a paucity of studies that examine the effects of group support systems on organizational factors, and a virtual void of studies that examine their relationship to organizational power and influence. Most of the studies involving group support systems and power and influence have

been conducted in laboratories using electronic meeting room technologies. This study has extended the scope of research in this area to organizations. In doing so, the current study has drawn on rich data from the experiences of an organization, thus generating an understanding of the changes in power and influence associated with adoption and use of GSS tools.

6.3.2 Conceptual Contributions

A number of conceptual contributions have also been made by this study. The principal conceptual contribution has been the development of models which will (1) guide future explorations of the relationships between group support systems and the distribution of power and influence, and (2) guide future explorations of the relationships between group support systems and empowerment issues. The development of these models represents the first known attempt to model these relationships. The proposed models are intended to serve as a starting point and a framework for continued research. However, further investigation will be needed to test and refine these models.

A second contribution has been the combining of inductive concepts generated by the field study with concepts of existing theory from the power literature. This study has taken a first step toward the development of an integrative theory which will tie concepts from the power literature to concepts in information systems. Specifically, the current

study has increased our understanding of the ways in which group support systems alter the theoretical determinants of power, as well as generating a deeper understanding of the role these technologies play in an organization.

Thirdly, the evidence in this study suggests that the availability and use of group support systems may make some components of existing theories of organizational power much less important than they historically have been. For instance, because group support systems provide virtual centrality for all organizational subunits, physical centrality may no longer be a significant factor. Further, this study suggests that additional concepts, such as perceived power distance, should be considered explicitly in these theories.

Finally, by using rich interview data and iterative analysis techniques, a deeper understanding of how group support systems alter the distribution of power and influence in organizations has been gained. This study has also unexpectedly identified a potentially significant relationship between group support systems and individual empowerment. The evidence in this study suggests that each of these is an area worthy of further research.

6.4 Limitations

This study is limited by several factors which are discussed in this section. First, because this study has been conducted within a single organization, generalization of the

results to other organizations is limited. However, the purpose of this study has been to generalize from the set of results to theory, rather than from samples to populations. The case study methodology employed in this study enables this type of analytical generalization (Yin, 1984; Eisenhardt, 1989). However, additional case studies will be needed to validate, refine and extend the theoretical model proposed in this study. Cross-case analyses will "test" the contribution of the proposed models by determining whether the observed pattern of results is replicated in other organizations.

A second limitation stems from the fact that there may be inherent biases within the site chosen for this study due to its vested interest in groupware products. However, as previously discussed, the benefits afforded by this particular site were thought to outweigh the limitations imposed by it. A finding of no relationship between group support systems and power and influence in this organization would have provided strong evidence that no such relationships exist. Because relationships were found in this study, they will need to be further explored, and confirmed or disconfirmed through additional studies at other organizations.

Another potential limitation of this study stems from the qualitative nature of the case study approach, which may have allowed biases and preconceptions of the researcher to enter into the interpretation of the data. Eisenhardt (1989) has argued that theory development from qualitative research is no more likely to be limited by such preconceptions than theory

built from any other form of inquiry. According to Eisenhardt (1989, p. 546):

> "the constant juxtaposition of conflicting realities tends to 'unfreeze' thinking, and so the process has the potential to generate theory with less researcher bias than theory built from incremental studies or armchair, axiomatic deduction".

Explicit attempts were made in this study to avoid such biases through the development of case study protocols and the use of multiple raters. Nonetheless, the effects of researcher biases on the theory developed in this study cannot be totally ruled out.

Similarly, this study may be limited by the fact that the ability of the researcher to conduct interviews improved as the project progressed. Therefore, interviews conducted at the end of the project may have contained richer information than those conducted at the beginning of the project.

Furthermore, the researcher was an outsider to the organization. For this reason, participants may have been unwilling to share thoughts and perceptions that could have been perceived by the researcher in a negative fashion.

6.5 Directions for Future Research

The findings and limitations of this study suggest many directions for future research. First and foremost, additional case studies involving other organizations should be conducted to determine if the pattern of findings will differ from those found in this study. Cross-case analysis

methods can then be used to test and refine the models proposed in this study. The current study suggests that a number of contextual factors (including organizational environment, user preferences, users skills, remoteness, and degree of centralization) play a role in the relationship between group support systems and the distribution of power. Studies involving other organizations should help to better define these roles, and may also help to determine the role that these factors play in the adoption and implementation of group support systems.

Future studies should also address more fully how the use of group support systems relates to issues of empowerment. Although the current study was not planned to address these items specifically, the evidence in this study suggests that there may be a significant relationship between these two factors.

Similarly, future research should address more fully the second proposition of this study (i.e., that group support systems will alter the manner in which power is acquired, maintained and exercised). Evidence gathered in the current study was not conclusive with respect to this issue.

The respondents in this study identified a number of potential benefits of using the group support technologies. Additional studies are needed to confirm whether these benefits are generalizable to other organizations. For instance, the following questions need to be addressed:

(1) is electronic communication truly harder to ignore than paper and voice equivalents?

(2) does electronic communication evoke more timely and complete responses than paper and voice equivalents?

(3) is the "lost message" rate for electronic communication less than it is for paper and voice equivalents?

(4) is there a difference in frequency and reach of electronic communication than for paper and voice equivalents?

(5) do group technologies reduce the number of and/or time spent in face-to-face meetings?

Similarly, this study has suggested that group support systems improve efficiency, and that the amount of work that is accomplished with them is greater than it would be otherwise. Additional studies are needed to confirm these improvements, and to measure their effects.

Users of group support systems in this study perceived that these systems increase participation in the decision making process, improve accessibility to information, and reduce the power distance to decision makers. Future studies should attempt to determine whether these perceptions are shared by the higher level decision makers.

Additionally, instruments should be developed to measure individual skills and preferences for written communication. Such measures may be useful in smoothing the implementation process and in the identification of organizational members who need specialized training. Similarly, studies are needed to determine important aspects of such training programs, and to develop them.

Future research should also be directed toward the development of software controls and corporate standards to assist users in the writing of electronic messages and the identification of important messages. These studies should include efforts to develop embedded, intelligent agents which could be used to sort and prioritize messages.

Finally, investigations of the relationships between group support systems and power and influence in organizations (as well as the relationship between these systems and empowerment issues) should be extended to GSS technologies other than those involved in this study. Specifically, the current study should be extended to include other commercially available groupware products, as well as electronic meeting room technologies. Additionally, efforts should be made to determine the actual adoption rate of the various group technologies in organizations.

6.6 Summary

This study has explored the relationships between group support systems and power and influence in an organization using a case study approach. The evidence gathered suggests that group support systems exert an equalizing force on the distribution of power in organizations, and that they have an empowering effect on organizational members. The overall image depicted by the results suggests that these relationships are worthy of further investigation. To that end, this study has culminated with the proposal of research

models which can be used to guide future organizational and information systems research in this area.

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APPENDIXES

APPENDIX A

INTERVIEW QUESTIONS

This section lists the interview questions which were asked of the participants in this study.

Note: Questions related to organizational demographics were asked only to the contact person. Similarly, questions regarding the specific features and capabilities of the GSS's in place at the organization were also asked only to the contact person.

Organizational Demographics (Background information - will not be asked of everyone)

How many employees are there in the organization?

How many years has the organization been in business?

What kind of business/industry is the organization in?

What is the market share of the organization?

What were the revenues for the most recent fiscal year?

Is the organization growing or shrinking in size (e.g., # of employees)?

Is the organization gaining or losing market share?

Is the organization growing or shrinking in terms of revenues and profitability?

How is the organization organized?

What is the organization chart?

How many branch offices/facilities/locations does the organization have?

Is decision making generally centralized or distributed?

Information About the GSS (Ask of IS director and/or other knowledgeable persons)

What forms of GSS technologies are being used? (Decision Room, E-mail, Video Teleconference, etc.)

What is the physical layout of the facility?

How large are the groups that typically use the GSS?

Are groups that use the GSS physically close or dispersed?

How long has the GSS been in place in the organization?

If the GSS is a decision room:

does each member in a group meeting have his/her own computer terminal?

is there a public screen?

does the GSS provide both public and private display and messaging capabilities?

is a facilitator needed to "run" the GSS?

if so, how involved is the facilitator in the meeting? (does he/she just push buttons or does he/she essentially lead the meeting)

does the GSS enable anonymous exchange of ideas and information?

does the GSS provide decision modeling tools? (optimization, scheduling, resource allocation models, etc.) If so, what kind?

does the GSS allow access to information "down the hall" on other computers?

does the GSS include group decision support tools (AHP, nominal group techniques, Delphi method, etc.)

does the GSS provide for voting and ranking of alternatives?

does the GSS enforce any "rules of order"? (e.g., who may speak and when?)

Note: The remainder of the interview questions were asked to all respondents.

Information About How the GSS is Used

Who uses the GSS?

How often is the GSS used?

Who controls access to the GSS?

For what general purpose is the GSS most often used? (Brainstorming, negotiating, planning, etc.)

Specifically, what kinds of decisions have been made using the GSS?

How long do GSS meetings typically last?

Uncertainty

How much uncertainty do you deal with in the course of accomplishing your work?

How do you attempt to deal with this uncertainty? (prevention, forecasting, absorption)

Is it possible to adopt routines to deal with these uncertainties?

To what extent do standardized rules (SOP) direct your activities?

How quickly is it possible to evaluate success?

Has the level of uncertainty changed since the GSS was adopted? If so, how?

Has the ability to cope with this uncertainty changed since the GSS was adopted? If so, how?

Access to Information

How much access do you have to information held by other departments? (e.g., production/marketing costs, reports, budgets, plans, schedules, etc.)

How much access do other departments have to information held by you?

To what extent are you able to deny others access to this information?

How has the accessibility of information changed since the GSS was adopted?

How has the accessibility to key individuals changed since the GSS was adopted?

Pervasiveness/Criticality

How highly connected is the flow of work from your department to the work of other departments?

How quickly would the inability for you to perform your work affect the ability of the company to offer its goods/services?

Substitutability

How easy/difficult would it be to replace you if it you became unable to perform your work?

Are replacements available internally, or would they have to be found outside the organization?

How easy is it to obtain people qualified to work in your department?

Do you have expert knowledge upon which others are dependent?

Conflict/Alliance Building

How often during the process of deliberating, debating and making decisions do you find yourself in agreement with the suggestions or proposals of others?

How has this changed since adopting the GSS?

To what extent is the open sharing of ideas encouraged?

How has this changed since adopting the GSS?

To what extent do you cooperate with other subunits to facilitate decisions or get particular ideas "on the table"?

How has this changed since adopting the GSS?

Influence/Participation in Decision Making

Which department has formal authority for (specific decision area)?

How involved are you in initiating discussion about (specific decision area)?

How involved are you in providing information about (specific decision area)?

How involved are you in choosing a course of action about (specific decision area)?

How involved are you in carrying out decisions made about (specific decision area)?

How have decision making roles changed since adopting the GSS?

How much influence do you have about (specific decision area)?

How has the your ability to influence decisions in this area changed since adopting the GSS?

How has your participation in decisions in this area changed since adopting the GSS?

Channels of Communication

Where is information about (specific decision area) most often exchanged? (formal meetings, informal meetings, lunchroom, hallways, etc.)

To what extent is critical information exchanged through formal channels?

What type of information is exchanged in informal settings?

How have these communication patterns changed since adopting the GSS?

Has the type and amount of information that is exchanged in formal/informal settings changed since adopting the GSS? If so, how?

How do you typically learn of the viewpoints of key individuals?

Where are conflicting viewpoints most often exchanged?

Where does negotiation about conflicting viewpoints take place?

How have these negotiations changed since adopting the GSS?

Satisfaction with Group Processes and Outcomes

To what extent does the GSS:

encourage the free exchange of ideas

encourage more equal participation among group members

keep the group focused on the task

alter the time spent in meetings

alter the number of meetings that are necessary

alter the time spent socializing in meetings

alter the level of acceptance of the decision

alter the confidence of group members in the decision

APPENDIX B

CODING MANUAL

This section provides the codes used in the content analysis of the verbal data. Examples of each code are included at the end of this section.

Technology Characteristics

Use this code when the respondent describes a general characteristic of the technology.

TECH-FEAT	The respondent describes features and/or limitations of the technology, such as: support for graphics, ease of use, reliability, security features, video delay, etc.
TECH-DIFF	The respondent indicates that there are differences between this technology and others.

Organization Characteristics

ORG	Use this code when the respondent indicates characteristics of the organization that are needed or result from use of the technology.

User Characteristics

Use this code when the respondent indicates personal preferences or self-imposed rules related to the technology.

USER-PREF	The respondent expresses a preference for written or oral communication.
USER-SKILLS	The respondent indicates his/her perception of the skills and abilities needed to use the technology effectively.
USER-RULES	The respondent describes rules and techniques he/she has developed to manage the system. (For example, message formats, types of information the user will or will not convey over the technology, techniques for prioritizing and filtering messages, etc.)

Communication Patterns

Use this code when the respondent describes the communication patterns enabled by the technology. This includes references to how often the technology is used, the number of people with whom it enables communication, and the amount of information that is exchanged.

[Note: This code is used when the response is given in a matter-of-fact, non-judgmental manner. For instance, use CP-AMT when the respondent says "I get a lot of information" or "I get more information than I did before", but NOT when the respondent says "I get too much information". The latter response has a negative connotation, and should be coded under PROB-IO (information overload).]

CP-FREQ	The respondent describes the frequency with which the technology is used.
CP-REACH	The respondent describes the number and/or location of people with whom it enables communication.
CP-AMT	The respondent describes the amount or volume of information that is exchanged.
CP-RESP	The respondent describes the pattern of responses obtained when the technology is used.

Changes in Work Practices

Use these codes when the respondent describes changes in work practices that result from using the system. The respondent may indicate that there has simply been a change (or no change), or may indicate an improvement (+) or disimprovement (-) in the item.

WP	The respondent indicates that the system has changed the way he/she works, without providing any additional detail.
EFFIC	The respondent describes changes in his/her own efficiency, or in the efficiency of other users, work groups, or the organization (+ = more efficient, - = less efficient).
QUALITY	The respondent describes changes in the quality of work that is performed, including quality of thought, depth of analysis, and/or changes in the perceived

quality of decision making processes and outcomes (+ = higher quality, - = lower quality).

Purpose for Which the System is Used

Use this code when the respondent describes the purpose(s) for which he/she uses the technology.

OM	The system is used to provide an "organizational memory". This category includes using the technology to track, organize, and/or categorize information.
SHARE	The system is used to share information. This includes disseminating information (FYI type stuff), gathering information, soliciting ideas from others, and holding on-line discussions.
ATT	The system is used to gain someone's attention, to become recognized or known to others, or to gain visibility.
INFL	The system is used with an intent to influence decision outcomes or to persuade the opinions of others. This includes negotiating solutions when conflicting points of view are held.
MOT	The system is used to motivate, to get someone to take action.

Issues Related to Perceived Power and Influence

Use this code when the respondent describes or infers ways in which the technology contributes to (or detracts from) changes in perceived power and influence. This includes comments that suggest changes in the respondent's sense of personal empowerment. The respondent may indicate that there has simply been a change (or no change), or may indicate an improvement (+) or disimprovement (-) in the item.

ACCESS	The respondent indicates a perceived change in his/her accessibility to information and/or persons (+ = increased accessibility, - = decreased accessibility).
PART	The respondent describes perceptions of his/her degree of participation in any

phase of the decision making process, or an equalizing of participation in general (+ = increased participation, - = decreased participation).

LEARN — The respondent describes opportunities to learn and/or develop skills (+ = increased opportunities/skills, - = decreased opportunities/skills).

CONTROL — The respondent describes perceptions of his/her ability to exercise control in performing job duties (+ = more control, - = less control).

Problems Associated with Use

PROB-LOSS — The respondent describes problems that result from the loss of interpersonal communication imposed by the technology.

PROB-NEG — The respondent describes negative connotations or misunderstandings that result from use of the technology.

PROB-IO — The respondent indicates "information overload".

PROB-IU — The respondent identifies ways in which the system is used inappropriately (overcopying, inappropriate forwarding, etc.)

PROB-LIMIT — The respondent describes "limits" of the technology, i.e., situations in which the technology can no longer effectively be used.

The remainder of this section provides examples of each code.

Technology Characteristics

TECH-FEAT	I can send graphics right along with my document. It's easy to use. It's very reliable, the system rarely goes down. I really trust the security of the system. You know they got your message. It doesn't fall off your desk like a sticky note or piece of paper. There is a delay on the video.
TECH-DIFF	It's a different form of communication.

Organization Characteristics

ORG	It flattens the organization. It makes you a tighter organization.

User Characteristics

USER-PREF	When someone tells me something, I'd rather they put it in writing than to tell me verbally. I'd rather someone would just talk to me. I'd rather express my thoughts in writing than have to speak.
USER-SKILLS	I express myself better in writing. His writing skills are terrible. Some people don't understand how highly visible this stuff is. You can get a nasty reputation. You have to learn to use it. If you don't know how to use it, it can convey a negative image.
USER-RULES	I won't put negative information in an e-mail message. I look at messages from my boss first. I don't send messages that won't fit on one screen. I use a bullet format.

Communication Patterns

CP-FREQ	I use it everyday. It's up on my desk constantly. We use it for weekly meetings.
CP-REACH	I regularly send messages to 250 people. I send messages to people in Boston, Ireland, all over the world.
CP-AMT	I get very little information. I get a lot of information. I get 50 messages a day.
CP-RESP	I get a faster response with e-mail. I get a more detailed response.

Changes in Work Practices

WP	It changes the way we work. You have to do things differently.
EFFIC	It makes me more efficient. It's faster, more timely. It eliminates the need to put someone on a plane and fly them to Boston. It takes too long -- it's overly time consuming.
QUALITY	When you put it in writing, you think about it more. We probably make better, more informed decisions. I think when you put it in writing, you are more honest, your true thoughts and feelings come out -- you are more clear about things.

Purposes for Which the System is Used

OM	I use it to track things. I categorize everything. I backlog everything for a year.
SHARE	I use it to inform - to say we're going to have a meeting at 2:00 pm Friday -- and here's the agenda. It use it to ensure that everybody gets the same information at the same time. It puts us all on the same page (information-wise).

	I use it to say "what are your ideas".
	I use it to look up information I need to do my job -- to look up part numbers, for example. I use it get information about the competition off the newswire. We have discussions on-line.
ATT	I use it to get in someone's face. I use it when I want to get someone's attention. I use it because I want them to know who I am.
INFL	I use it to persuade others to see my point of view. We use it to hammer out solutions -- to negotiate.
MOT	I use it to get someone to take action. I use it to motivate my people.

<u>Outcomes Related to Perceived Power and Influence</u>

ACCESS	It enables me to access information I would otherwise not have access to. You don't have to worry about time zones or if someone will be at their desk. I can get through to the CEO if I want to, and I know he will get my message. Without this technology, that would be very difficult. It brings the "right" person to the meeting.
PART	I can participate at the level I choose. I feel more involved. It puts me in the loop. It's inclusionary. I am involved in decisions that I would otherwise not be. I can express my opinion and know that I will be heard. It levels things out. It levels things. It puts us all on the same page (participation-wise). You can use it no matter who you are or where you are in the organization.

LEARN	It has helped me to improve my own personal communication skills. I communicate better now that I've mastered this technology. It gives me insights into the way other people approach things -- the way that they think. I have opportunities to learn that I didn't have before.
CONTROL	I can control it. I can get to it when I'm ready and not be interrupted needlessly. It enables me to do things I couldn't otherwise do. It puts the responsibility on them -- I have a right to expect a response.

Problems Associated with Use (PROB)

PROB-LOSS	You don't get the nuances. You lose the emotional content.
PROB-NEG	Things are more easily misinterpreted. Things tend to sound negative or terse when they aren't meant to be.
PROB-IO	I get too much information. I don't have time to read them all. I hear that some people don't even read them anymore. It's gotten out of hand -- it's information overload.
PROB-IU	We overused it. People overcopy all the time. They send out anything (including junk mail). Messages are forwarded when they shouldn't be.
PROB-LIMIT	You reach the point where you really have to have a face-to-face meeting.

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VITA

Susan E. Rebstock

Doctor of Philosophy

Thesis: GROUP SUPPORT SYSTEMS AND POWER AND INFLUENCE: A CASE STUDY

Major Field: Business Administration

Biographical:

Education: Bachelor of Science in Mathematics, Southwest Missouri State University, 1975

Master of Business Administration, Southwest Missouri State University, 1985

Completed the requirements for the Doctor of Philosophy degree at Oklahoma State University in July, 1995

Experience: Employed as an information systems professional in the software development and telecommunications industries from 1976 to 1991.

Employed as a graduate assistant at Oklahoma State University from 1991 to 1994.

Employed as Assistant Professor of Management at Georgia Southern University, 1994 to present.

Professional Memberships: Decision Sciences Institute
Association for Computing Machinery
Institute for Operations Research and the Management Sciences

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 10-26-94

IRB#: BU-95-007

Proposal Title: GROUP DECISION SUPPORT SYSTEMS AND THE DISTRIBUTION OF POWER AND INFLUENCE IN ORGANIZATIONAL DECISION MAKING: A MULTIPLE CASE STUDY

Principal Investigator(s): Rick Wilson, Susan Rebstock

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved with Provisions

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

PROVISION REQUESTED:

It would be beneficial to the researcher and the subjects to present the subjects with a summation of their rights as a participant prior to conducting the interview (nature of the study, confidentiality measures, voluntariness of participation, contact person and phone numbers for questions regarding the research, approximate duration of participation, the subject's right to discontinue participation without penalty). The above-listed elements of informed consent can be presented to the subject on an information sheet, or orally by the researcher (it is indicated in the application that some of these elements will be communicated in this fashion). If the elements of informed consent will be administered orally, please provide a script detailing the elements to be communictaed to the subject.

Signature: John H. Wyckoff

Chair of Institutional Review Board

Date: November 2, 1994