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ORGANIZATIONAL IMPACT OF INFORMATION TECHNOLOGY ON THE DISTRIBUTION OF DECISION-MAKING POWER IN STATE LEGISLATURES

BY

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ABSTRACT

ORGANIZATIONAL IMPACT OF INFORMATION TECHNOLOGY ON DISTRIBUTION OF DECISION-MAKING POWER IN STATE LEGISLATURES

BY

LYNN BENEDICT LEHLE

This dissertation is a comparative study of the fifty American state legislatures to determine if there is a relationship between the levels of information technology and the location of legislative decision-making. Organizational theory is used to link the location of decision-making with the information technology. Theoretical predictions that increases in information technology will result in more decentralized, centralized or a reinforcement of the previous location of decision-making are examined using data from the time periods of 1964, 1974 and 1981. Hypotheses are tested using crosstabular, simple regression and lagged time series regression analysis. The results of the analyses indicate that there is a relationship between levels of information technology and the location of legislative decision-making. States with higher levels of information technology tend to have more centralized decision-making,

while states with lower levels have more decentralized decision-making. Dividing the state legislatures into centralized and decentralized groups demonstrated that in previously centralized legislatures, longer sessions, larger budgets and more automatic data processing reinforced centralization. In previously decentralized legislatures, longer sessions and larger budgets reinforced decentralized decision-making. But automatic data processing in previously decentralized states did not reinforce decentralization, rather it had a centralizing effect.

DEDICATED TO MY FAMILY

FREDRIC ROTH LEHLE (my husband)
WALTER WILLIAM LEHLE (my father-in-law)
DORIS ROTH LEHLE (my mother-in-law)
HELEN ROTH (my grandmother-in-law)
WALLY LEHLE(my brother-in-law)
PAM LEHLE (my sister-in-law)
CHRISTOPHER MCFARLAND (my nephew)

LONA EFNOR BENEDICT (my mother)
HENRY EFNOR (my grandfather)
LANORE EARLEY EFNOR (my grandmother)
ED EFNOR (my uncle)
MARILYN EFNOR (my aunt)

JON BENEDICT (my brother)
GEORGIA BENEDICT (my sister-in-law)
LYLA BENEDICT (my niece)
KATHERINE BENEDICT (my niece)
MARIE BENEDICT (my niece)

ANN BENEDICT BENNETT (my sister)
MIKE BENNETT (my brother-in-law)
ALETHEA BENNETT (my niece)
CARISA BENNETT (my niece)

CAROL BENEDICT KELLEY (my sister)
DON KELLEY (my brother-in-law)
MATTHEW KELLEY (my nephew)
SCOTT KELLEY (my nephew)

AND IN MEMORY OF

RUSSELL BENEDICT (my father)
ARIEL AMOS BENEDICT (my grandfather)
OLGA TECKLA PLEISTER BENEDICT (my grandmother)
MYRTA BENEDICT (my great-aunt)
LEE BENEDICT (my great-uncle)
LAWRENCE PLEISTER (my great-uncle)
BERTA PLEISTER (my great-aunt)
DAISY BROOKE EARLEY (my great-grandmother)
ALLAN ROTH (my grandfather-in-law)

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CHAPTER I

Introduction to the Research Question

Introduction

One of the major organizational changes in state legislatures since the 1960's has been the increase in the amount and diversity of information technology and resources. Increases in information technology become more important as legislatures are being asked to solve increasingly large numbers of complex social problems. The ability of a legislature to handle the increased demand for legislation depends on its organizational capacity. Increased legislative resources can allow legislatures to operate more efficiently. The appearance of a more modern organization can also lend legitimization to legislative decisions.

The study of legislatures in the past thirty years has been dominated by the influence of the behavioral revolution in social science research. Legislative behavioralism scholars concentrated their research on the individual actor. The individual behavior of legislators, staff members, lobbyists, legislative constituents, voters, bureaucrats, governors, presidents etc. was the focus of the behavioralists. During the 1960s and 1970s, this

emphasis by behavioralists resulted in a shortage of research on legislative organizations, and a lack of understanding of the relationships between organizational variables and organizational decision-making.

Toward the end of the 1970's the study of legislatures from an organizational perspective became more popular. This "new institutionalism" focused on the affect of institutional arrangements on decision-making and policy outcomes. The study of legislative innovations is another example of this re-emphasis on organizational features. Jewell and Patterson (1977) note that major changes in state legislatures deserving study include the innovations and changes in the organization. In a 1981 article on the state of recent legislative research, Jewell stressed the importance of researchers understanding the impacts of innovations being adopted by state legislatures. The National Conference of State Legislators has also called for more research on the use of information technology in state legislatures.(1981) At the federal level, the Congressional Research Service has sponsored a number of studies on the use of information technology in the United States Congress and in the state legislatures.(Chartrand and Miller 1982, Chartrand and Bortnick 1977)

Legislators are among those who are interested in learning more about information technology because of its potential to increase their efficiency in handling their

larger work loads. It is also of interest because management of information can affect the distribution of power in state legislatures. Given the recent increases in information resources in state legislatures, it is more important for legislative researchers to examine the political impacts of information technology on the legislatures. The efforts of investigations into legislative use of information technology may result in findings of no observable change, centralization, decentralization or reinforcement of decision-making power within the legislatures.

Interest in the study of information technology is not limited to legislative scholars or even political scientists. Changes in the use of information technology have affected society in general and are being studied by scholars in disciplines such as business, sociology and future studies. An example of a futures study can be found in John Naisbitt's 1982 best seller Megatrends. He pinpoints 1957 as the turning point between an industrial society and an information servicing society. The new mass product of this society is information. He argues that information is a power resource and that the impact of these changes have been the decentralization of power in society. In government, he cites New Federalism and the shift of governmental programs from the national level to

the state and local level as an example of the decentralizing effect of information technology. In organizations he cites the uses of networks as an example of the decentralizing effect of information technology.

This dissertation will examine the same topic that Naisbitt discussed in his book. This study will focus on legislative organizations and attempt to determine if information technology does in fact have the decentralizing effect that Naisbitt found in his study of information use in society. This link with the broader concept of information use in society means that the findings of this study will be potentially of interest to a broad audience.

In the next section of this chapter, the major concepts of the dissertation will be defined. They include information technology, centralization, decentralization and reinforcement of organizational decision-making. Then arguments for the three locational effects of information technology on decision-making will be outlined. Finally, in the last section an overview of the cross-sectional and the lagged time series analysis will be outlined.

Overview of the Research Question

Information technology can be defined as the organizational means to achieve legislative production goals. Harder and Davis (1979) define information technology in legislatures as that part of the process

which is formally structured and generally perceived as instrumental to the purposes for which the organization exists. Organizational aspects of legislatures include the use of specialized staff to assist in the management and organization of raw information. The staff is, in term, increasingly utilizing a growing variety of computer applications. Legislative computer applications include roll-call voting, legislative calendars, committee agendas, library catalog databases, bill status, bill drafting, statutory retrieval, budget tracking, legislative accounting, attorney general's opinions, and fiscal note tracking.

As more time is needed to absorb and utilize the increased amount of information, longer legislative sessions become more essential. Ability to utilize information technologies is also influenced by availability of office facilities. The lack of individual offices in a large number of state legislatures seriously affects the ability of legislative members and staff to perform analysis or to keep track of the issues before them. Legislators in those situations tend to be restricted to their desks in the legislative chamber. Some legislators in those states, keep their files in their cars, or their temporary living quarters during the session, or back in their home districts. They tend to interact with other

legislators, constituents and lobbyists at various locations, generally away from the capitol. Under these circumstances, the legislature as an organizational group will have less interaction. Legislatures with shorter sessions and less adequate facilities tend to consider fewer and simpler legislative issues.

In approaching the study of information technology, it is not appropriate to assume that more is better. It is true that information in organizations is becoming increasingly abundant. Herbert Simon (1976) argues that because of this increase, the raw accumulation of information is not as valuable as the organization of information technology. In looking at the organizations and their levels of information technology one of the more interesting questions is "What effect does information technology have on the structure or location of decision-making in the organization?"

In order to approach a study of the impact of information technology on organizations it is necessary to discuss the concepts involved in the study. The central concept is information technology. One of the first scholars to identify the importance of technology in organizations was Joan Woodward (1958). She defined technology as the objective and techniques of production. She found that the structures of organizations differed (centralized or decentralized) according to the type of

work that was done. In her study, "job-shop firms, mass-production firms, and continuous process firms all had quite different structures because the type of tasks, or the "technology" was different." Structure has been conceptualized as the distribution of positions of influence along various lines of people in the organization. This distribution influences the role relations among those people. (Blau, 1974)

Structure in organizations involves the the division of labor (Hall,1977). It is different people being given different tasks within organizations. It often means that organizations contain ranks, or a hierarchy. Hall states that "structure is the setting in which power is exercised." Structure sets or determines which positions have power over decision-making. The location of decision-making power in legislatures has been labeled the loci of decision-making or the centralization or decentralization of decision- making by Francis (1967), Uslaner and Weber (1977) and Francis and Riddlesperger (1982).

In legislatures, centralization means that decision-making power is more concentrated. It is controlled or strongly influenced by fewer people. Those with the most influence tend to be at the top of the organizational hierarchy, in the leadership positions. In this study that

is reflected "when legislators feel that the most important decisions are made in policy committees, the governor's office, or in the offices of the party leaders. Such decision-making is more centralized than when legislators indicate that the important decisions are made in regular committee meetings, one the floor, or in subcommittees." (Jacoby and Francis, 1985)

Organizational theorists argue that decision-making power in legislatures is in some ways centralized and in other ways decentralized. Party leadership and caucus leadership are well recognized sources of central authority. The leadership may exercise their control through their ability to monitor bill introduction, assess the fiscal impact of bills and control the flow of information to members through the system (Newkirk, 1979). They may also exercise central control through committee assignments, allocation of office space, allocation of staff resources and allocation of funds. Decentralization of decision making in legislatures can be seen in increased legislative decision making in committees and subcommittees.(Francis and Riddlesperger, 1982)

The next section will be a discussion of the research methodology. It will introduce the theoretical arguments, the data utilized and the statistical tests to be preformed.

Overview of the Research Methodology

From the earliest studies of technology in organizations the structures and distributions of decision-making power have been considered. This study differs from other organizational studies in that it is examining the impact of a particular type of technology (information) on the distribution of decision- making in organizations, and because it uses legislative organizations instead of executive agencies.

Organizational theory is used as a basis to formulate the following research question: What is the impact of information technology on the location of decision-making in organizations? Organizational theory focuses on the properties of institutions rather than the properties of individuals in institutions. The theoretical questions being posed in this study concern the impact of information technology on the location of decision-making power in state legislatures.

Three theoretical explanations will be tested in this study. The first explanation of the impact of information technology is that it will cause decision-making power to become more centralized. This means that in legislatures with higher levels of information technology the leadership will have more power. The second theory states that increases in information technology will increase the

decentralization of power in state legislatures. This would result in more power for individual legislators, committee members and chairs. The third theory that will be tested states that information technology had different effects depending on the previous location of decision-making power. According to this theory, in previously decentralized legislatures, higher levels of information technology reinforce the decentralization of decision-making, while in previously centralized legislatures higher levels of decision-making reinforce more centralized decision-making. Next, the operationalization of these theories will be discussed.

The models for all three theories use the following general concepts: location of decision-making, organizational interaction time (length of session), support personnel (staff), equipment (computers), and the financial resources of the organization (operating budget). The theoretical relationship between these concepts specifies that the location of decision making is influenced by or dependent upon the levels of organizational interaction time, the personnel, the plant, equipment, and budget.

Hypotheses generated from the three theories will be empirically tested using regression analyses. The centralization and decentralization theories will be tested using a simple linear model. The reinforcement

theory will be tested using a lagged time series model. It will utilize a slope dummy variable to measure the interaction between the previous level of centralization or decentralization and the current levels of information technology. In both models the dependent variable will be the location of decision-making in state legislatures and the independent variables will include staff, sessions, budgets and automatic data processing applications. The variations accounted for by each independent variable will be measured controlling for all the other independent variables. A standard five percent significance level will be used to accept or reject the null hypothesis. Following the regression analyses for the centralization and decentralization theories a crosstabulation table analysis will be preformed. The is an important analysis because it allows the researcher to examine the grouping of the states in an ordinal table, which is helpful in subsequent substantive interpretations of the analysis.

The data was collected for the years 1964, 1974 and 1981. The variables are measured for the fifty United States legislatures. The dependent variable (location of decision-making) is taken from survey responses of state legislators collected by Wayne Francis in 1964 and 1981 and Uslaner and Weber in 1974. The independent variables measurements of the length of legislative sessions, the

number of legislative staff, the number of computerized data applications in the legislatures, and the operating budget of the legislatures.

Summary

The topic of the impact of information technology in organizations has extensive implications for a society which has shifted from industrial production to information production. As organizations increase their levels of information technology, they have the potential to affect the distribution of decision-making power in those organizations. Information technology resources in state legislatures are important in achieving increases in productivity and control.

The impact of the level of information technology in state legislatures can be conceptualized in terms of the organizational location of decision-making. Centralization is reflected in the states where the leadership has more influence over decisions. Decentralization can be seen in those legislatures where the individual members or committees have more influence over the decisions that the legislature makes. Information technology is conceptualized to include legislative session lengths, legislative staff, operating budgets and automatic data processing technology.

There are three theories that will be tested in this study. The first two (centralization and decentralization) involve explanations of the location of decision-making power. The third theory (reinforcement) is an argument that information technology has different effects on different state legislatures as a result of their previous location of decision-making. The theories are tested using data from the fifty United State legislatures for the years 1964, 1974 and 1981. The statistical test will include simple regression analyses, interactive regression analyses, and cross-tabulation analyses.

Chapter II

LITERATURE REVIEW

Introduction

Studies of the impact of information technology on organizations have been growing since the introduction of computers for use by society in the 1950's. Work on this topic can be found in the fields of political science, sociology, and business. Researchers interested in this topic do not agree on the impact that information technologies have on organizations. Whistler and Leavitt (1958) and Whisler (1964, 1970) argued that the use of computers and information technology by businesses would tend to increase the centralization of power in those organizations. Other researchers, Worthley and Heaphey (1978), Madron (1983), and Frantzich (1982) argue that information technology will have a decentralizing effect on organizations. An alternative to both the centralization, decentralization positions is the argument made by Danziger, Dutton, Kling and Kraemer (1982). Based on their studies of local government, they argue that increased use of information technology reinforces existing power relationships.

In this chapter, the literature on organizational theory and its application specifically to legislative bodies will be reviewed. It will also include a

discussion of the literature on the approaches to the study of power and how information technology is conceptualized as a power resource. Finally, the centralization, decentralization and reinforcement theories of organizational decision-making will be presented.

Overview of Literature on Organizational Theory

Organizational theory attempts to provide fundamental principles to explain how organizations operate. In the discipline of political science organization theory has focused primarily on the administration of governmental policies through the executive branch. The earliest theorists argued for the separation of the study of administration and politics. Woodrow Wilson in his essay "The Study of Administration" (1887) drew this distinction by stating that "politics sets the tasks for administration." This orientation was reiterated by Frank Goodnow in his 1900 text Politics and Administration. Goodnow argued that the executive branch should administer the laws passed by the legislative branch.

The argument for the separation of the study of administration from politics was greatly influenced by the political problems of the early 1900's. Policies once adopted by legislative branches were frequently enacted by political machines. This resulted in widespread corruption

and inefficiency. Frederick Tayor's theory of "scientific management" was an attractive solution for the problems of administrative management faced by businesses and governmental units entering the industrial age.

Taylor was a mechanical engineer whose work was intended to increase industrial productivity. He conducted "time and motion studies" to identify the "one best or most efficient way" to complete any task.(Taylor, 1978) At that time, the ideas of administrative efficiency were considered more applicable to the executive branch than the legislative branch.

Leonard D. White in The Introduction to the Study of Public Administration (1926) encouraged students of public administration to study management techniques to identify the best methods of operation. "Shortly after White's textbook appeared, the depression and Franklin Roosevelt's administration resulted in a tremendous expansion of the executive branch and in the creation of numerous and varied administrative agencies. Given these opportunities and needs, students of public administration focused on the executive bureaucracy. At that time, White's book stressing executive management was one of the few written sources available that specifically addressed that needs of the new public managers."(Worthley, 1976) Consequently, it had an important impact in shaping the efficiency movement of in government.

The scientific management approach to organizations assumed the values of efficiency, rationality, productivity and profitability. The predominant model of a rational bureaucracy was developed by the German sociologist Max Weber. His writings were translated into English in the 1940s. The Weberian bureaucratic model has the following components: hierarchy, division of labor and functional specialization, formal rules and procedures, maintenance of files, and records and professionalism (H. Gerth and C. Wright Mills, 1943).

While Weber pointed to the formal structures of bureaucracies, the human relations researchers began to examine the informal social structures of organizations. Workers according to the Weberian model need to be controlled by management. They will respond to economic incentives, and will behave rationally to maximize their utility. In contrast to this view of organizations, the human relations school saw workers as seeking social and psychological rewards through work. Chester Barnard in 1938 explained that "Organizations are cooperative systems, not the products of mechanical engineering...they have natural groups within them, upward communication, authority from below rather than from above and leaders who functions as a cohesive force." (Perrow, 1973)

Additional criticisms of the rational bureaucratic model come from James March and Herbert Simon (1958). They argue that the Weberian assumption of rationality can not be met in most cases. People have limited time, intelligence, information, and means to order their preferences. Workers will select the first alternative that meets the minimum not the maximum requirements to complete a task. They will "satisfice" instead of "maximize".

Charles Perrow (1973) argues that the Weberian bureaucratic model has ignored the environment in which organizations operate, while the human relations school has largely ignored the importance of leadership in organizations. However, he notes that these varied schools can agree that organizations are systems and specifically open systems. "The systems view is intuitively simple. Every unit, organization, department, or work group takes in resources, transforms them, and sends them out, and thus interacts with the larger system."

In summary, the study of public administration in the early 1900s focused on the executive rather than the legislative branch of government. The goal of much of the research on public organizations was increased efficiency. The human relations school of public administration viewed organizations as cooperative systems, that can be influenced from the bottom-up and not just from the

top-down as suggested by the hierarchial model introduced by Weber. The systems theory of organizations can be used to integrate both the rational hierarchical and the human relations models of organizations.

Organizational Implications for Legislatures

Application of organizational theory to legislative systems has been the focus of relatively few political scientists. The legislative system has been studied primarily from a political process perspective. This approach is consistent with belief in the separation of politics and administration that organizational theorists and public administration theorists have held since the 1900's.

Worthley in Public Administration and Legislatures (1976) argues that the general exclusion of legislatures within the field of public administration is the result of a strong executive branch orientation by most organizational scholars. More recently some researchers have examined legislatures from an organizational perspective. The following researchers have focused on the United States Congress: Froman 1968, Polsby 1968 and Patterson 1970, Ornstein and Rohde 1977, and Chartrand and Miller 1982. At the state level researchers who have based their studies on organizational theory include: Chaffey

1970, Rosenthal 1973, 1974, Worthley and Crane 1976, Worthley 1977, Worthley and Heaphey 1978, Harder and Davis 1979, Hedlund and Freeman 1981 and Hedlund 1984.

Legislatures as a subgroup of organizations are an especially fertile ground in which to examine the questions of whether information technology will have a more decentralizing impact, a more centralizing impact or will tend to reinforce existing power distributions. Organizational theorists argue that power in legislatures is in some ways centralized and in other ways decentralized. Rieselbach (1983) notes that "the more heterogeneous an organization's environment, the more decentralized its decision structures." Logrolling and bargaining are characteristic of a decentralized organization that values member independence. Cooper (1977) says that Congress is a decentralized organization with centralizing authority in the party system. Committee chairs and legislative party leaders are other well recognized sources of central authority.

The leadership may increase their control through their ability to monitor bill introduction, assess the fiscal impact of bills and control the flow of information to members through the system (Newkirk, 1979). Alternately, the question of centralization or decentralization may depend on the type of tasks being preformed. It may be that routine tasks will be centralized and more politically

sensitive tasks will be decentralized. Northrop, Dutton, and Kraemer (1982) suggest that appropriate structural arrangements may be unique to each task to which computing is applied.

Approaches to the Study of Political Power

Political power is one of the most fundamental concepts in the field of political science. Its origin in Western writings is ancient. "From very early times, certainly since Socrates and probably before, people have been inclined to judge the relative desirability of different types of political systems by among other characteristics, the relations of power and authority in those systems." (Dahl, 1968) Aristotle argued that the location of power in a political system was one of the main criteria to separate good constitutions and bad constitutions. (Barker, 1962).

More recently, social scientist Max Weber defined power as "the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests."(Parsons, 1957) His work influenced later political scientists especially Merriam and Lasswell of the Chicago school. In 1950, Lasswell and Kaplan wrote that "political science, as an empirical

discipline, is the study of the shaping and sharing of power." The ideas, such as the study of power, which emerged from the Chicago school spread and influenced much of the work in American political science.

"Who governs?" "Who gets what, when and how?" Where is power located in political systems? Is it centralized or dispersed? These were the questions being asked about power by political scientists. In attempts to answer these questions, researchers proposed and tested the theories of populism and elitism. These theories represent opposite ends of the spectrum in attempts to answer questions about power. Populism basically posits that political power is decentralized, while elitism argues that power is centralized.

Populism is based on the concept of popular sovereignty. This concept means that the location of power, the final authority in society lies with the people. Decisions in this form of government must reflect the popular will of the people. However, the power of citizens to make decisions need not be only made by a majority of the citizens as in a direct democracy. They may delegate or entrust that power to their representatives in government and form a republic. The populace maintains control over the representatives through election, re-election, impeachment and re-call. The flow of power according to the populist view is from the citizens to the

representatives. This is a decentralized view and is also referred to as bottom-up, or grassroots control over government.

The theory of elitism provides a direct contrast to the views of populism. It states that political power is concentrated at the top of societal and organizational hierarchies. This power flows downward as the elites make decisions and control resources. Max Weber's definition of power presented above provided a basis for the development of elitism theory. From his conceptualization of power Weber developed a typology of society stratified into levels which he identified as classes and status groups. Weber attempted to demonstrate that social class would determine who has power and who doesn't. C. Wright Mills (1956) in The Power Elite identified the members of the elite. He argued that power in modern industrial societies is centralized in a complex of military/industrial and top governmental officials.

> "The power elite is composed of men whose positions enable them to transcend the ordinary environments of ordinary men and women; they are in positions to make decisions having major consequences. Whether they do or do not make such decisions is less important than the fact that they do occupy such pivotal positions: their failure to act, their failure to make decisions, is itself an act that is often of greater consequence than the decisions they do make. For they are in command of the major hierarchies and organizations of modern society." (Mills, 1956)

The discussion above presents a brief sketch outlining two diverse positions that centralization and decentralization of power have taken in the discipline of political science. This provides an intellectual foundation upon which to expand the question of location of power to organizations and more specifically focus on the possible changes in power distributions in legislatures as a result of different levels information technology use.

Information Technology As A Power Resource

Information is a source of political power, and organizational modernization has changed the way and the speed with which information can be recorded, retrieved and disseminated. Computers and information technology have been identified in the literature as two distinct types of resources: computer resources and information resources. Computer resources can be defined as the allocation of financial resources to support the computing operation (Danziger and Kling, 1982). Information resources are linked with issues of access and control over the information itself (Dutton and Kraemer, 1982). Because the adoption of computers and information technology is increasing rapidly, the addition of new computer resources and changes in access and control may result in significant power shifts. Information resources may aid in the

concentration of power for those officials already in control, or it may tend to disperse power.

Information as a resource has different characteristics than physical or financial resources. Economic theory supports the assumption that resources are scarce. Resources have zero-sum properties which means that as one group is given a certain amount of resources other groups will be deprived of that same amount. This concept functions well when applied to physical resources, but not so well when applied to information resources. Information resources possess more of a positive-sum property. Cleveland (1982) argues that information has an abstract quality that gives it the following characteristics. Information can be expanded or compressed. It can be substituted for other resources. It is easily transported, and it tends to be leaked. Finally, Cleveland notes that one can share an idea, yet still have it. This is an example of the sum-sum characteristic.

Simon in Administrative Behavior (1976) notes that as information becomes increasingly abundant, the new scarce resource is the attention of managers. He states that there has been a tendency in developing the design of management information systems to use all of the enormous power of computers to provide huge amounts of data to top level managers. In making this point Simon assumes that information will flow upward through the system. Simon

goes on to argue that more important than the development of information producing systems is the development of information processing systems. The accumulation of information is not as valuable as the as the organization of information. The development of information processing systems should include increased "understanding of how information can be transmitted, how it can be organized for storage and retrieval, how it can be used (and how it is used) in thinking, in problem-solving, in decision-making." (Simon, 1976, p.285)

Not only has information become more abundant, but the percentage of our labor force that works with information rather than manufacturing is increasing. Naisbitt in Megatrends (1982) points to 1956 as the year when white-collar workers outnumbered blue-collar, an essential development for the emergence of the post-industrial society. Information workers include clerks, researchers, technicians, teachers, bureaucrats, lawyers, bankers, secretaries, etc. In 1950 Naisbitt reports that 17% of the labor force were information workers. In 1980 that figure has increased to 60% and it will continue to increase as 90% of all new jobs created in the 1970's were information jobs.

Cleveland (1982) calls the "information society" a new definition of democracy. Wide distribution of information

is important because good up-to-date information has always given leaders the advantage over the uninformed. Certainly access to information is an important ingredient for a democracy. It can be said that Thomas Jefferson recognized the importance of information when he argued that "A nation can not be free unless the press is free and everyman from the poorest to the richest can read" (Dumbuald, 1978,p.93).

Teledemocracy is another variation on the information society democracy theme. Teledemocracy is a term for electronically aided, two-way political communication. Becker (1981) advocated "teledemocracy" as a way to bring power back to the people. A good example of teledemocracy in action was the 1978 Hawaii Constitutional Convention. A computerized conference was set up in 21 community centers on different islands around the state. The public could follow the progress of the convention and register their opinions on each issue using the computer polling network (Hiltz and Turoff, 1978). The natural separation of the islands may have provided just the right stimulus to experiment with technological citizen participation.

The idea of a new teledemocracy is an exciting one. It offers the possibility that new information technologies can have a decentralizing effect on the political process. These new technologies may lead to more informed and increased citizen participation. Although new technologies may provide the necessary conditions to decentralize the

political decision-making process, they will not always provide sufficient conditions to insure or predict that they will have a decentralizing effect. Westin in Information Technology in a Democracy demonstrates that it is a longstanding phenomena to greet new technologies as solutions to our social problems. He provides the following interesting cases.

> "With the printing press men thought the spread of literacy would dispel the ignorance, prejudice, and terror of life. It was felt that the steam engine and the factory system would at last give man the capacity to produce enough so that populations would no longer be hungry, unclothed, and ill housed; on this foundation, wars and revolutions would no longer plague mankind. When the aerial balloon was invented, leading statesmen saw this as the end to national wars; each side would observe the other and there would be no surprise or advantage in border maneuvers. The telegraph and radio were hailed as instruments that would bind all peoples into a connected network. After the explosions at Hiroshima and Nagasaki, we 'knew' wars would be unthinkable in the future." (Westin, 1971, p.1)

The "green revolution" of high-tech, super-productive agriculture is another on the list of technologies that would "save the world". But this last example provides an instructive study in hindsight. The transfer of agricultural technology repeatedly increased dependency rather than self-sufficiency of third world countries. Farmers found it necessary to purchase quantities of fertilizer and pesticides in order to bring their new "genetically engineered wonder seeds" to harvest. The

transfer of technologies that were successful in the West had a centralizing (top-down) effect on on the distribution of power, rather than a decentralizing (bottom-up) effect when applied in developing countries.

The simple presence of a new technology is not sufficient to make the organization of agriculture more decentralized or political systems more democratic. To quote Wildavsky (1983), "Democracy means selectivity, not only availability of data." He states that organizations exist to suppress data. In the political system parties serve to narrow and simplify electoral decisions for voters. Although voters may want to reduce the amount of information needed to make decisions, politicians often would like more information and the ability to manage and absorb that information.

What is the impact of computers and information technology on organizations? Is it a neutral technology whose major problem is attracting funding for the purchase of equipment and the hiring of personnel? Is it simply a matter of management so that there is a sufficient amount of information without being an overwhelming amount? Or does information technology change the distribution of power in organizations? If computers and information technology do change the distribution of power, then it is important to examine the direction and consequence of that change.

The literature on the impact of computer use on the distribution of control in organizations is a sizable body of work. It includes research results that support the rival hypotheses of centralization decentralization, and reinforcement. The next three sections will examine that literature.

Organizational Centralization of Power

Centralization of power is used to indicate that decision-makers will increase their control over resources and policy decisions. In legislatures, it would increase the leadership's ability to persuade and influence their colleagues. In business organizations, centralization would increase the power of those at the top of the hierarchy.

The first computers used in the 1950's were viewed as an organizational resource. Computers could handle large amounts of data, that had been previously compiled and processed by large numbers of workers. Computers were expensive and this necessitated making them a central organizational resource as a matter of economics of scale. (Griesemer, 1984) In 1958, Leavitt and Whisler predicted that high-speed computers would recentralize large business organizations. Top executives would benefit as increased information made its way up to them through new information

channels. Leavitt and Whisler predicted that by the 1980's there would be a restructuring of the middle level managers with some moving up while others moved down in the organization.

It is interesting that Leavitt and Whisler made their prediction as long ago as 1958, but what is really intriguing is how accurately it appears to reflect the business hierarchial changes in the 1980's. Business Week (April 25, 1983) reports on this change in management. "As companies grew rapidly after World War II, middle level management-whose function was to turn the policy decisions of top management into revenues-grew even faster. And their function changed. More and more, they became collectors of information, which they then analyzed, interpreted, and passed on to top executives...The onrushing electronics revolution is changing the role of the middle manager and forcing a radical restructuring of the corporation's middle ranks...in one third of the 100 largest companies in the U.S."

In 1964 Whisler proposed that social scientists who were interested in measuring the distribution of control within organizations would profit from looking at business research. He argued that using the distribution of financial compensation would theoretically make a good measure of the structure of control within any

organization. He acknowledged that this measure is more appropriate for profit-making organizations, however he felt that all organizations are based on similar rational structures. For purposes of measuring financial compensation these include separation of roles, job analysis and job evaluation and an official structure of compensation.

By centralization of control, Whisler (1970) means that control is unevenly distributed in organizations and that those at the top have a disproportionate share. Computers can link formerly independent parts of the organization. These separate divisions were needed to facilitate span of control. Prior to computers the division of labor was necessary or executives would quickly have an information overload in attempting to manage and integrate the multiple organizational parts. Computer-based systems, using the large information-handling capacity of the computer, can be used to monitor, correct, and adjust actions over a much broader area than could any human group. Given the typical pyramidal structure of business organizations, this integration results in shifting system control up higher in the organization than where it formerly was located. Thus an examination of organizations before and after the application of the computer should provide evidence of increased centralization of control. (Whisler, 1970, p.99)

Herbert Simon (1960), concurred with Leavitt and Whisler (1958) that the activities of middle level managers would be more completely automated than others. He predicted that organizations would have fewer manual tasks and more maintenance ones as a result of computerization. He thought that well-structured problems would be rapidly taken over by computers and that solving ill-structured problems and supervising by computers would slowly follow.

The argument for increased centralization of control as a result of more information technology was supported by a legislative study by Rosenthal (1973). He found that increases in the Wisconsin legislative staff enhanced the power of the leadership, rather than the individual members.

Organizational Decentralization of Power

Power in organizations can be decentralized. Computers and information technology need not only provide information flows upward (Leavitt and Whisler, 1958). The "information-decision system will allow more accurate information flow in all directions, including top down, bottom up, and horizontally" (Worthley and Heaphey, 1978). More extensive communications technology can provide more information to lower levels of decision-making. Information technology can allow more choice options at the

perimeter of organizations while keeping the center well informed (Worthley and Heaphey, 1978).

The expense of a computer system is falling, therefore peripheral units can more easily afford to adopt them. As the price falls the number of people using computers is rising. The old large expensive mainframe computers required a separate location and a separate highly specialized staff. This necessitated a centralized approach. With the development of minicomputers and microcomputers the technology can and is being decentralized. The use of computers both as terminals and as stand alone units has increased the potential for decentralization. Madron (1983) in Microcomputers in Large Organization notes that "the networks of the 1980's and 1990's will tend to be decentralized because data processing and data bases will become increasingly distributed.

Decentralization of power means that decisions can be made or influenced at the lower levels of the organization. The town meeting, the initiative, the referendum, and the computerized conference on the Hawaii Constitution are examples of policy making through citizen participation. In public administration incremental budgeting is cited as a case of decentralized the decision making. Budgets are built from the bottom-up with lower level managers turning estimates of the amounts necessary to operate their

programs. The old political machine with its central authority held by the party boss has given way to a corps of professionals who can make decisions based on their expertise not just on the directions from the top.

Legislatures are by their design decentralized. Cooper (1977) argues that they can not centralize their operations because they do not have hiring and firing control over their members. In the legislature job security is ultimately in the hands of the electorate not the legislative leaders (although they and the party organization certainly can influence the electorate). This gives legislators grounds to act independently. This independence is reinforced by democratic norms of equality.

In discussing the impact of computers on Congress, Frantzich (1982) distinguishes between different types of information that members need and use. He argues that in the past "resident" information was the most valuable kind. The longer a member stayed in Congress the more knowledge that person would acquire. This knowledge included the accumulation of specialized information relating to committee work and procedural information to the organizational rules.

Persuasion is a major skill in legislative decision making. A wealth of resident knowledge has given more senior members power over less senior legislators.

Trading information for loyalty gave more senior members a considerable advantage. Frantzich argues that this advantage is changing as members can increasingly rely on information accessed through computer data banks. He labels this new resource "access" information. In a study of technological innovation among congressmembers, Frantzich (1979) found younger members with less seniority were more likely to adopt information technologies. Their willingness to take the risk of innovation appears to be related to whether they were from a secure district or a marginal one. He concludes that "perhaps the most positive indication of democratization (decentralization) is revealed by the generational pattern of computer use" (Frantzich 1982, p.240).

Organizational Reinforcement of Power

Reinforcement politics means that under different conditions and in different organizations the distribution of power resulting from computer use will vary. Kraemer and Dutton (1979) stated that, "computer-based systems tend to follow and reinforce the existing pattern of power relationships, whether that pattern be pluralist or centralized in bureaucrats, technocrats, or politicians. Computing reallocates power or influence only in the sense that it accentuates existing inequalities of influence."

Kraemer and Dutton (1982) assessed the centralization and decentralization power shifts resulting from government use of computers. They used data from the Urban Information Systems Project (URBIS) that consisted of a 42-city survey and case-study data. Their results supported the hypothesis that power was more concentrated as a result of computer use. However, the power shifts were not always in the same direction.

Kraemer and Dutton (1982) argue that these results were consistent with reinforcement of existing power distributions. In smaller cities the mayor (executive branch) gained control as a result of computer use. In larger cities, that the authors noted had strong departments that were more independent of the local chief executive, the strong departments gained power.

Summary

This dissertation examines the impact of computer and information technology use on the organizational structures and distribution of power in state legislatures. In reviewing the literature, the first step was to discuss the various schools of organizational theory. They include the Weberian bureaucratic model, the human relations model, the Simon and March satisficing model and finally the systems model which Perrow argues is the underlying organizational model of these diverse schools. It was noted that

organizational studies in political science have focused primarily on the executive branch. Of the few organizational studies that have considered legislatures, most have been limited to the Congress. Next, the concept of power (the dependent variable in the proposed study) and it's distribution was examined. Finally, the literature concerning the centralization, decentralization and reinforcement of power in organizations as a result of information technology use was reviewed. Applying these ideas to state legislatures is exciting not only because of the potential to learn more about legislative information systems, but also for the role it may play in expanding the field of public administration to include more research on the legislative branch.

CHAPTER III

THEORY AND OPERATIONALIZATION

Introduction

This chapter begins with a discussion of the theoretical orientation of the research question. The rationale for selecting organizational theory is based on its utility in understanding the legislature as a whole unit. Organizational theory focuses on institutional structures and their relationships to decision-making in organizations. Institutional structures provide the framework within which various decision-making positions acquire their authority.

Organizational theory links organizational structures with technology. Technology in state legislatures can be seen in the formal work arrangements in the organization. These include the length of time that the organization is working, the amount of financial resources it utilizes, its staff, and its automated data processing techniques.

Since the 1960's the state legislatures have been increasing their levels of information technology. This raises the question of the impact of those changes on the structure of legislative decision-making. Theoretical arguments have been made by some researchers that that the impact of these changes will increase the centralization of

decision-making, while others argue that it will decrease centralization and increase decentralization. A third argument states that increases in computer use will have a reinforcing effect on the existing distribution of power.

From the theoretical arguments, a statistical model of the relationship between organizational decision-making and information technology is developed. The dependent variable (decision-making) and independent variables (information technology) are specified and the appropriate statistical tests are discussed. Finally, the data to be used in the analysis is introduced, and the data modifications are explained.

Theoretical Orientation

Theory is a tentative or preliminary explanation of social phenomena (Dooley, 1984). It is a systematic way to understand a given subject. It suggests the relationships one would expect to find in a given environment. Propositions or hypothetical statements can be derived from theories. They, in turn, can be operationalized and tested empirically using real situations and events.

Organizational theory provides a basis that can be used to interpret the decision-making location in state legislatures. It also provides a means with which to link

this study with other organizational decision-making studies, other studies of legislatures, and other studies of information technology. As a theory, it provides the framework within which the information technology concepts can acquire special significance.(Hoover, 1984)

All theories stress certain things and not others. It is the responsibility of the researcher to select the theoretical explanation that will allow a better understanding of the phenomena in question. In this study, theories of individual level decisions by legislators, which have been the predominant choice in the past, are excluded in favor of organizational level theories. That is not to say that the theories of individual choices are inaccurate or faulty. The reason that they are excluded from this research is because they do not provide explanations of legislatures as organizational units.

There has been a re-emphasis on the study of institutions in recent years. Instructive studies of Congress that use an institutional approach include Froman (1968), Polsby (1968), Patterson (1970), Ornstein and Rohde (1977), Rohde and Shepsle (1978), and Chartrand and Miller (1982). State legislative researchers who have used organizational theory include Chaffey (1970), Rosenthal (1973, 1974), Worthley and Crane (1976), Worthley (1977), and Worthley and Heaphey (1978), Harder and Davis (1979), Hedlund and Freeman (1981), and Hedlund (1984).

State legislative studies have also included an emphasis on legislative professionalism. In a study conducted by John G. Grumm (1971) the degree of professionalism is measured in relation to the responsiveness of legislators to their constituents. Legislators were considered professionals "if they were well paid, if they tend to think of their jobs as full time and their legislative role as a professional one." Grumm measured legislative professionalism using legislative salaries, legislative expenditures, length of session, number of bills introduced, and a legislative service score and analyzed these factors with relation to spending on welfare programs. In this research organizational variables are used in combination with concepts which measure individuals attitudes toward their own roles. This dissertation is related to the studies of professionalism in legislatures through the examination of the institutional resources concepts, however it differs in that it does not consider the attitudes of individuals towards their role as individual legislators.

In organization theory, there is an emphasis on the consequences of specific structures and decision rules (Hansen, 1983). Under the broad canopy of organizational theory, the explanations with the most promise for understanding the questions in this dissertation focus on

the relationship between organizational decision-making structures and information technology.

Organizational theory is used to identify concepts and relationships that will advance our understanding of organizations. First, the concept of an organization should be considered. Modern organizations are distinctive because of their bureaucratic structures. One of the most fundamental structures is the hierarchy or the division of labor. It specifics which positions have authority or legitimate decision-making power.

Therefore, decision-making in formal organizations can be linked with positions in the organizational hierarchy. "If individuals are asked to describe how much influence is associated with each type of position in the organization, then it is possible to construct a "control graph" that depicts how centralized or decentralized is the distribution of power in the organization." (Scott, 1981) A picture of the location of organizational power can also be derived from legislators responses to a question asking where the decisions are made in the legislature.

Typically, in large organizations the authority is located at the top of the hierarchy. The positions at the top of the hierarchy are the leadership posts. However, there are also organizations where decision-making authority is delegated to the lower levels in the hierarchy. The term street level bureaucracy has been

applied in some cases to exemplify organizations that have decentralized decision-making structures. In these types of organizations authority in many circumstances is given to the rank and file members of the organization.

Organizational scholars in their study of decision-making power have used the concepts of centralization and decentralization to identify the location of decision-making in organizations. "In the legislative context, various types of decision-making (e.g., gubernatorial, majority leadership, caucus, committee, subcommittee) may be indicative of greater or lesser centralization."(Francis, 1985)

In legislatures, centralization of authority can be seen in the actions of strong leaders. Legislatures are more centralized in those cases where leaders control committee membership, assignment of bills to committees, have a strong impact on voting decisions of members, control organizational resources, and act as the major conduit for information between the legislators and the executive branch.

Alternately, decentralization can be seen in legislatures where the leadership is relatively weak. Requirements of frequent rotation of the leadership will produce a weaker leadership. Powerful committee and subcommittee chairs tend to weaken the influence of the

chamber leadership. Staff allocation to committees, subcommittees and individual members can strengthen the individual legislator relative to the leadership.

Using the framework of organizational theory, the location of decision-making in organizations can be linked to the concept of information technology. In organization theory, technology is used to describe the work that is done. It is one of the determinants of organizational structure. This is important because organizational structure influences where decision-making authority is located.

If technology has an impact on the structural authority in organizations, then changes in the levels of information technology lead to questions about the potential impact on that decision-making authority. As legislative work loads become heavier, and problems put to the legislature become more complex, then legislators respond by increasing the level of information resources. One can use the theoretical link between organizational structure and technology to ask if changes in the latter influence changes in the former? Furthermore, what will be the direction of those changes in decision-making?

Organizational theory can be used to predict that increases in information technology in organizations will lead to more centralized control. For example, Whistler and Leavitt (1958), and Whisler (1964, 1970)

argued that the use of information technology by organizations will tend to increase the centralization of power. They argue that increases in information technology in organizations will give more control over decision-making to the top leadership in organizations.

Alternately, increases in information technology can have a decentralizing effect on organizations. For example more extensive communications technology can provide more information to lower levels of the organization. Increases in information technology can allow more participation at the perimeter of organizations while keeping the center well informed, which can have a decentralizing effect.

A third theory states that the previous locations of power will be reinforced as information technology is increased. This theory was supported by a study of urban governments conducted by Danziger et al. (1982). This theoretical explanation means that information technology will have different effects on organizations, depending on their previous location of decision-making power.

Operationalization of Organizational Theory

In operationalizing the theoretical relationship between decision-making and information technology the following theoretical concepts are used. The variable to be explained or the dependent variable is legislative

decision-making. The independent variables are operationalizations of information technology and include organizational interaction time (length of the legislative session), support personnel (full time and part-time staff), equipment (computer applications) and legislative operating budget.

In constructing the hypotheses to test the models an inductive method will be used. The procedure that will be followed is the acceptance or rejection of the hypotheses. The key to this form of hypothesis testing is the use of the falsification. Using empirical observations it is logically possible to falsify or disconfirm a hypothetical relationship with negative evidence, but not to confirm a hypothesis with positive evidence. To establish causality requires an enormous burden of proof. Even positive evidence to support hypotheses is not logically sufficient for validation. However, negative empirical evidence is sufficient to disconfirm the validity of a hypothesis. Therefore, if rival hypotheses are presented, it is logically possible to disconfirm or falsify one of the hypotheses. This according to Karl Popper, is the limit of inductive logic. "All we can say about our hypotheses is that they are falsified or unfalsified." (Salmon, 1975)

In the test between the competing hypotheses, the question is first asked if there is evidence to support the

null hypothesis that there is no association between the dependent and independent variables. In using the results of the empirical test of the hypothesis, it is possible to commit two types of mistakes. First, if based on the evidence, the null hypothesis is rejected, it is still possible that the null hypothesis is in fact true. The probability of this type I error is set by the alpha level of the statistical test. By convention, it is usually set at five percent. This is the level of risk that the research takes in stating that there is an association when in fact there is no association. If on the other hand, the null hypothesis is accepted when there is in fact an association then a different error or type II error is committed by the researcher.

The following statistical model will be used to test the null hypothesis that there is no statistically significant relationship between the dependent variable (location of decision-making) and the independent variables (information technology). The alternative hypothesis states that there is a significant relationship between the dependent and independent variables.

$$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + e$$

Y = loci of decision-making in the state legislatures

a = intercept of the regression equation

$b_1 x_1$ = length of legislative session

$b_2 x_2$ = full and part-time legislative staff

$b_3 x_3$ = legislative operating budget

$b_4 x_4$ = legislative computer applications

e = error term

This model will be tested using linear multiple regression analysis. In the multiple regression technique, the influence of the independent variables can be assessed simultaneously. In this study, the impact of each of the independent variables is measured while holding all of the other independent variables constant. All of the variables in the regression analysis are measured on an interval level.

The partial correlation coefficients will be used to compare the independent variables with each other. The F statistic can be used to measure the overall goodness of fit of the regression equation. The results of the statistical analysis will be used to evaluate the hypotheses. If there is not statistically significant relationship between the dependent and independent variables then I will accept the null hypothesis. If there is a statistically significant relationship then the null

hypothesis will be rejected and that will support the alternative hypothesis.

If the null hypothesis is rejected then the alternative hypothesis must be interpreted. The dependent variable is a measure of the location of decision-making in state legislatures. Decision-making is measured as a scale with the higher values indicating more centralized decision-making and the lower values indicating more decentralized decision-making. Positive values for the independent variables indicates support for centralized decision-making, while negative values will indicate support for decentralized decision-making.

A reinforcement model will be constructed to determine if the previous level of decision-making has an interactive effect with the current measures of information technology. The same basic regression equation will be used, however an interactive dummy variable will be added for each of the independent variables. The dummy variable will be computed using the level of decision-making for the previous time period and multiplying that value by each of the independent variables. The dummy variable will be created by dividing the states in the given previous time period into two parts based on the level of centralization. Then the differences between the two groups can be evaluated to see whether the previous level of centralization had a

different effect when it interacts with the information technology variables in the current time period. The following model was developed to test the reinforcement hypothesis.

$Y=a+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+b_7x_7+b_8x_8+e$

Y = loci of decision-making in the state legislatures

a = intercept of the regression equation

b_1 x_1 = length of the legislative session

b_2 x_2 = full and part-time legislative staff

b_3 x_3 = legislative operating budget

b_4 x_4 = legislative computer applications

b_5 x_5 = session times the loci of decision-making dummy variable

b_6 x_6 = staff times the loci of decision-making dummy variable

b_7 x_7 = budget times the loci of decision-making dummy variable

b_8 x_8 = computer applications times the loci of decision-making dummy variable

e = error term

Data Sources and Manipulations

Data to test the the model was collected for the time periods 1981, 1974 and 1964. Starting with the data for 1981, the data for the dependent variable, location of decision-making in state legislatures was collected through the use of a survey of state legislators in the

United States. This survey was conducted by Wayne Francis in 1981. There were 2028 respondents to the survey. The questionnaire was sent to a random sample of legislators of all ninety-nine chambers in all fifty states.

They were asked the following question. In your legislature, where would you say the most significant decisions are made? The legislators were given the following choices: party caucus, in policy committee, on the floor, regular committee meetings, prelegislative session, office of presiding officers or majority leaders, in governor's office, in subcommittees, and other. The legislators were asked to rank their top three choices.

The response categories were arranged in the following array from the most centralized to the most decentralized: policy committee, governor's office, office of the presiding officers or majority leaders, party caucus, regular committee meetings, on the floor, and in subcommittees. The prelegislative session choice had a very low response rate and was dropped from the array. (Francis and Jacoby, 1985)

The location of decision-making for 1964 and 1974 was taken from a similar surveys of state legislators. The 1964 survey was conducted by Wayne Francis and is currently available through the Inter-University Consortium for Political Research at the University of Michigan. The

second survey was conducted by Eric Uslaner and Ronald Weber and was made available for this study through them. The wording and choices in these two surveys were identical. The legislators were asked where the most significant decisions were made in their legislature. The choices were: party caucus, on the floor, regular committee meetings, prelegislative session, in policy committee, in the governor's office, and other. The categories were arranged in the following order from the most centralized to the most decentralized: in the governor's office, in policy committee, party caucus, regular committee meetings, on the floor. The prelegislative session choice was dropped from the final array due to low response rates. It has been considered an inappropriate category. The 1964 survey had 837 respondents, while the 1974 survey had 1163 respondents.

Scores for the individual states ranged from 1 to 0, with 1 being the most centralized and 0 being the most decentralized. For the 1964 and 1974 surveys, the responses of "in the governor's office" and "in policy committee" received a score of 1, "party caucus" responses a score of .50; and "regular committee meetings" or "on the floor" responses received a score of 0.(Francis, 1967) The 1981 coding scheme follows the same pattern with the inclusion of "office of presiding officers or majority leaders" with the "party caucus" category, and

"subcommittees" with the "regular committee meetings and on the floor" category.

In collecting the data for the independent variables every attempt was made to make the data as comparable as possible from one time period to the next. The length of the legislative sessions for all three years were taken from the Book of the States. Some adjustments had to be made for the biannual sessions of the states. If a state had a biannual session, the total number of days in session was compiled and that total was divided by two to yield the average number of days in session per year. Because the data were collected for three specific years, it was possible for those state with biannual session which met during the year prior to or following either 1964, 1974 or 1981 to appear to have zero days in session. Taking the average for the biannual period produced a more realistic picture of the length of session time for those states.

States also vary in whether they report calendar days in session or legislative days. When ever calendar days were reported those were used, however when session days were reported the number of calendar days was counted from the first calendar session day to the last calendar session day. Furthermore, any extra session were added onto the total number of calendar session days.

The legislative budget data was collected from the Bureau of the Census, Compendium of State Government Finances for 1964, 1974, and 1981. This is the operating budget of the legislatures not the total state budget. For each year, it was adjusted by the total number of legislators. The size of the legislative chambers was taken from the Book of the States for the appropriate years. This yields a more comparable figure of the financial resources a available relative to the size of the organization.

The number of staff for 1981 was taken from a report published by the National Conference on State Legislatures. It is a combination of full time and part time staff. Part time staff were counted a half of full time staff. The total numbers were divided by the total number of legislators for the state, again as reported in the Book of the States. Staff data for the 1974 time period was taken from a Council of State Governments Legislative Staff Improvement Study for 1968. These figures were adjusted for total number of state legislatures. In a 1963 report of the Committee on Organization of Legislative Services of the National Legislative Conference, some descriptive data on legislative staffs is provide, but it is insufficient for analytical purposes.

Legislative use of automatic data processing for all three time periods is reported by the Council of State

Governments. The figures used are the total number of different applications. For the 1964 time period, the data that was reported in 1967 was used.

Summary

In this chapter, the research theory and methods of analysis and data were presented. This study is based on organizational theory, which can be used to explain the relationship between organizational structures of decision-making and organizational impacts of information technology.

Organizational theory emphasizes the consequences of specific structures on organizational decision-making authority. Organizations are characterized by the divisions of work. The technology of an organizations is the methods it used to conduct its work. If that technology changes then it has the potential to affect the distribution of decision-making authority in the organization.

In the past twenty years legislative organizations have been undergoing extensive changes in their organizational information technology. Given the linkage between decision-making and technology in organizations, it is possible to generate a theoretical model of the

relationship. In this study it is proposed that increases in information technology will influence the location of decision-making in the legislatures. This change in decision-making can increase the centralization or decentralization of influence. It is also possible that it will reinforce the existing distribution of decision-making in the organizations.

Using data for the fifty U.S. state legislatures for the time periods, 1964, 1974 and 1981 the relationship between the location of decision-making in state legislatures and the levels of information technology will be examined. Data for the dependent variable (decision-making) is taken from three national surveys of state legislators, who were asked where in the legislature are the most significant decisions made? Measures for the concept of information technology include the length of time that the organization works, the amount of financial resources it has, the size of its support staff, and the automatic data processing capabilities it uses. Sources of the data and the necessary data modifications were enumerated.

The principle analytical technique to be used is a multiple regression analysis. It will be used to test both the centralization model. In addition a multiple regression analysis using an interactive dummy variable

will be used to test the reinforcement model. In the next chapter the results of the statistical analysis will be presented and discussed.

CHAPTER IV

RESEARCH METHODS AND RESULTS

Introduction

This is a comparative legislative study, which uses data from the fifty U.S. state legislatures from the time periods of 1964, 1974 and 1981. Use of data from different time periods is important, because it allows examination of changes over time. Comparative studies are useful in the analysis of organizational theory because they can illuminate the variations in state legislative organizations. Comparative studies are also useful in that they can provide the basis for generalizations to a larger population.

This chapter will begin with a discussion of the statistical techniques that will be used in the research analysis. Next, the results of the analyses will be presented and interpreted for each time period. The first series of results will be from the test of the centralization and decentralization models. These models use cross-sectional data and will be discussed under chapter sub-sections for the three years. Finally, the results of the test of the reinforcement model will be presented and interpreted.

Statistical Methods

Statistical analysis can only be meaningful to the degree that it adds insights based on empirical evidence to the research model and theory. A theory should provide a logically plausible explanation of the phenomena prior to the data analysis stage, and it must be kept in mind during the analysis process. In evaluating a theory prior to the empirical analysis, a researcher must think about how strongly she or he believes the theoretical explanation. (Hanushek and Jackson, 1977)

If the theory is not believable or logically plausible, then it will yield weak models, which in turn may be easily falsified. Even if data collection and analysis could be done easily and quickly this would be an inefficient research procedure. A far more productive approach is the construction of the strongest theoretical arguments possible. Then from these arguments, models can be developed and subsequent hypotheses derived. The falsification of hypotheses related to strong models is much more useful in the development of theories.

The rules of logic provide guidance in interpreting the results of empirical inductive research. The statistical analysis utilizes data based on observations of existing organizations. Data constitutes positive evidence, and regardless of the amount and quality of such data, models

can not be "proven" using observations. Positive instances of events do not logically validate hypotheses. However, observed instances of negative evidence can logically refute hypotheses. Therefore, the procedure that has been established to satisfy these logical requirements is to test competing hypotheses.

The theory behind this analysis emphasizes the consequences of organizational attributes for decision-making in organizations. It states that organizational decision-making is influenced by the organizational technology. The focus on decision-making is not on what policies are made but where they are made in the organization. Therefore, the predictions of the models can not be used to speculate about policy outcomes. Rather to the degree that they have predictive value, they can be used to generalize about the effects of information technology on organizations. More specifically, the location of decision-making model can be used to generate statements about the association between the levels of information technology and the location of decision-making in organizations. The reinforcement model can be used to make statements about the interaction of previous levels of decision-making with current levels of information technology and the effect of those variables the on current location of decision-making.

The measurement level for the study is state units. It was selected because data for a number of the variables (budget, session, staff, and computer applications) was only available for the state legislative branch. Furthermore, the data that was available for individual legislative chambers for the dependent decision-making variable could be accurately collapsed in order to maintain a uniform level of measurement for all variables. Although, it would be possible to estimate values for all 99 chambers, it would not be appropriate. Such a procedure would violate the regression assumption that the errors of the independent variables are not correlated. The result of violating this assumption (of no autocorrelation) would be to bias the estimates of the coefficients. Therefore, state legislative units are the appropriate measurement level for this investigation.

Multiple regression will be the major statistical test of the research models. Regression analysis assumes that there is a linear relationship between the dependent and independent variables. For this analysis that means that a unit change in information technology corresponds to a unit change in location of decision-making. In most social science research the observations do not produce an exact fit of the model. They do not explain all of the variance; therefore a stochastic or error term is added to the model. This term is never observed, and its mean is assumed to be

zero. By adding it to the model the researcher can proceed with the analysis while recognizing that there may be unexplained variance.

The regression analyses will be conducted using the forced entry with a fixed order of the variables in the model. This technique is preferred to either stepwise or the use of a statistical criteria to add variables to the model, because it utilizes a theoretical framework.

The regression model used to test the location of decision-making theories is:

$$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + e.$$

As discussed in chapter three, the dependent term (Y) is a measure of the location of decision-making. In the scale used for this variable, the low end reflects more decentralized decision-making while the high end reflects more centralized legislative decision-making. The independent (x) variables are interval level measures. A positive correlation between the levels of session, staff, budget, and automatic data processing in a given year, will be evidence to support the centralization hypothesis. Negative correlation values will indicate support for the decentralization hypothesis.

Following each of the regression analyses, a table analysis will be presented in order to examine the location of the various states. Each table will be constructed

using the bivariate relationships between location of decision-making and the levels of information technology for a given year. The categories used to divide the variables remain consistent for each of the different years in the analysis. The statistics included in the crosstabulation analysis will be chi square, the level of significance for chi square, and gamma. The measure of association, chi square is calculated using the frequencies of states in each category in the table. The strength and direction of the association will be measured by the gamma statistic.

In the test of the centralization and decentralization models a simple regression analysis was used, while in the case of the reinforcement model a lagged dependent variable from the previous time periods was included as an interactive term in the regression equation. The use of a lagged endogenous variable allows one to determine if the previous level of decision-making (either centralized or decentralized) has an interactive effect with the independent information variables in the later time period. The interaction term (slope dummy) is calculated by multiplying the information variables in the current time period by a bivariate variable for the level of centralization in the previous time period. As specified in chapter three, this model can be expressed as:

$Y=a+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+b_7x_7+b_8x_8+e$

It includes the information variables for the current year, and the slope dummy variables, which measure the interaction between the previous level of decision-making and the current information variables. This is precisely the right test for the reinforcement hypothesis. The reinforcement theory says that the level of centralization or decentralization in 1964 will determine the effect of the information technology variables on the location of decision-making in later time periods.

The results of the reinforcement test should be interpreted in the following way. Negative partial correlation coefficients for the previously decentralized state legislatures will be evidence to support the reinforcement hypothesis. It would mean that the previous decentralized condition of a state legislature is determining the effect of the information technology variables on location of decision- making in the later time period. Positive correlation values for the previously decentralized states would be support for the centralization hypothesis. They would mean that those positive information coefficients for the previously decentralized states would cause those legislatures to become less decentralized. A positive coefficient for the previously decentralized legislature would mean that the

information variable was having a centralizing effect on the current level of decision-making.

Positive partial correlation coefficients for the previously centralized state legislatures will support the reinforcement hypothesis for that group of states. It will mean that the previous level of centralization will determine the effect of the information variables on the location of decision-making in the later time period. A negative correlation coefficient for the previously centralized states would mean that the previous location of decision-making was not able to continue the centralizing effect of the information variables on the current level of centralization. Instead the information variables were having a decentralizing effect on previously centralized states. The difference of the two groups of states, the previously decentralized and previously centralized, will be determined by the significance level for the interactive slope dummy. If the interactive term is significant, then the two groups of states are significantly different from each other.

The use of lagged endogenous variables is discussed by Charles Ostrom in his publication Time Series Analysis: Regression Techniques. He notes that this procedure "creates a number of new considerations." These considerations are related to the fact that in lagging the endogenous variables the assumption that the error terms in

the regression model are uncorrelated is violated. This can produce bias in the estimates of the coefficients because of serial correlation. However, the question being asked by this lagged model is whether or not the previous level of decision-making is having an effect on current levels of information technology. If the results of the analysis show the lagged variable to be unrelated to the independent variables in the later time period then it would be more reasonable to expect that the lagged variable would have less covariance with the current endogenous variable. If there is an interaction effect between the endogenous variable (dependent) and the exogenous variables (independent) in the current time period then it is understandable that the previous endogenous variable is also related to the current endogenous variable, especially if the current endogenous variable is also related to the current exogenous variables.

In comparing the independent variables in the regression analysis the partial regression coefficients (B's) will be used. This is an appropriate measure because all of the variables are taken from the same sample of fifty U.S. state legislatures. The partial correlation coefficient measures the unit change in independent variable on the unit change in the dependent variable, while holding all the other independent variables constant. It

is used to determine "whether the dependent variable and one independent variable are related after netting out the effect of any other independent variables in the model."(Pindyck and Rubinfeld,1976)

In examining the strength of the relationship between the dependent and independent variables in regression analysis it is common to rely on R square. It measures the percentage of explained variance to the total variance in the sample. It has been frequently referred to as a measure of the goodness of the fit of the independent variables in predicting the dependent variable. Models with low R squares are often said to be less powerful than those with high R squares.

Achen (1982) takes exception to the positions above. He says, "Nothing about R square supports those claims." (That a model with a higher R square represents a stronger relationship.) In Interpreting and Using Regression he writes, "It is a statistic that characterizes the geometric shape of the regression points and not much more. The central difficulty with R square for social scientists is that the independent variables are not subject to experimental manipulation. Sample variances tend to differ and are a function of the sample not the underlying relationship. Therefore they cannot have any real connection to the strength of the relationship. Frequently a relationship is said to be strong if the coefficients are

substantially large. This measure is drastically affected by the variance of the independent variables."

Achen is saying that two statistics that are frequently used to measure the strength of the relationship, R square and the partial correlation coefficients, are susceptible to sample variations. This is important for this study because the variances of the variables are large. To demonstrate this problem the mean for each independent variable and their variances are included in the tables used to present the regression results.

As a remedy for this problem, I find the recommendations of the User's Guide: Statistical Package for the Social Sciences X (1983) by Marija Norusis to be persuasive. Norusis's writing agrees with the advice of Achen (and Hanushek and Jackson, 1977) about the effect of sample variances on the R square and partial correlation coefficients and recommends that statistics which are susceptible to sample variance be interpreted very cautiously.

Another statistic which can be used in comparing the effect of the independent variables is their elasticity. This is the "percentage change in the dependent variable that would be expected from a one percent change in an independent variable. This measure has the advantage of being unit free. Further, its evaluation is not as

sensitive to sample definitions as the standardized coefficients." (Hanushek and Jackson, 1977) The elasticities tend to vary at different points along the regression line. Therefore the value that is used is the "point of the means of each of the independent variables." (Pindyck and Rubinfeld, 1976

The ordering of the variables was considered and the following rationale was developed. Given the independent variables, (legislative session length, legislative organizational budget, staff and computer applications) an order was established based on which variable would necessarily precede the other variables. I argue that the first information resource necessary is session length. Organizational time to conduct work is a fundamentally essential resource. Closely related are the financial resources of the organization. Budgets are also essential to the acquisition of other resources. Staff is important in gathering, processing and assessing information. Finally, computer applications are changing the speed and capabilities of legislators to handle large amounts of information. The independent variables were entered into the regression analysis in the order outlined above: session, budget, staff and computer or automatic data processing applications.

State Legislatures in 1964

Before discussing the statistical result for each of the time periods, it may be useful to present some descriptive information about the state legislatures. In the 1960s most of the state legislatures were amateur organizations. They were also largely dominated by rural legislators, because the legislative district lines had not been changed to reflect the mass movement of population to urban areas. In the 1962 case Baker v. Carr, the United States Supreme Court ruled that state courts should protect the rights of citizens from malapportionment. In 1964, the Supreme Court again ruled on this question and in the Reynolds v. Sims case held that the state legislative district should reflect "one man, one vote." This meant redrawing the district lines.

This reapportionment radically changed the membership of the state legislatures. "These new legislatures drafted and adopted completely new state constitutions in some states; in others, a flurry of amendments created streamlined structures and modernized procedures in a wide range of governmental areas. One aspect of modernization was the move to full-time professional legislatures and the hiring of expert legislative staffs to assist them." (Aldrich, Miller, Ostrom, and Rohde, 1986)

In 1964 twenty states had annual sessions. This had been gradually increasing since the end of World War II when only four states had annual sessions. The average length of the session was 100 days. The average budget was $1,411,140, and the average size of the legislature was 157 members. There was less than one office for every third legislator, with offices provided to the legislative leaders in most states. The remaining legislators were provided with a desk in the legislative chamber. Fourteen states had the following types of automatic data processing (adp) procedures in operation: history of bills, statutory retrieval, budget status, bill drafting and journal indexing. Four more states had plans for adp applications. A majority of the clerks and secretarial staff were part time, and figures for total numbers are not available. (Council of State Governments, 1963)

Regression Results for 1964

The results of the regression analysis for 1964 show that greater levels of information technology correspond positively with more centralized decision-making in state legislatures. (Table 1) The R square for this model in this year was .11, and the F statistics was 1.89 which was not statistically significant. Overall this was not a statistically strong model or significant relationship.

However, it demonstrates a positive relationship, which would support the centralization hypothesis rather than the decentralization hypothesis.

Next, each of the variables in the model will be examined individually to see their contribution to the model and to demonstrate the location of each state with its level of information technology.

Sessions in 1964

In examining the individual independent variables, session length was statistically the strongest. It was also a positive value which meant that legislators in states with relatively long sessions reported that decision-making in their legislatures was more centralized and legislators in states with shorter session reporting that decision-making was more decentralized. Session lengths are an important link in the use of information. "A legislature that meets only for a few months every other year cannot dig very deeply into the whys and wherefores, the facts and figures, the social and economic implications, of the legislation that comes before it." (Citizens Conference and John Burns, 1971) Moving from a part time to a full time legislature was a popular cause for legislative reformers in the mid-1960s.

TABLE 1

1964 REGRESSION RESULTS OF LOCATION OF LEGISLATIVE DECISION-MAKING WITH SESSION LENGTH, BUDGETS FOR THE LEGISLATIVE BRANCH AND AUTOMATIC DATA PROCESSING APPLICATIONS

DEPENDENT VARIABLE: LOCATION OF LEGISLATIVE DECISION-MAKING

INDEPENDENT VARIABLES	MEAN	STANDARD DEVIATION	PARTIAL CORRELATION COEFFICIENT	SIGNIFICANCE	ELASTICITY
SESSION	99.9000	78.1772	.077	.069	.188
BUDGET	14.5736	21.7725	.114	.485	.041
ADP	.8200	1.3045	.399	.874	.008

R SQUARE	.1099
F STATISTIC	1.8940
SIGNIFICANCE	.1440

Source: Author's calculations using Francis 1967, Council of State Governments, 1964, Bureau of Census, 1964.

The partial correlation coefficient for sessions in 1964 was .077, which is significant at the .069 level. This measure represents the change in the decision-making corresponding to a unit change in session length. The elasticity statistic indicates that a one percent change in the session length would have a nineteen percent (positive) effect on decision-making.

The positive association between session length and more centralized state legislatures can be explained in part by the increased tenures of legislators in those states with longer sessions. The leadership in legislatures with longer sessions had more time to establish a strong base of support among their colleagues, through desirable committee assignments, support for member legislation, and assistance with constituent concerns. For examples of states with longer sessions and stronger centralized legislative leadership, see the cells in the lower right corner of Table 2.

TABLE 2

1964 DECISION-MAKING WITH LEGISLATIVE SESSION LENGTH

SESSION LENGTH

	1	80	133	384
1	FLORIDA	IOWA		
	IDAHO	MISSISSIPPI		
DE-	NORTH CAROLINA	NEBRASKA		
CENTRAL-	NEW MEXICO	NEW HAMPSHIRE		
IZED	NEVADA	SOUTH CAROLINA		
	OREGON	VERMONT		
DECISION-	SOUTH DAKOTA			
MAKING	TEXAS			
	WYOMING			
31	COLORADO	ALASKA	MASSACHUSETTS	
	KANSAS	MINNESOTA	MICHIGAN	
	MARYLAND	MISSOURI	OHIO	
	MONTANA	OKLAHOMA		
	NORTH DAKOTA			
	UTAH			
	WASHINGTON			
46	ARKANSAS	ALABAMA	ARIZONA	
CENTRAL-	GEORGIA	CALIFORNIA	DELAWARE	
IZED	HAWAII	CONNECTICUT	NEW JERSEY	
	INDIANA	ILLINOIS	PENNSYLVANIA	
DECISION-	TENNESSEE	KENTUCKY	WISCONSIN	
MAKING	VIRGINIA	LOUISIANA		
	WEST VIRGINIA	MAINE		
		NEW YORK		
86		RHODE ISLAND		

CROSSTABULATION STATISTICS: CHI SQ. 5.35
SIG. .25
GAMMA .38

Source: Author's calculations using Francis 1967, and Council of State Governments 1964.

Budgets in 1964

The relationship between centralized decision-making and the operating budgets for the legislative branches was positive. The partial correlation coefficient for budgets in 1964 was .114 and had a significance level of .485. (Table 1) The mean elasticity effect on decision-making was .041. This elasticity value indicates that budgets had a small positive effect on centralization in 1964, and the relationship was not very statistically significant.

States with higher budgets and more centralized decision-making tend to be more industrialized and to have a larger tax base. This group includes some of the largest states in the nation, for example, California, Michigan, New York, Pennsylvania and Wisconsin. (Table 3) The decentralized state legislatures with lower budgets include smaller less industrial, and less populated states. Examples in this group include Idaho, Maine, Montana, New Mexico, North Carolina and Wyoming. Again the former group (centralized) tends to be dominated by northern and eastern states, while the latter group (decentralized) is dominated by western and includes some southern states. Clearly, there are a number of exceptions which is not surprising given the relatively low level of significance of this variables in the regression equation.

TABLE 3

1964 DECISION-MAKING WITH LEGISLATIVE BRANCH BUDGETS

BUDGETS IN CONSTANT DOLLARS

	1	12.5	30	320
DE-CENTRAL-IZED DECISION-MAKING	1	FLORIDA IDAHO IOWA MISSISSIPPI NEW HAMPSHIRE NEW MEXICO NORTH CAROLINA SOUTH CAROLINA SOUTH DAKOTA VERMONT WYOMING	NEBRASKA NEVADA OREGON TEXAS	
	31	COLORADO KANSAS MARYLAND MINNESOTA MISSOURI MONTANA NORTH DAKOTA OHIO OKLAHOMA UTAH WASHINGTON	ALASKA	MASSACHUSETTS MICHIGAN
CENTRAL-IZED DECISION-MAKING	46	ALABAMA ARKANSAS CONNECTICUT ILLINOIS INDIANA MAINE TENNESSEE RHODE ISLAND VIRGINIA WEST VIRGINIA	ARIZONA DELAWARE GEORGIA HAWAII KENTUCKY LOUISIANA NEW JERSEY WISCONSIN	CALIFORNIA NEW YORK PENNSYLVANIA
	86			

CROSSTABULATION STATISTICS: CHI SQ. 6.79
SIG. .15
GAMMA .39

Source: Author's calculations using Francis 1967, and Bureau of the Census 1964.

Automatic Data Processing in 1964

Automatic data processing in state legislatures was a very new type of information resource in 1964. Early uses of adp included electronic voting and bill status systems. Iowa had the first automated bill status system in the nation in 1963. None of the states had what could be called a high level of adp. The partial correlation coefficient was .399 with a .874 level of significance. ADP had an elasticity value of .008 which was the lowest of the three variables. This variable could hardly be expected to reliably cause a small, if any change in centralization. (Table 4)

In this early period of use of computers in state legislatures, a number of state legislatures used computers that were controlled by the executive branch. This reliance on the executive branch could be seen in budget preparation. It has been a relatively recent phenomena for state legislatures to initiate the budget process. It was far more common to receive and revise a budget prepared by the governor's office of management and budget.

Generally in 1964, state legislatures had short sessions, with limited budgets and were just beginning to use automatic data processing. The statistical results for the cross-tabulation tables were not significant, because the states tended to be lined up on the left side of the tables-reflecting the low levels of information technology.

TABLE 4

1964 DECISION-MAKING WITH AUTOMATIC DATA PROCESSING

		AUTOMATIC DATA PROCESSING		
	1	2	7.5	19
DE-CENTRAL-IZED DECISION-MAKING	1 IDAHO MISSISSIPPI NEBRASKA NEVADA NEW HAMPSHIRE NEW MEXICO NORTH CAROLINA OREGON SOUTH CAROLINA SOUTH DAKOTA VERMONT WYOMING	FLORIDA IOWA TEXAS		
	31 COLORADO MARYLAND MASSACHUSETTS MINNESOTA MONTANA NORTH DAKOTA OKLAHOMA UTAH WASHINGTON	ALASKA KANSAS MICHIGAN MISSOURI OHIO		
CENTRAL-IZED DECISION-MAKING	46 ALABAMA ARKANSAS ARIZONA CALIFORNIA DELAWARE GEORGIA HAWAII ILLINOIS INDIANA KENTUCKY LOUISIANA MAINE RHODE ISLAND 86 WEST VIRGINIA	CONNECTICUT NEW JERSEY NEW YORK PENNSYLVANIA TENNESSEE VIRGINIA WISCONSIN		

CROSSTABULATION STATISTICS: CHI SQ. 1.04
SIG. .59
GAMMA .20

Source: Author's calculations using Francis 1967, and Council of State Governments 1967.

The gamma values for each of the three tables were low, however they were positive. The same positive association was also demonstrated in the the statistical results of the cross-sectional regression analysis. Although the regression results were not highly significant, there was a weak positive association, which would lend more support to the centralization rather than the decentralization hypothesis. Legislative session had the strongest impact on centralization of decision-making and came the closest to the five percent significance level.

Legislatures in 1974

The decade between 1964 and 1974 was one of growth in the size of state governments. During this time state legislatures lengthened their sessions, increased their budgets and staff support, provided more office space and expanded their use of automatic data processing. The longer sessions increased their power balance with the executive branch by making legislators more of a presence in state government. Longer sessions increased the "visibility of legislators as well as their workload." (Kurtz, 1974) According to Kurtz, the most significant area of improvement at this time, was the establishment of a professional fiscal staff. This gave the legislatures the "ability to make independent judgments concerning taxation and spending by state government," which put the

legislatures on a more even footing with the executive branchs.

In 1974, the state legislature had made increases in each of the information variables included in this study. Sessions had grown from an average of 99 days to an average of 126. Between 1964 and 1974, the budgets had increased an average of 156%. There were 22 staff members for every one hundred legislators. There was one office for approximately every two legislators. The number of automatic data processing applications increased to an average of 6 per state, with only Arkansas and New Mexico reporting no legislative computer applications.

Prior to running each of the regression analyses, a check was done for multicollinearity. It can occur when there is high intercorrelation between the independent variables. Because the independent variables are all measures of different aspects of information technology, it is not unusual to expect to find a certain amount of intercorrelation. Lesser amounts of intercorrelation can cause wide variances in the correlation coefficients. This is another source of variance in addition to the variances observed within the data sampled. If the intercorrelation of the independent variables exceeds .7, it can cause the signs of the correlation coefficients of the highly intercorrelated variables to be reversed.

In the 1974 sample, there was an intercorrelation of .74 between the independent variables budget and staff. When both variables were entered in the equation the sign of the staff variable was negative. When staff alone was entered with the other independent variables its sign was positive. One possible solution to this problem is to combine the intercorrelated variables. In this case that creates problems of interpretation of the new variable, because the variables are measured in different units (dollars and people). Another remedy is to delete one of the variables. For this analysis, the staff variables was deleted, because it is theoretically less important than the budget. It also appears to have more variability in reporting than the budget, because of the large number of part-time staff, and unpaid student interns.

The results of the regression analysis for 1974 were not statistically significant. (Table 5) None of the coefficient values came close to the five percent significance level. This may have been because this was a transition period in state legislatures. It could also be caused by some unknown difference in the survey used to generate the dependent variable. Aside from the general lack of significance for the 1974 analysis, the most noteworthy finding is the negative value of the adp variable.

TABLE 5

1974 REGRESSION RESULTS OF LOCATION OF LEGISLATIVE DECISION-MAKING WITH SESSION LENGTH, BUDGETS FOR THE LEGISLATIVE BRANCH AND AUTOMATIC DATA PROCESSING APPLICATIONS

DEPENDENT VARIABLE: LOCATION OF LEGISLATIVE DECISION-MAKING

INDEPENDENT VARIABLES	MEAN	STANDARD DEVIATION	CORRELATION COEFFICIENT	STANDARD ERROR	SIGNIFICANCE	ELASTICITY
SESSION	126.6400	83.3808	.025	.036	.495	.095
BUDGET	37.3706	48.3308	.076	.065	.247	.086
ADP	5.8200	2.5690	-.176	1.094	.873	-.031
R SQUARE	.0673	F	1.1060	SIGNIFICANCE	.3560	

Source: Author's calculations using Uslaner and Weber 1985, Council of State Governments, 1974, Bureau of Census, 1974.

Florida is the leading decentralized state to use automatic data processing. In 1974, it had ten different applications, while the average number for all states was 5.8. A history of using innovative techniques, can have a positive effect on the adoption and development of automated systems. Florida started using electromechanical voting in 1930, which was the year following its introduction by Iowa.

The results for 1974 are presented in Tables 5 through 8, in an effort to honestly report the findings of the analysis. However, because of the lack of statistical significance and reliability of the results, it is not productive to attach explanatory value or interpretations to the findings.

TABLE 6

1974 DECISION-MAKING WITH LEGISLATIVE SESSION LENGTH

		SESSION LENGTH		
	1	80	133	384
DECENTRALIZED DECISION-MAKING 1	ARKANSAS FLORIDA GEORIGA IDAHO NEVADA NEW MEXICO NORTH DAKOTA SOUTH DAKOTA TEXAS VIRGINIA WYOMING	KANSAS MAINE MISSISSIPPI NEBRASKA NEW HAMPSHIRE OREGON TENNESSEE	MASSACHUSETTS MICHIGAN MISSOURI SOUTH CAROLINA VERMONT	
31	ALABAMA INDIANA MONTANA UTAH WASHINGTON	ALASKA MARYLAND WEST VIRGINIA	ARIZONA COLORADO ILLINOIS IOWA OHIO RHODE ISLAND	
CENTRALIZED DECISION-MAKING 46	KENTUCKY LOUISIANA	CONNECTICUT HAWAII MINNESOTA NEW YORK WISCONSIN	CALIFORNIA DELAWARE NEW JERSEY OKLAHOMA PENNSYLVANIA	
86				

CROSSTABULATION STATISTICS: CHI SQ. 4.54
SIG. .34
GAMMA .34

Source: Author's calculations using Uslaner and Weber 1974 and Council of State Government 1974.

TABLE 7

1974 DECISION-MAKING WITH LEGISLATIVE BRANCH BUDGETS

BUDGETS IN CONSTANT DOLLARS

	1	12.5	30	320
DE-CENTRALIZED DECISION-MAKING	ARKANSAS MAINE NEW HAMPSHIRE NEW MEXICO NORTH DAKOTA SOUTH DAKOTA VERMONT WYOMING	GEORGIA IDAHO KANSAS MISSISSIPPI MISSOURI NEVADA NORTH CAROLINA SOUTH CAROLINA TENNESSEE VIRGINIA	FLORIDA MASSACHUSETTS MICHIGAN NEBRASKA OREGON TEXAS	
	ALABAMA RHODE ISLAND UTAH WEST VIRGINIA	COLORADO INDIANA IOWA MONTANA	ALASKA ARIZONA ILLINOIS MARYLAND OHIO WASHINGTON	
CENTRALIZED DECISION-MAKING		CONNECTICUT DELAWARE KENTUCKY OKLAHOMA	CALIFORNIA HAWAII LOUISIANA MINNESOTA NEW JERSEY NEW YORK PENNSYLVANIA WISCONSIN	

CROSSTABULATION STATISTICS: CHI SQ. 7.83
SIG. .10
GAMMA .49

Source: Author's calculations using Uslaner and Weber 1974 and Bureau of Census 1974.

TABLE 8

1974 DECISION-MAKING WITH AUTOMATIC DATA PROCESSING

		AUTOMATIC DATA PROCESSING		
		1	2	7.5 19
DE-CENTRAL-IZED DECISION-MAKING	1	ARKANSAS NEW MEXICO VERMONT	IDAHO MAINE MICHIGAN MISSISSIPPI MISSOURI MASSACHUSETTS NEBRASKA NEVADA NEW HAMPSHIRE NORTH CAROLINA NORTH DAKOTA SOUTH DAKOTA TENNESSEE TEXAS VIRGINIA	FLORIDA GEORGIA KANSAS OREGON SOUTH CAROLINA WYOMING
	31		ALABAMA ALASKA ARIZONA COLORADO INDIANA MONTANA OHIO UTAH RHODE ISLAND WEST VIRGINIA	IOWA ILLINOIS MARYLAND WASHINGTON
CENTRAL-IZED DECISION-MAKING	46		CONNECTICUT DELAWARE HAWAII KENTUCKY LOUISIANA MINNESOTA NEW JERSEY	CALIFORNIA NEW YORK PENNSYLVANIA WISCONSIN
	86		OKLAHOMA	

CROSSTABULATION STATISTICS: CHI SQ. 3.56
SIG. .47
GAMMA .26

Source: Author's calculations using Uslaner and Weber 1974 and Council of State Governments 1974.

Legislatures in 1981

The movement toward modernization in state legislatures that was stimulated by the malapportionment crisis in the 1964, had slowed down in some areas of legislative reform, and changed direction in other areas. Lengthening legislative sessions was one of the early responses to the concerns about reforming the amateur status of the state legislatures. The average length of the session in 1981 was 170 days, and forty-three states had annual sessions. Between 1979 and 1981, no states changed their constitutions to extend their sessions. At the same time, the number of states in which more than half of the legislators consider themselves to be full-time has increased. Some examples of states that have a more full-time legislature include California, Illinois, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania and Wisconsin.

In 1981, many states legislators were still sharing office space, but the ratio had improved to an average of .65 per member. The number of legislative staff had increased to 2.3. The budget in constant dollars increased 25% between 1974 and 1981. The number of automatic data processing techniques had increased by 69%, between 1974 and 1981. These changes improved the position of the legislative branch relative to the executive branch. The

executive branch also came under more scrutiny through the development of administrative oversight.

Results of the Regression Analysis for 1981

Prior to running the regression analyses, a check was done for multicollinearity. In the 1981 data, the multicollinearity between budgets and staff was more severe than in the 1974. It had risen to a level of ninety-two percent. Again this caused the sign of the staff partial coefficient to be negative when entered into the regression with budget and positive when the budget variable was excluded. Therefore it was deleted from the 1981 regression analysis.

The regression model for 1981 location of decision-making with sessions, budgets and adp was significant at the .02 level. Of the three cross-sectional analyses, this model generated the statistically strongest results. This finding also appears to be substantively reasonable, because the level of the information variables had risen substantially, which would be a necessary although not sufficient reason for them to have a stronger impact on the location of decision-making.

Since 1964 states have been increasing their legislative resources. Because these resources were quite low in 1964, it is not too surprising that the relationship expressed by the model was not strongly supported at that

time. The results in 1981 mean that most of the states with high levels in information technology also were more centralized. This relationship supports the centralization model, and also indicates that it is increasing over time. (Table 9)

Sessions in 1981

Session length for the regression equation in 1981, had a mean elasticity of 14%.(Table 9) This indicates that a one percent increase in sessions would produce a 14% increase in centralization of decision-making. The partial correlation coefficient was .034 with a significance level of .063, which is quite close to the acceptance level of .05. Table 10 demonstrates that in 1981 most of the states have sessions longer than 133 days. This can be compared with Table 2, which shows that most of the states had sessions considerably shorter than 133 days.

Budgets in 1981

Using the elasticity mean, a one percent increase in the budget could be interpreted to predict an eight percent increase in centralized decision-making. The partial correlation coefficient was .049 and had a somewhat improved level of significance (relative to previous years) of .175. However, this indicates that budgets can not be shown to strongly predict centralization, but there is a positive relationship between them. (Table 11)

TABLE 9

1981 REGRESSION RESULTS OF LOCATION OF LEGISLATIVE DECISION-MAKING WITH SESSION LENGTH, BUDGETS FOR THE LEGISLATIVE BRANCH AND AUTOMATIC DATA PROCESSING APPLICATIONS

DEPENDENT VARIABLE: LOCATION OF LEGISLATIVE DECISION-MAKING

INDEPENDENT VARIABLES	MEAN	STANDARD DEVIATION	PARTIAL CORRELATION COEFFICIENT	SIGNIFICANCE	ELASTICITY
SESSION	170.9200	103.8385	.034	.063	.142
BUDGET	46.6328	52.2527	.049	.175	.056
ADP	9.8600	5.0669	.155	.628	.038
R SQUARE	.2003				
F STATISTIC	3.8410				
SIGNIFICANCE	.0160				

Source: Author's calculations using Francis 1985, Council of State Governments 1981, Bureau of Census 1981.

TABLE 10

1981 DECISION-MAKING WITH LEGISLATIVE SESSION LENGTH

	SESSION LENGTH 1	80	133	384
DE-CENTRAL-IZED DECISION-MAKING	VIRGINIA WYOMING	IDAHO MISSISSIPPI	MISSOURI NEBRASKA NEVADA OREGON SOUTH CAROLINA TEXAS	
31	ARKANSAS NEW MEXICO UTAH WEST VIRGINIA	GEORGIA KANSAS LOUISIANA MARYLAND MONTANA NEW HAMPSHIRE NORTH CAROLINA NORTH DAKOTA VERMONT WASHINGTON	ALABAMA CONNECTICUT COLORADO FLORIDA MAINE MASSACHUSETTS TENNESSEE	
46	SOUTH DAKOTA	HAWAII INDIANA IOWA KENTUCKY MINNESOTA	ALASKA ARIZONA CALIFORNIA DELAWARE ILLINOIS MICHIGAN NEW JERSEY NEW YORK OHIO OKLAHOMA PENNSYLVANIA RHODE ISLAND WISCONSIN	
CENTRAL-IZED DECISION-MAKING				
86				

CROSSTABULATION STATISTICS: CHI SQ. 6.24
SIG. .18
GAMMA .26

Source: Author's calculations using Francis 1985, and Council of State Governments 1981.

TABLE 11

1981 DECISION-MAKING WITH LEGISLATIVE BRANCH BUDGETS

BUDGETS IN CONSTANT DOLLARS

	1	12.5	30	320
DE-CENTRAL-IZED DECISION-MAKING	1	IDAHO WYOMING	MISSOURI MISSISSIPPI	NEBRASKA NEVADA OREGON SOUTH CAROLINA TEXAS VIRGINIA
	31	MAINE NEW HAMPSHIRE VERMONT	ALABAMA ARKANSAS CONNECTICUT GEORGIA KANSAS MARYLAND MONTANA NEW MEXICO NORTH CAROLINA NORTH DAKOTA TENNESSEE UTAH WEST VIRGINIA	COLORADO FLORIDA LOUISIANA MASSACHUSETTS WASHINGTON
CENTRAL-IZED DECISION-MAKING	46	SOUTH DAKOTA	DELAWARE IOWA KENTUCKY RHODE ISLAND	ALASKA ARIZONA CALIFORNIA HAWAII ILLINOIS INDIANA MICHIGAN MINNESOTA NEW JERSEY NEW YORK OHIO OKLAHOMA PENNSYLVANIA WISCONSIN
	86			

CROSSTABUALTION STATISTICS: CHI SQ. 12.00
SIG. .02

Source: Author's calculations using Francis 1985 and Bureau of Census 1981.

Automatic Data Processing

The levels of automatic data processing in 1981, in the majority of states increased significantly from an average of 5.8 applications in 1974 to an average of 9.9 in 1981. (Table 12) States continued to increase their data base systems of bill status, statutory retrieval, legislative library catalogues, however they also began to expand their analytical applications to including budget and revenue forcasting, revenue analysis, and budget effects on legislation increased.

In the 1981 regression equation, adp had an elasticity of four percent, and a correlation coefficient of .155 with a significance level of .628. This finding supports the centralization hypothesis for 1981, but it is not statistically reliable.

In summary, the results of the cross-sectional analysis for 1964, 1974 and 1981 show a positive association between the centralized legislative decision-making and the length of sessions, the size of legislative budgets and number of adp applications. This finding means that the more decentralized states generally had lower levels of information technology, and the centralized states had higher levels. This is very useful information, because it indicates that information technology is associated with strong centralized legislative leadership. But, this analysis can not be used to predict whether this

TABLE 12

1981 DECISION-MAKING WITH AUTOMATIC DATA PROCESSING

		AUTOMATIC DATA PROCESSING	
	1	2	7.5 19
DE-CENTRALIZED DECISION-MAKING	1	IDAHO MISSOURI SOUTH CAROLINA	MISSISSIPPI NEBRASKA NEVADA OREGON TEXAS VIRGINIA WYOMING
	31	ALABAMA MAINE NEW HAMPSHIRE NEW MEXICO NORTH CAROLINA TENNESSEE VERMONT WEST VIRGINIA	ARKANSAS COLORADO CONNECTICUT FLORIDA GEORGIA KANSAS LOUISIANA MARYLAND MASSACHUSETTS MONTANA NORTH DAKOTA UTAH WASHINGTON
CENTRALIZED DECISION-MAKING	46	ARIZONA DELAWARE HAWAII OKLAHOMA	ALASKA CALIFORNIA IOWA ILLINOIS INDIANA KENTUCKY MICHIGAN MINNESOTA NEW JERSEY NEW YORK OHIO PENNSYLVANIA RHODE ISLAND SOUTH DAKOTA WISCONSIN
	86		
		CROSSTABULATION STATISTICS:	CHI SQ. 3.05 SIG. .55 GAMMA .22

Source: Author's calculations using Francis 1985 and Council of State Governments 1981.

relationship will increase or decrease over time. In order to study dynamic changese a time series analysis will be conducted. In this analysis the relationship between the previously location of decision-making and the current effects of information technology on the current location of decision-making in the legislature, will be examined using a lagged time series analysis.

Reinforcement Analysis

The results presented above using the cross-sectional analyses demonstrated a positive association between higher levels of information technology and more centralized decision-making. This leads to the question of how the states have changed within this eighteen year time period. The reinforcement theory says that the previous level of decision-making will have an interactive effect on the information variables in a later time period. The level of centralization or decentralization in 1964 will determine the effect of the information technology variables on the location of decision-making in 1981.

The results of the reinforcement hypothesis will be interpreted in the following way. If the correlation coefficients of the previously decentralized states are negative then the reinforcement hypothesis will be accepted. If the correlation coefficients of the previously centralized states are positive, then again the reinforcement hypothesis can be accepted. The test of the significant difference between the two groups will be the significance statistic for the slope dummies.

First, the interaction terms should be considered. They indicate whether the two groups of states are significantly different from each other. The results indicate that the previously centralized and decentralized

state legislatures were significantly different from each other. The significance of sessions was .063, and of budgets, .069 and for automatic data processing it was .166. This means that the differences between the two groups had those levels of significance.

Table 13 includes the statistics for the 1981 levels of decision-making with the interactive slope dummies for the levels of decision-making in 1964. The results demonstrate that for the previously centralized legislatures, the partial correlation coefficients are positive. This means that use of information technology in 1981, in the state legislatures that were centralized in 1964, had a positive or reinforcing effect on the level of centralization in 1981.

Information technology was measured as session lengths, legislative budgets and automatic data processing. The correlation coefficient for session length in the previously centralized states was .04, and it had a significance level of .036. This variable does not have a large impact on current levels of centralization, but it does have a statistically significant effect. The correlation coefficient for budgets of previously centralized states was .034 with a significance level of .262. This variable had a small impact that was not statistically significant. The automatic data processing correlation coefficient was 0.3, and it had a very weak

TABLE 13

1981 REGRESSION RESULTS OF LOCATION OF LEGISLATIVE DECISION-MAKING WITH LAGGED INTERACTIVE BINARY DUMMY VARIABLES FOR LEVELS OF LEGISLATIVE DECISION-MAKING IN 1964 AND SESSION LENGTH, BUDGETS FOR THE LEGISLATIVE BRANCH, AND AUTOMATIC DATA PROCESSING APPLICATIONS IN 1981

DEPENDENT VARIABLE: LOCATION OF LEGISLATIVE DECISION-MAKING IN 1981

INDEPENDENT VARIABLES	SESSION FOR DECENTRALIZED STATES IN 1964	BUDGET FOR DECENTRALIZED STATES IN 1964	ADP FOR DECENTRALIZED STATES IN 1964
CORRELATION COEFFICIENT	-.Ø16	-.18Ø	.693
STD. ERROR	.Ø26	.112	.396
SIGNIFICANCE	.559	.115	.Ø88
	SESSION FOR CENTRALIZED STATES IN 1964	BUDGET FOR CENTRALIZED STATES IN 1964	ADP FOR CENTRALIZED STATES IN 1964
CORRELATION COEFFICIENT	.Ø4Ø	.Ø38	.Ø31
STD. ERROR	.Ø18	.Ø34	.375
SIGNIFICANCE	.Ø36	.262	.935
INTERACTION SIG.	.Ø63	.Ø69	.166
R SQUARE	.432	F 5.45Ø	SIG. .ØØØ3
DURBIN-WATSON	.82Ø		

Source: Author's calculations using Francis 1967, 1985, Council of State Governments, 1964, 1981, Bureau of Census, 1981.

level of significance of .935. This means that all of the information technology variables had a positive or reinforcing effect on decision-making in 1981 for states that were centralized in 1964. But this reinforcement was statistically quite weak.

In the previously decentralized states, the effect of the interaction on the current levels of decentralization was negative. For the decentralized states a negative correlation coefficient means that information technology is reinforcing the decentralized decision-making. Session lengths in previously decentralized legislatures had a negative value of -.016 and a significance level of .559. This means that longer session are related to more decentralized decision-making in previously decentralized states, except that it is not a statistically significant relationship.

Budgets for previously decentralized legislatures had a negative correlation coefficient of -.18 and a significance level of .112. This also supports the reinforcement hypothesis, but not very strongly.

The most interesting result in this table is the effect of automatic data processing on location of decision-making in previously decentralized states. It does not have a negative value, but a positive one of .693, and a level of significance of .088. This means that adp in previously

decentralized states has a centralizing effect on decision-making.

This finding is important because it means that automatic data processing having a different effect on previously decentralized states, it is making them more centralized. In understanding why adp has a centralizing effect, while the other information variables in the previously decentralized states do not it is helpful to take a closer look at automatic data processing in the state legislatures.

In order to see the differences in the centralized and decentralized states in 1981 with the previous levels of centralization and decentralization, Table 14 was constructed. It shows the four groups of states as well as their average session lengths, budgets and adp applications. The most noteworthy cell is the one that includes the states that were decentralized in 1964 and became centralized in 1981. Those states had more adp applications than any other group. This is especially interesting because they did not have the highest average budgets. They did not just have more adp applications because they were the wealthiest states, but because that is how they chose to spend that part of their legislative budgets.

These data are also informative, because they show that those states that were centralized in 1964 and became decentralized in 1981 had the shortest sessions, the smallest budgets, and the fewest adp applications. The largest group of states were those that were centralized in 1964 and in 1981. They have the most professional legislatures, with the longest sessions. They also have the largest budgets however they have the second largest number of adp applications, behind those states that became centralized in 1981. This group of states represents the reinforcement theory for the centralized states. Finally, the states that were decentralized in 1964 and remained decentralized are in the upper left corner of the table. These decentralized states represent the reinforcement theory for the decentralized states. They have longer sessions and larger budgets than the states that became centralized, but they do not have more adp applications.

Is adp really responsible for making Iowa, Kansas, Minnesota, North Carolina, North Dakota, Oklahoma, South Dakota and Washington more centralized in their legislative decision-making? One way to answer this question is to try to get a picture of how adp is used in these state legislatures compared with how it is used in the other groups of states.

In a study by S. Blair Kauffman (1983), he examined policies concerning access to state legislative information

systems. He published a descriptive table of the access policies. The most restrictive type of access policy in his table would only allow access to the legislature. The next level of access is used for those states that allow legislative access as well as state agency use. The third level includes legislative access, state agency and others. The others include anyone for a fee, public terminals in the capitol, anyone with compatible equipment, and municipal governments. Table 15 is a presentation of the state by state access policies using the centralization-decentralization framework from Table 14.

This information is more useful when it is summarized. Table 16 presents summaries for each group of states and column summaries for the decentralized and centralized states in 1981. In examining these data, I will first consider those states that became centralized in 1981 (in the upper right cell). They restricted their use of adp to the legislature only in 63% of the states. This is more restrictive than either group of the currently decentralized states (53% and 38%). The other group of currently centralized states (in the lower right cell) is the only one that had a larger percentage of states that were as restrictive as those states that became centralized (78%).

These data verify the findings of the reinforcement analysis in two ways. First, it provides evidence that the classification of the centralized and decentralized state legislatures that were generated by Wayne Francis in 1964 and 1981 are evident in legislative policies involving information management in the legislatures. By that, I mean that the decentralized states shared their legislative information with more groups of people both within and outside of the legislature. This is what it means to be decentralized, that decision-making is not concentrated in a few positions, or individuals, but spread around a larger number. This can be seen in the column totals for the decentralized states in 1981. Forty-three percent of that group limited access to the legislature only, while the remaining fifty-seven percent shared information with outside groups. This can be contrasted with the centralized states in 1981. Seventy-three percent limited access to the legislature only, while the remaining twenty-seven percent shared legislative information generated by adp with outside groups.

This is an unusual finding from a technological perspective. By that I mean that those states with the largest budgets, could actually afford to have more terminals available to the public in the capitol, or in public libraries. They could also develop more sophisticated data sharing systems with local and federal

TABLE 14

1964 LEGISLATIVE DECISION-MAKING WITH 1981 DECISION-MAKING IN STATE LEGISLATURES AND AVERAGE LEVELS OF SESSIONS, BUDGETS AND AUTOMATIC DATA PROCESSING

	1981 DECENTRALIZED DECISION-MAKING	1981 CENTRALIZED DECISION-MAKING
1964 DECENTRALIZED DECISION-MAKING	COLORADO FLORIDA IDAHO MISSISSIPPI MISSOURI MONTANA NEBRASKA NEVADA NEW HAMPSHIRE NEW MEXICO OREGON SOUTH CAROLINA TEXAS VERMONT WYOMING SESSION 146.2 BUDGET 32.2 ADP 9.7	IOWA KANSAS MINNESOTA NORTH CAROLINA NORTH DAKOTA OKLAHOMA SOUTH DAKOTA WASHINGTON SESSION 116.8 BUDGET 30.2 ADP 12.8
1964 CENTRALIZED DECISION-MAKING	ALABAMA ARKANSAS GEORGIA LOUISIANA MAINE MARYLAND MASSACHUSETTS UTAH VIRGINIA SESSION 112.8 BUDGET 26.2 ADP 5.6	ALASKA ARIZONA CALIFORNIA CONNECTICUT DELAWARE HAWAII ILLINOIS INDIANA KENTUCKY MICHIGAN NEW JERSEY NEW YORK OHIO PENNSYLVANIA RHODE ISLAND TENNESSEE WEST VIRGINIA WISCONSIN SESSION 240.4 BUDGET 73.4 ADP 9.9

Source: Author's calculations using Francis 1967, 1985 Council of State Governments 1981, & Bureau of Census 1981

TABLE 15

1964 LOCATION OF LEGISLATIVE DECISION-MAKING WITH 1981 DECISION-MAKING AND LEGISLATURES' AUTOMATED INFORMATION SYSTEMS DIRECT ACCESS POLICIES*

	1981 DECENTRALIZED STATES AND LEGISLATIVE ACCESS	1981 CENTRALIZED STATES AND LEGISLATIVE ACCESS
1964 DECENTRALIZED DECISION-MAKING	CO LEGISLATURE ONLY FL ANYONE FOR FEE ID LEGISLATURE ONLY MS STATE AGENCIES MO STATE AGENCIES, PUBLIC TERMINALS IN CAPITOL MT STATE AGENCIES AND MUNICIPAL GOVERNMENTS NE STATE AGENCIES NV LEGISLATURE ONLY NH STATE AGENCIES NM LEGISLATURE ONLY OR ANYONE FOR FEE SC LEGISLATURE ONLY TX LEGISLATURE ONLY VT LEGISLATURE ONLY WY LEGISLATURE ONLY	IA LEGISLATURE ONLY KS ANYONE FOR FEE MN LEGISLATURE ONLY NC LEGISLATURE ONLY ND ANYONE WITH COMPATIBLE EQUIPMENT OK LEGISLATURE ONLY SD LEGISLATURE ONLY WA LIMITED ACCESS FOR STATE AGENCIES
1964 CENTRALIZED DECISION-MAKING	AL LEGISLATURE ONLY AR MISSING DATA GA STATE AGENCIES LA ANYONE FOR FEE ME ONE PUBLIC TERMINAL IN CAPITOL MD LEGISLATURE ONLY MA LEGISLATURE ONLY UT ANYONE FOR FEE VA ANYONE WITH COMPATIBLE EQUIPMENT	AK ANYONE WITH STATE APPROVAL AZ LEGISLATURE ONLY CA LEGISLATURE ONLY CT LEGISLATURE ONLY DE LEGISLATURE ONLY HI STATE AGENCIES IL LIMITED ACCESS FOR STATE AGENCIES IN LEGISLATURE ONLY KY LEGISLATURE ONLY MI LEGISLATURE ONLY NJ LEGISLATURE ONLY NY ANYONE FOR FEE OH LEGISLATURE ONLY PA LEGISLATURE ONLY RI LEGISLATURE ONLY TN LEGISLATURE ONLY WV LEGISLATURE ONLY WI LEGISLATURE ONLY

Source: Author's calculations using Francis 1967, 1985 and Kauffman 1983.

TABLE 16

1964 LOCATION OF LEGISLATIVE DECISION-MAKING WITH 1981 DECISION-MAKING AND AVERAGES OF LEGISLATURES' AUTOMATED INFORMATION SYSTEMS DIRECT ACCESS POLICIES*

	1981 DECENTRALIZED STATES AND LEGISLATIVE ACCESS		1981 CENTRALIZED STATES AND LEGISLATIVE ACCESS	
1964 DECENTRALIZED	LEGISLATURE ONLY	53%	LEGISLATURE ONLY	63%
	STATE AGENCIES	33%	STATE AGENCIES	12%
	ANYONE FOR FEE	13%	ANYONE FOR FEE	12%
	ANYONE WITH COMPATIBLE EQUIPMENT	Ø%	ANYONE WITH COMPATIBLE EQUIPMENT	12%
1964 CENTRALIZED	LEGISLATURE ONLY	38%	LEGISLATURE ONLY	78%
	STATE AGENCIES	12%	STATE AGENCIES	11%
	ANYONE FOR FEE	25%	ANYONE FOR FEE	6%
	ANYONE WITH COMPATIBLE EQUIPMENT	12%	ANYONE WITH COMPATIBLE EQUIPMENT	Ø
	TERMINAL IN CAPITOL	12%	ANYONE WITH STATE APPROVAL	6%
	LEGISLATURE ONLY	43%	LEGISLATURE ONLY	73%
	STATE AGENCIES	26%	STATE AGENCIES	12%
	ANYONE FOR FEE	17%	ANYONE FOR FEE	8%
	ANYONE WITH COMPATIBLE EQUIPMENT	4%	ANYONE WITH COMPATIBLE EQUIPMENT	4%
	TERMINAL IN CAPITOL	4%	ANYONE WITH STATE APPROVAL	1%

Source: Author's calculations using Francis 1967, 1985 and Kauffman 1983.

government. Instead, the states with the lowest legislative budgets actually had the most decentralized policies. In some of the states with smaller budgets, adp access is shared, because they are provided with their system by the executive branch. In this sense they are forced to share. But this is not true for all the decentralized legislatures. Florida is one of the most developed of this group and they have their own in-house system. Their access policy is open because they adopted that policy.

Summary

In this chapter the statistical methods were explained and the statistical results were interpreted. The centralization and decentralization models were tested using cross-sectional data for the three time periods. A regression analysis was used to determine the relationship between the level of information technology in state legislatures and the location of decision-making. In 1964 there was a weak positive relationship between states with longer legislative sessions, larger budgets and more adp and more centralized decision-making. This finding supports the centralization hypothesis, however it was not very statistically significant. In 1974 the relationship was also positive, but it had a very low level of significance.

The cross-sectional results for 1981, also supported the centralization hypothesis and were significant at the .Ø2 level. This stronger relationship indicates that the increased presence of information technology in state legislatures was related to more centralized decision-making in state legislatures.

In order to test the reinforcement theory, a time series analysis was conducted. The reinforcement theory says the previous location of decision-making will determine the effect of the information variables on the location of decision making in later time periods. The results of the test of this model support the reinforcement theory for legislative sessions and budgets. Those variables cause more centralization in previously centralized states and more decentralization in previously decentralized states. However, the most interesting finding of the reinforcement analysis, was that automatic data processing caused more centralization in previously decentralized states. This finding was confirmed by a comparison of the adp applications. Those states that became centralized also had the largest number of adp applications. This was further confirmed by an examination of the legislative adp access policies. The centralized states had the most restrictive access policies and the decentralized states were much less restrictive.

CHAPTER V

CONCLUSIONS AND FUTURE RESEARCH

Conclusions

Any research project must begin and end with consideration of the theory. The researcher must consider what insights to the theoretical explanation were gained by examination of the empirical evidence. In this study organization theory is used to examine the relationship between state legislatures and some key features of their informational structure. Organizations are structured so that various parts carry out various tasks. Centralization and decentralization in organizations are used to identify the location of decision-making in legislatures. Centralized decision-making can be seen in legislatures where there are strong leaders. In those legislatures, the leadership exercises control through assignment of bills to committees, assignment of committee chair and membership positions, and control over organizational resources (staff, budgets, office space, and automatic data processing services). In decentralized legislatures decision-making is more dispersed. Some examples of characteristics of decentralized decision-making include automatic rotation in leadership positions and powerful

committee and subcommittee chairs with control over legislative resource allocation.

The states that became more decentralized were primarily Southern. These state legislatures are characterized as having a high membership turnover, which in turn can make it more difficult for the leadership to establish a long history of favors and a firm basis for support. This is one of the reasons Southern legislatures are said to have weak leadership. The leadership also has declined in its power to appoint members to chair committees and in some cases to assign bills to various committees. The power of the governors in that region has declined. For example, in Tennessee the governor used to appoint the legislative leadership, but not anymore. Other governors have lost their power to appoint members to committees in the legislature.

Alternately, the governors of more urban, more complex states have relatively more formal powers. (See tables based on Schlesinger's index of governor's powers in Politics of the American States, 1965, 1976 and 1983) New York, Illinois, California, Pennsylvania, New Jersey are rated as states which have more powerful governors. The membership turnover in the legislature is lower, as more of the legislators consider themselves full-time legislators. The legislative leadership in states such as Michigan is noted for its strong position. (Patterson, 1983)

Partisan politics also appears to be playing a role in the relative positions of the states. In the Southern legislatures parties are considered to be weak in terms of decision-making, because the legislatures tend to be one party (Democratic) organizations. In the more centralized states partisan politics has been becoming more important. Minnesota is an example of a state legislature which has shifted for non-partisan to partisan and from decentralized to centralized.

As a single organization, legislatures probably face as many different types of decisions and problems as any other organization. Because of this complexity of decision-making, legislatures are interested in organizational changes that would make this load more manageable. Increasing the organizational resources has been seen as one way to help legislators manage their decisions. When an organization has a large number of decisions to make it can simplify the process by centralizing the decision-making and follow the leadership, or it can simplify the decision-making by dividing the decisions into small groups (committees) and then follow the recommendations of the committees. This is the basis for the theoretical arguments that increased information technology in organizations can according to some scholars centralize decision-making in organizations and according to others decentralize it.

The development of the committee and subcommittee system has been linked in numerous works to the increased complexity and work load of legislators. The implication is that increases in information handling capabilities are associated with the use of legislative committees as centers of decision-making. That is certainly a plausible development, but is that what has happened in the state legislatures? Or has the increase in session lengths, budgets, and automatic data processing had a centralizing impact on the legislative decision-making? The centralization theory says that legislatures with higher levels of information technology will have more centralized decision-making. Rosenthal found this to be true of his comparative study of legislative staffs. He notes that in Wisconsin, a legislature with a large professional staff, the staff strengthen the power of the leadership.

During the eighteen years covered by this study, state legislatures have greatly expanded their organizational resources. Legislative sessions have lengthened from an average of 100 days per year in 1964 to 170 days in 1981, an increase of 70%. Budgets have increased an average of 220%. Staff has increased from primarily part-time secretarial and clerical personnel, who were employed only for the sessions to an average of 2.3 staff in 1981 for every legislator. Automatic data processing had a dramatic increase over this time period. The average number of

applications in 1964 was .82. In 1981 adp was 9.86, an increase of 11Ø2%. This was the fastest growing information resource used by state legislatures between 1964 and 1981.

The statistical tests for the centralization and decentralization models were cross-sectional regression analyses, with location of decision-making as the dependent variable and measures of legislative information technology as the independent variables. The statistical test for the reinforcement model used interactive slope dummy variables to measure whether the previous location of decision-making caused the information technology in later years to reinforce the current type of decision-making.

Using the cross-sectional data for the years 1964, 1974 and 1981 the results of the regression analysis for all three time periods support the centralization theory, that state legislatures with longer sessions, larger budgets, and more automatic data processing have more centralized decision-making. Examples of states with the highest levels of information resources and centralized decision-making are California, Illinois, New Jersey, New York, Ohio, Pennsylvania and Wisconsin. The centralization theory was also supported by those states that had low levels of information technology and more decentralized decision-making. This group of states included Alabama,

Arkansas, Idaho, Maine, Mississippi, New Mexico, Virginia, West Virginia, Utah, and Wyoming.

The cross-sectional analysis did not support the decentralization theory. In each of the three years (1964, 1974 and 1981) the regression coefficients for the information variables were positive with the exception of automatic data processing in 1974. However, as discussed in chapter four the results for 1974 had a very low level of significance. Adp had a .87 level of significance, so it is more reasonable to rely on those results with higher levels of significance, which support the centralization theory.

The type of analysis summarized above is useful in creating a composite picture of the state legislatures at three different moments in time, but it can not accurately describe the changes between those time periods. It is necessary to be able to analyze changes over time in order to test the third theoretical model that as states legislatures increase their levels of information technology, they will reinforce their existing type of decision-making either centralized or decentralized.

Estimation of the interaction effect of the previous types of decision-making with the present levels of information technology can be accomplished using a lagged time series regression analysis. The results of this analysis demonstrate that session length, legislative

budgets and automatic data processing had different effects depending upon whether a state had previously been centralized or decentralized. States where the legislatures had previously been centralized the effect of session length, budgets and adp application on the current centralization (1981) of decision-making was positive. This was a weak positive relationship with a low level of significance. Sessions had the most significant coefficient with a value of .Ø34. This was followed by budgets with a significance level of .262 and adp with a low significance of .935.

In states where the legislature had previously been decentralized, increases in session length and budgets reinforced decentralized legislative decision-making. The significance level for these two variables was not high. Sessions in previously decentralized states had a significance level of .559, and budgets had a significance level of .115. These findings in conjunction with the results described above for the previously centralized states support the reinforcement hypothesis. This means that the previous location of decision-making caused the increases in sessions and budgets to reinforce that previous type of decision-making. States that had been centralized remained centralized and states that had been decentralized remained decentralized.

Automatic data processing was different in the previously decentralized states. For those states, the previous decentralized location of decision-making did not cause the increases in adp in 1981 to reinforce decentralization, but instead to become more centralized. This unusual finding is supported by the number of adp applications in those states that were decentralized in 1964 and became centralized in 1981. The had the highest average number of adp applications of any of the other groups of states.

The previously decentralized states that became centralized also had more restrictive access policies over the use of their automatic data processing. This was true as well for the other group of centralized states, but was not true for either group of decentralized states (those that were decentralized in both 1964 and 1981, and those that became decentralized in 1981).

The impact of adp on the previously decentralized states was similar to a finding by Dutton and Kraemer (1977). They state that "a technology controlled by and oriented to top management might be expected to serve their goals, such as greater efficiency, cost cutting, and centralized control of operations. However a technology controlled by and oriented to the operating departments might allow agency staff greater autonomy in exercising their professional judgments on how to best serve their

clients." In those states that became centralized, had tighter controls over access to legislative automatic data processing. This increased their centralization. Those states did not use adp to increase the power of committee and subcommittee decision-making, rather the leadership in those states benefited from increases in adp.

Another reason why adp had a centralizing effect on decision-making stems from the type of computers used in the state legislatures in 1981. Mainframe computer systems can more readily controlled by the legislative leadership than by individual legislatures, committees or combinations of various groups of legislators in conjunction with the legislative service bureaus. In 1981 the microcomputer revolution had not yet hit the state legislatures. microcomputers which are also called personal computers can more easily be controlled by individuals. Frantzich (1982) observed this type of individual control over computers in his study of congressional computer use. He discusses shifts in congressional power as a result computer innovation by individual members of congress. This same phenomena may be observed in state legislature in the near future. Then computer use may have a decentralizing effect on the location of legislative decision-making.

In conclusion, there is a relationship between levels of information technology and location of legislative decision-making. States with higher levels of information

technology tend to have more centralized decision-making, while states with lower levels have more decentralized decision-making. By dividing the state legislatures into centralized and decentralized groups it can be shown that in previously centralized legislatures, longer sessions, larger budgets and more adp reinforced centralization. In previously decentralized legislatures, longer sessions and larger budgets reinforced decentralized decision-making. But adp in previously decentralized states did not reinforce decentralization, rather it had a centralizing effect.

Future Research

In order to expand on the conclusion of this study, further research is necessary. I am currently in the process of collecting data and doing some preliminary analysis of the demands in the various states for increased information technology in their legislatures. The Council of State Governments has noted numerous times that states have the financial capacity to improve the levels of information technology in their state legislatures, and state government in general. (Book of the States:1982-83.) Are external demands placed on state legislatures part of the reason for the rate of increase of information technology?

In examining state levels of information technology there appears to be a connection between party competition in the states and levels of information technology. There may also be a connection between the party organizational strength with the levels of information technology. This connection might be characterized as a type of demand for information. Party organizations that can provide legislators with detailed information about saliency of issues to a legislators constituents may generate a desire among legislators to be able to produce and utilize that information on their own or in addition to the information provided by the parties.

Another demand for higher levels of information technology may be linked to the numbers of bills generated by various legislatures. There may be organizational expectations about the number of bills that will be considered in any given session. As the number of bills increases, the legislature's organizational capacity to is under demand to expand. Is there a lack of demand in states with lower levels of information technology? Operationalizing demands might include some measure of interest group interaction with state legislatures. It might also be related to the technical complexity of the state. One measure of technical complexity can be observed in the level of organizational development of the executive branch. State executive branches that are well staffed, have larger budgets and larger research and computer facilities may make greater demands on state legislatures. This demand may be translated in part, into better staffed, more technologically developed legislatures.

A second area of research inquiry that I would like to pursue from this initial study, involves the power relationship between the legislative branch and the executive branch in the various states. Legislatures are becoming more organized. They are using their resources to develop their own budget and fiscal analysis databases. They are more capable of conducting legislative oversight. States with high levels of legislative information

technology also have stronger legislative leaders and stronger governors. Do strong leaders set information management policies to enhance their leadership? Examination of the shifts of power or the reinforcement of power in these relationships is an interesting question.

By examining legislative organizations, I am saying that I believe that organizations make a difference. This is not a unique position, Riker (1980) makes this point and asks, "What are the outcomes of particular institutional arrangements?" Miller (1985) also raises this question in thinking about the impacts of the reform movement in city governments. Who benefits from institutional changes? In asking this question of state legislatures it would be necessary to consider the mechanisms used and the policies achieved by those institutional mechanisms. In future research, I would like to learn who benefits if legislatures develop more centralized arrangements of organizational information.

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