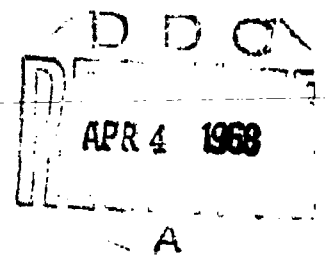


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Field studies as well as broad scale surveys are under way also in banking, light and heavy industry to study the effects of the computer and EDP on managerial and organizational behavior. An attempt is being made to gauge the impact of computers on organizational life in general and managerial behavior in particular.

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THE DECISION TO AUTOMATE THE SMALL COMMERCIAL
BANK: A BEHAVIORAL APPROACH TO THE ANALYSIS OF
DECISION MAKING PROCESSES

Avner M. Porat

April 2, 1968

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DISSERTATION

THE DECISION TO AUTOMATE THE SMALL COMMERCIAL BANK:
A BEHAVIORAL APPROACH TO THE ANALYSIS OF
DECISION MAKING PROCESSES

by

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Submitted to the Graduate School of Business of
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degree of Doctor of Philosophy

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ABSTRACT

THE DECISION TO AUTOMATE THE SMALL COMMERCIAL BANK
A BEHAVIORAL APPROACH TO THE ANALYSIS OF
DECISION MAKING PROCESSES

Avner M. Perat

University of Pittsburgh, 1968

The decision to automate the small commercial bank has to be approached from three different aspects:

1. The theory of decision making aspect, where some of the questions facing the researcher are: What are the elements in the decision? Who participates in the process and in what role? Can common features be discovered in the process among different organizations?
2. The computer aspect, where these questions arise: Why is there a need to consider automation and how does this need effect the decision process and the final decision?
3. The small bank aspect, where the following questions arise: How does a small organization deal with a decision leading to a major change which is outside the main stream of regular decisions made in such an organization? And what, if any, are the differences between large and small organizations in approaching the problem?

The purpose of this study is to examine, keeping two major goals in mind, the decision process involved in deciding to automate the small

commercial bank. The first goal is to develop a descriptive model which provides an outline of the process in a form which will make it possible to follow, understand, and analyze the phases in the decision. The second is to examine whether the principles of the behavioral theory of the firm, which were originally developed for the large organization dealing with repetitive decisions, apply also to a small organization facing a one-time decision.

The analyses are based on data collected in twenty-three small commercial banks, which were studied while they were in various stages of the decision process and in the process of applying various solutions to the questions facing them. The method employed in this investigation was based mainly on interviews in the field with the people involved in the process, supported by supplementary questionnaires and examination of written records. A flexible schedule covering the activity, subjects, participants and time dimensions of the process was used in the field interviews.

The results of the data collection and analysis are presented in three parts. The first includes data on the various phases of the process from the time the active decision process had begun through the decision period itself, and up to the completion of the first conversion or termination of the process. In this part, questions regarding the available alternatives, the elements effecting the decision makers, the roles of insiders and outsiders, and the effects of the way the decision was made are discussed in detail. Based on the data in the first part, the second part is used to develop the descriptive model which applies to the banks participating in the study. The final part makes use of the data to examine the applicability of the principles of the behavioral theory of the

firm, as described by Cyert and March, to the decision process in the small bank.

The study demonstrates that although each bank makes the given decision only once, the process is similar enough in its development to be summarized in a descriptive model. The model emphasizes the principles of a sequential approach to problems, limited search for arriving at the best decision, and unsystematic feasibility study leading to a decision.

Of the four major relational principles in the Cyert and March theory, only one was fully applicable to the process studied. This was the concept of problematic search which assumes a motivated search, which is both simple-minded and biased. The concepts of organizational learning and uncertainty avoidance had to be partially modified to be adjusted to the condition of the one-time decision. The concept of quasi-resolution of conflict had to be modified so that it could be adjusted to the special conditions of a small organization.

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I. INTRODUCTION

A. Statement of the Problem

Over the last 15 years the computer, or as it is often called, Electronic Data Processing (EDP), has established itself as an accepted tool for many organizations and an instrument effecting the organizational environment and members. One of the first questions an organization faces when it considers EDP services is how to approach the decision and what is involved in it. The present study concentrates on the process involved in deciding whether or not to acquire computer services in one segment of the business world, the small commercial bank. The subject is approached from three different aspects.

1. The Decision-Making Aspect.
2. The Computer Aspect.
3. The Small Bank Aspect.

These three supply the framework for the study, which is based on field research covering 23 small commercial banks that have recently made the decision to start using EDP.

1. The Decision Making Aspect

In the last twenty years there has been an enormous growth in decision-making literature. Researchers and writers have been concerned for several years with the question of how people and organizations make their decisions. This question was examined along with the question of how decisions should be made, and the results have been

several models of decision making which were incorporated into what is now called the behavioral theory of the firm.

With the availability of many theories and models of decision making, it is surprising how little has been done in testing those models and relating them to actual decision making in business organizations. In the few instances where simulations of decision models were actually tested, they usually were restricted to quantitative and repetitive decisions, and the economic considerations dominated the decisions.¹ A gap still to be closed in the area of research and writing on decision making includes the more complicated, less repetitive decisions. One example of such a decision is the process involved in the decision to introduce electronic data processing.

2. The Computer Aspect

Over the past fifteen years, computers and EDP equipment have become part of everyday business life. According to one source, in 1955 there were only 10-15 computers installed, while by the end of 1966 the total number had reached 28,500 worth \$7.8 billion. Projections to 1970 indicate that there will be 60,000 computers in use by that time, to be valued at \$18 billion. (Myers, 1967, p. 1)

As more computers are being introduced into the business world, an increasing amount of literature dealing with computers, their place in our world and their present and future impact on organizations and people, has been generated. The writings have come from people of diverse backgrounds and opinions and, due to

¹Several models and simulations are discussed in Cyert and March (1963), and Cohen and Cyert (1965).

their lack of experience with automation, have often been in the form of generalizations with little or no empirical evidence. Typically, the impact of automation has been considered in its broad economic and social dimensions, or in the form of "check lists" suggesting what to do with computers.² But with the increase of organizational experience with computers, research data are becoming available and should be utilized to provide meaningful insights into some of the many managerial aspects of the automation problems.

In the introduction of the computer to the business world, as is the case of many other changes, there have been disappointments as well as gains. This was recognized by George J. Brabb and Earl B. Hutchins (1963):

The revolution now in progress, like all revolutions, is not progressing smoothly and without problems. There have been reports of disappointment and disillusionment and even, in some instances, of withdrawal of computers. Such situations have more often been attributed to those who use and those who sell rather than to the equipment itself. (p. 33)

Often the problems develop at the early stage of the introduction of the computer and are a result of the way the decision to acquire the computer was made and of the conversion process used. In an article, "Seven Deadly Dangers of E.D.P.", L. R. Fiock (1962) raised this specific issue:

If businessmen were more knowledgeable about some of the dangers involved in setting up and evaluating an EDP installation, maybe they would be able to protect their

² Examples of early writings about the impact of computers can be found in the following volumes: Greenberger (1962), Wriston (1962), Jacobson and Rouchek (1959). A recent example where the emphasis is moved from theory to the use of empirical data appears in the volume edited by Myers (1967).

4

companies better from the waste of time and money...Just how you go about acquiring EDP equipment clearly plays a major role in the success you can expect to achieve. (p. 89)

A similar idea was emphasized several years ago in a study sponsored by the Controllers Institute Research Foundation (Conway, 1959)

If experience, both successful and unsuccessful, has shown anything in the last five years, it is that deciding what and how and where and when and even why to do something about electronic data processing are complex and important questions which must be correctly answered if the end result is to be looked back upon with the same relish as it was anticipated. It has also indicated that with the proper approach, care, and skill these answers can be obtained. (p. 20)

Although it is the first crucial step in the change toward automation, little has been published on what is involved in making the decision to automate. On the subject of computers, the majority of the publications have dealt only with the questions of equipment, management of EDP, quantitative techniques and the effects on the formal structure of the organization, rather than the decision to automate.

3. The Small Bank Aspect

Whenever research has been done in the area of computers and decision making, it has usually been confined to large organizations. Until recently the small business organization did not receive the appropriate amount of attention in the area of decision making. This has been true in spite of increasing evidence that the small business cannot afford to make wrong decisions or ignore areas of national trends and developments (Sanders, 1966, Ch. 1), including such major changes as the introduction of EDP systems into the business world.

Several years ago, G. Moller (1964) summarized it in the following way:

Management of small enterprises, as well as those of medium-sized ones, who aim not only at survival but at healthy

growth and development, cannot avoid their preoccupation with automation of the total operation, comprising physical and clerical processes and particularly management decision-making and control. To do this successfully, a complete re-orientation of management thinking will have to take place on a much, much larger scale than is perceivable, and perhaps even conceivable, today. (p. 50)

The situation of the small commercial bank with deposits of under \$50 million fits well the above description. Even though many bankers don't admit it yet the question facing them regarding automation is "When and how to automate?" rather than "Should we automate?"

B. Purpose of the Study and Basic Assumptions

The purpose of this study is to examine the behavioral aspects of the decision-making process in relatively small organizations involved in changing to EDP services. The particular type of organization examined is the small commercial bank in the United States. The main concern is to construct a descriptive model that will enable the reader to better understand the process and dimensions involved. This will be achieved through the development and examination of meaningful propositions relating to the various stages of the decision process, examination of the behavioral aspects of each stage in the process, and identification of the factors and persons influencing the decision process.

Once the descriptive decision-process model is suggested, the principles of a behavioral decision theory, as presented by Cyert and March in their book, A Behavioral Theory of the Firm, are applied in examining the model. Other decision theories and models are referred to as is deemed necessary. As the study progresses, the writer's research and observations are synthesized in a series of

propositions, or findings, relating to the decision process involving the decision to automate. Many of these propositions are advanced against the backdrop of assumptions arising from the behavioral theory of the firm. These propositions will be cited in appropriate places in the course of the study.

The major assumption made is that a non-repetitive decision such as the decision to automate in a small bank is a result of a process that can be defined and examined in a descriptive model.

The main hypotheses tested in this study are:

1. The process of the decision to automate is initiated by outside agents, such as computer salesmen, representatives of larger banks, etc., rather than people within the organization.
2. The decision to automate a small bank is triggered by operational pressures rather than policy planning.
3. The process initiated, the search and the choosing among alternatives are limited, rather than exhaustive.
4. The decision on automation represents a coalition solution effected by the goal conflicts of the various departments in the bank.
5. The process of decision making is guided by the principle of uncertainty avoidance and, therefore, innovative features in the solution selected will be minimized.
6. In the process of the decision and conversion planning, attention is focused on technical and economical aspects only. Little or no attention is given to socio-political aspects.

Hypotheses 3-5 are based on principles of the behavioral theory of the firm by Cyert and March and the relationship is further reviewed in Chapter II. The second and last hypothesis represents an effort to add new dimensions to the behavioral approach and will be discussed further in Chapter VIII.

C. The Design of the Thesis³

In Chapter II the need for a behavioral theory of the firm is described, and the principles of the Cyert and March theory, as they will be related to the analysis of the data, are reviewed. The second part of the chapter reviews the literature studying the decision to automate and outlines the major elements involved.

The purpose of Chapter III is to familiarize the reader with specific characteristics of the banking industry in general and with small commercial banks in particular. The chapter concludes by reviewing the rising need for automation in the banking industry and leads to the discussion of the decision process of the individual bank which is presented in Chapter V.

Chapter IV includes a brief description of the methodology used in the field study. The chapter reviews the methods of sample selection and data collection.

Chapter IV and V summarize the field data by reviewing the various stages the banks went through in the process of making their

³The format used in the thesis follows the guidelines set by the APA Publication Manual (1967 revised edition) and the procedures set forth in "Style and Format of Graduate Thesis, Dissertations and Abstracts." (University of Pittsburgh, 1966)

decisions. Following a presentation of data concerning the triggering cues, three phases are identified: the first is the initial search and definition of the question, and the second is the decision period itself including the collection and evaluation of information. In Chapter VI, the third phase - that of planning and executing the conversion to EDP is discussed, followed by data on management's post-evaluation of the change to EDP.

Based on the field results presented in the two previous chapters, a describable decision process model is outlined in Chapter VII.

The purpose of Chapter VIII is to bring together the behavioral concepts outlined in Chapter II, with the results of the field study (Chapters V and VI) and the describable model developed in Chapter VII. It includes a summary of the results organized according to the major elements considered. In the final section of the chapter the concepts of the Cyert and March theory are examined in light of the field results and the appropriate conclusions are drawn.

The final chapter in the thesis includes a discussion of the study's implications together with an outline for future research and the conclusions of the study.

II. BEHAVIORAL DECISION THEORIES

The purpose of this chapter is to summarize the main ideas in the relevant literature of decision making and change, and identify their importance in the decision to automate in an organization. The approach taken is to start with the general principles of decision theories and narrow the subject down to the specific decision to automate.

The first section discusses the development toward a behavioral approach to decision making, and the choice of the Cyert and March behavioral theory of the firm as a framework for the analysis. The main principles of the Cyert and March theory are reviewed in this section. The second section concentrates on the decision to introduce change. It reviews the elements involved in such a decision, and examines the available literature on the specific decision to introduce automation into the organization.

A. The Behavioral Approach to Decision Making

1. The movement toward a uniform theory

In the conventional theory of the firm, there was no attention given to, nor interest taken in, the actual process by which individual firms, or executives, reach their decisions. The assumptions of rationality in the theory were reduced to two propositions: a) Firms

seek to maximize profits, and b) Firms operate with perfect knowledge. (Cyert & March, 1963, p. 8) Up to the last 10-15 years, whenever the question of how a decision is made came up, the textbook answer would rely heavily on a "rational-comprehensive" approach where the decision maker molds all his behavior into an integrated pattern by:

- a. Viewing the behavior alternatives prior to the decision in a panoramic fashion.
- b. Considering the whole complex of consequences that would follow each choice.
- c. Singling out one from the whole set of alternatives with the system of values as the criterion. (Simon, 1957 p. 80)

In the last two decades many writers of organizational theory have questioned the practicality of the above approach and its usefulness in describing real decision processes in organizations. The new movement rested on a few simple propositions:

- a. Individuals do not attempt to maximize utility but seek to achieve alternatives that are "satisfactory." A satisfactory alternative is one that satisfies the "level of aspiration."
- b. The level of aspiration changes over time, going up when achievement goes up, coming down when achievement comes down. It adjusts upward faster than downward.
- c. If the individual sees an alternative that is satisfactory, he will not search very vigorously for additional alternatives.

This approach simplifies the whole process of decision making, reducing it to the principle of "marginal satisfaction of the decision", and

applying the principle of limited rationality to the process. This principle is also known as that of bounded rationality:

Behavior is rational within certain limits...By utilizing the principle of bounded rationality it is possible to explain why the perceivers, alternatives and the perceived consequences of each of these alternatives have the content they do rather than to take them as given...

The behavioral theory postulates that, because of the executives' limited capacity and the exceedingly complex world he faces in the organization, his decision making represents a somewhat incomplete process...

He has a subjective, simplified view of the decision situation that can be called his definition of the situation. The elements that make it up are the results of the psychological and sociological processes involving the executive. (Howard, 1963, pp. 23-24)

The drawback of the simplified approach to decision making is that it gives only a limited understanding of how and why a decision is made. This is especially true in complex situations for which we lack adequate knowledge of the processes that are involved in decision making. It became necessary to define certain characteristics of decisions, and based on those characteristics, to examine the process involved in making the decision. A set of five general factors has been formulated, within which numerous theories and approaches were developed dealing with the steps necessary in making a decision.

(See Appendix A) The five factors are:

1. The set of possible alternatives.
2. The set of behavior alternatives actually considered.
3. The set of possible outcomes.
4. The decision maker's pay-off function.
5. Information about the correspondence between the alternative course of action and the possible outcomes. (Cohen & Cyert, 1965, p. 324)

One way to examine a decision is to identify the above factors in the decision and review their impact on the process. Another way to look at a decision is to examine the approach taken by the decision maker in solving the problems he is facing. Several approaches are open to him. They include: relying on previously used methods and techniques to solve the problem; copying previously used solutions; or, viewing the decision as a new one requiring a systematic approach, considering the problem for its own merits, and following an organized procedure until a solution is discovered and accepted.¹

Up to this point, little has been said about what influences the decision and the decision maker or, using Drucker's (1967) words, "what 'makes' the decision." In the most simplified way, the decision maker wants to arrive at a "good" or "correct" decision. This should be done by relying on two parameters, the first being the GOALS he tries to accomplish and the second being the FACTS supplied in the information. But the minute we introduce normative concepts of "good" or "correct" decisions, we have to consider more than two parameters, and thus we move from the concept of fact to the concept of value or, as Simon (1957) puts it, "the decisions have an ethical as well as a factual content." (p. 46)

The search for a more complete understanding of the process will lead to the introduction of two more influences, in addition to goals:

¹For further discussion see Giuseppe di Roccaferrera (1964, p. 2-3)

1. The perceptions involved

2. The flow and network of communications (Howard 1963a, Ch. 3)

These two, when combined with facts, help to formulate the EXPECTATIONS which, in turn, together with the GOALS, result in a CHOICE procedure in response to a problem. In Cyert and March's behavioral decision theory, the three variables form the exhaustive variable categories which are one of the major organizing devices of the theory.

2. The Cyert and March Behavioral Theory

With the negligible amount of empirical data available on decision making in small organizations and, specifically, on the decision to automate, it was found necessary to rely on one major behavioral decision theory in the analysis of the decision to use automation in small banks. The Cyert and March (1963) theory was chosen for two reasons. The first is that the theory is one of the more complete ones and, at the same time, not too complicated to become impractical for use in field research. The second reason is that there is a challenge involved in applying it to the type of study presented here. It was initially applied to large complex organizations (Ch. 1), to quantitative types of decisions, and to repetitious decisions. At the same time the authors mention a wide range of other cases where the theory might apply pending further examination. The principles of the theory, which was developed originally as a descriptive one, but carried within it also normative suggestions will have to be modified to fit non-repetitive decisions and small organizations where many of the variables cannot be quantified.

In order to integrate the principles of the theory into the decision model described in Chapter VII, the two major organizing devices of the theory are summarized below. Each one will be examined in Chapter VIII in regard to its application to the decision process model outline in Chapter VII.

1. The Exhaustive Variable Categories²

a. Two sets of variables affecting the goals of an organization.

1. The set that influences the dimensions of the goals (what things are viewed as important). This depends on the composition of the organizational coalition, the organizational division of labor in decision making, and the definition of problems facing the organization.
2. The set influencing the aspiration level of any particular goal dimensions. This depends on the organization's past performance of other "comparable" organizations.

b. Two sets of variables affecting the organizational expectations.

1. The set influencing the process of drawing inferences.
2. The set influencing the process by which information is made available to the organization, particularly those affecting research activity within the firm.

c. Two sets of variables affecting organizational choice.

1. The set influencing the standard decision rules. This depends on the past experience of the organization and the past record of organizational slack.

²For further detail see Cyert and March, 1963, p. 115-116.

2. The set influencing the order in which alternatives are considered. This depends on the part of the organization in which the decision is being made and past experience in considering alternatives.

2. The Major Relational Concepts³

- a. Quasi-resolution of conflict which emphasizes:
 1. Goals are independent constraints imposed on the organization by the members of the organizational coalition.
 2. Local rationality dealing only with a limited set of problems and a limited set of goals.
 3. Acceptable-level decision rules, which require local optimization by a series of independent decision centers.
 4. Sequential attention to goals, which helps to resolve conflict among goals, in part, by attending to different goals at different times.
- b. Uncertainty avoidance which emphasizes:
 1. Feedback-react decision procedures, which assume each problem is solved only as it arises.
 2. Negotiated environment among firms aimed at eliminating uncertainty.
- c. Problemistic search, which assumes three things:
 1. The search is motivated and is problem-oriented.
 2. The search is simple-minded in the sense that it reflects simple concepts of causality.

³For further detail see Cyert and March, 1963, p. 116-125.

3. The search is biased and reflects: special training or experience, interaction of hopes and expectations, and communication biases reflecting unresolved conflict within the organization.
- d. Organizational learning, which emphasizes:
 1. Adaptation of goals as the function of: Previous goals, organizational experience with respect to the previous goals, and experience of comparable organizations with respect to the goal dimension in the past.
 2. Adaptation of attention rules by learning to scrutinize some criteria and ignore others and by learning to devote attention to some parts of their comparative environment and neglect other parts.
 3. Adaptation of search rules based on learning experience and changing environment.

B. The Decision to Change

1. The elements involved

This study is concerned with one type of decision only - the decision to introduce change in the small bank through the introduction of automation. Using Simon's (1965, p. 62) classification of decisions, this decision can be viewed as a one-shot, ill-structured, policy decision. But it involves more than that. The introduction of the computer is a major change in any organization and should be viewed as such.

When managers speak about change, they usually refer to it as a decision to improve, and as Leo Moore (1958) stated: "Managers flatly state that they are 'for' improvement. They go on to show why by enumerating such reasons as competition, growth, progress, survival and such personal considerations as advancement, development and prestige." (p. 75) Moore continues by stating three main requirements for implementing change or improvement.

1. All managers must first be concerned with developing and maintaining a philosophy of improvement centering around the problem of attitude in managers and their people.
2. Every manager must then use a procedure designed to implement the improvement attitude and philosophy in everyday practice.
3. The final step in the process is the establishment of an improvement program, which should be designed around communication and motivation and be aimed at the accomplishment of agreed-on objectives. (p. 80)

Following this approach it is necessary to bring together the economic and social elements when a behavioral model is examined. In the present study, three groups of elements influencing the decision maker are examined and their impact on the decision process is evaluated in Chapter VIII:

The Technological Elements

The Economic Elements

The Organizational Elements

The persons responsible for the decision to automate in a small bank are assumed to have very little or no technological knowledge with respect to automation. They have to rely almost totally on the information supplied by the seller of the equipment or the service, and must depend on the latter to explain to them the technical aspects involved. Therefore, until they learn more, they take for granted the technical information furnished to them.

The economic element usually receives the most attention from the decision makers. Until recently it also used to be one of the more important "sales pitches" of the computer salesmen. This became evident when we interviewed bankers who made their decisions to automate 3 - 5 years ago. Since then, many computer salesmen have shifted much of their sales efforts from the argument that cost-saving is the primary advantage of automation to that of it being only one of several benefits. To the small banker, the immediate cost involved is still an important issue and he wants to know how much it will cost him in start-up cost and, afterwards, in operational costs. The economic cost involved in the automation of the bank can vary significantly, depending on the type of automation achieved and its role in the bank; but when a bank considers automation, the decision cannot be based only on dollars and cents figures.

The organizational elements can be broken down into two major groups: social and political. The bank is a social system where the employees spend a considerable part of their day and, the job provides them with a degree of security within the system. An important change, such as the introduction of automation, might therefore have considerable effect on their morale, dedication to their work and the organization and, in turn, their efficiency on the job.

Every organization is also a political system where the power is distributed among members according to their level in the organization, location in the structure, status, leadership qualities, and their relationship with others in the organization. A small bank might not have the formalities of a large organization, but the power structure exists none the less. The introduction of computers requires new types of knowledge, changes in the communication patterns and, often, re-allocation of the power structure.

2. Studying the Decision to Automate

Several years ago, Mann and Williams (1960) observed that the changeover to electronic data processing is different from other types of change such as model conversion in an automobile plant, turn-around in an oil refinery, or the starting up of a new plant. There can be no stock-piling before suspending operations; there is little or no opportunity to make trial runs of new systems without the continual maintenance of the older system. (p. 221) Therefore, they suggest that it might be useful to identify seven different phases in the sequence of a change-over to EDP; 1) relative stability and equilibrium before the change, 2) preliminary planning, 3) detailed preparation, 4) installation and testing, 5) conversion, 6) stabilization and 7) new equilibrium after the change. (p. 221-222)

For each of the above phases, the decision maker has to be prepared to face the social, economic and technical problems involved; otherwise, he faces the same danger pointed out almost a decade ago. "Where, as has frequently happened, the resulting work organization has failed to satisfy the social and psychological needs of its

members, their attitudes or task performance have inhibited the full realization of technological potential and lowered productivity."

(Rice, 1958, p. 4)

On the specific subject of the decision to automate, at least two direct studies have been made. The first was directed by Ernest Dale (1964) in the early sixties. The study covered 32 companies, three of which were banks. All of them were chosen because of their leadership in size, profits, progressive attitude and the author's familiarity with their industries. His main hypothesis was that, due to the large investment involved, the consideration of computer use may be treated as a possible area of systematic decision making. The study emphasizes the reasons for going on computers and the outcomes of the conversion, and concludes that "the process of deciding on the investment in a computer is becoming highly rational from both an economic and a technical point of view, at least when compared to many other business decisions." (Dale, 1964, p. 14) Several limitations of Dale's study reduce its usefulness for comparison to the present study. In the first place Dale's study concentrates only on large firms which utilize system groups within the organization to investigate and promote the computer. The situation varies significantly in the small bank which lacks this type of group. The study also pays little attention to the specific process of making the decision, and to the forces and factors active in the decision process.

A second study aimed directly at the decision to automate was sponsored by the United States Department of Labor-Management Administration (1966) and was conducted by a team of researchers in the

Stanford Research Institute, California, during late 1963 and early 1964. This study covered seven companies, two of them large banks, and had two major objectives:

1. To determine what factors influenced managerial decisions to automate in selected cases; and
2. To compare the expectations and effects of automation in the selected cases, particularly as they affect the work force. (p. 1)

As in the previous study mentioned, the subjects studied were large companies, and the results have only a limited application for small companies.

Both studies emphasize the economic and technological issues, and little or no attention was given to the social and political issues involved. The research methods in both studies consisted of interviews and examinations of written records, which were supplemented in the second study by written questionnaires.

In two recently published studies the issue of the decision to automate received special coverage. The first one by Mohammed Hamid was mainly concerned with price and output decisions in the computer industry, but did devote one chapter to the buyer's decision-making process (Hamid, 1966, Ch. V). Based on information from sources in or close to the computer manufacturers industry, he identifies two major motives of a potential customer for getting interested in EDP. The first is the cost feasibility and the second is summarized under intangible motives such as: ease and speed of information gathering, R & D, prestige, etc. The decision concerns itself with only two major questions:

1. Shall the computer be purchased or rented?
2. What is the appropriate computer model in view of the buyer's general need? (p. 87)

Likewise the selection mechanism is narrowed down to two instruments only. The first is to hire a consulting firm to make a study and recommend a course of action, and the second is to set up the buyer's own group of experts selected from members of the firm who have the knowledge and skill to make a computer evaluation. Finally, the chapter concludes with the following proposition:

- (a) The "Price-Performance" criterion provides the primary guide for the buyer's decision: sales promotion efforts of the seller and his prestige influence the buyer's choice;
- (b) the bidding-by-manufacturers procedure aids the buyer in making his decision, but does not necessarily produce an optional solution. (p. 99-100)

While this study's main interest lies mainly in the economic aspects of the buyer's decision and its effect on price and quantity, it is felt that by neglecting almost all aspects of the process except the economic ones, the process becomes over-simplified. As a result, even though the author suggests a decision-making model of an organization in the process of purchasing a computer system, the model does not contain enough elements to be representative of the process involved in actual decisions.

The second study by Boris Yavitz deals specifically with the impact of automation in commercial banking. The study is defined as a case study and conceptual analysis and devotes one chapter to the individual banks' decision to automate (Yavitz, 1967, Ch. 3). As in the previously mentioned study, primary attention is given to the formal feasibility study and the economic and technical elements of the decision to automate. Only once are the management aspect and management

role in the process mentioned. The focus is on the question, "On what basis was the final decision made?" rather than, "How was it made and what influenced the process?"

Several other studies which were directed toward the impact of computers in general had some observations about the initial decision to acquire automation; but for the most part, the decision process was only of minor interest and the findings dealt mainly with economic-technological effects.⁴

⁴The reader interested in such studies might refer to the following books: Conway, Gibbons, & Watts, 1960; Rico, 1967, Sanders, 1966; and Gallagher, 1961.

III. THE SMALL COMMERCIAL BANK

The main purpose of this chapter is to supply the reader with a better understanding of the industry being studied. The chapter consists of two major parts. The first outlines the economic and organizational characteristics of the industry as a whole and specifically the individual bank. The second part explains the needs for automation in the banking industry, and the state of automation development in banking. While the first part mainly consists of background information, the second part leads directly to the discussion of the decision to automate in the individual bank presented in Chapter V.

A. The Banking Industry

The main focus of this study is on the bank as a business enterprise rather than as a creator of money or a tool of monetary policy. In order to give a better understanding of the impact and importance of EDP for the industry and the commercial bank, this chapter will review five areas.

1. The services offered by the commercial bank.
2. Developments in the banking industry.
3. Structure of the industry.
4. Organization and characteristics of the small bank.
5. The bank's financial structure.

TABLE 3.1

POSSIBLE SERVICES OFFERED BY THE COMMERCIAL BANKI. Traditional Banking Services

- | | |
|--|--|
| 1. Demand Deposits | a. Regular Accounts |
| | b. Economy Accounts |
| | c. Commercial Accounts |
| 2. Time Deposits | a. Saving Accounts |
| | b. Time Certificates |
| | c. Various saving programs
(Christmas Club, etc.) |
| 3. Loans | a. Commercial |
| | b. Installment and personal |
| | c. Mortgages |
| | d. Revolving Credit |
| | e. Others |
| 4. Investments | |
| 5. Trust Accounts | |
| 6. Safekeeping | |
| 7. Transfer and Correspondent Services | a. Domestic |
| | b. International |

II. Other Services

8. Credit Cards*
9. Accounts Payable and Receivable
10. Billing and Collection Services*
11. Payroll Processing*
12. Accounts Reconciliation*
13. Scheduling*
14. Travel Services
15. Insurance Services
16. Others

*Those services are, for the most part, a function of the availability of EDP.

1. Banking Services

The banking industry is presently a service industry whose services can be divided into financial and non-financial ones. In the past, the financial services were emphasized, and the major principle guiding traditional banking was that the individual bank should get outside funds and put them to work safely and profitably. The in-stream of funds was, for the most part, in the form of deposits while the out-stream was in form of investments and loans. Table 3.1 outlines the traditional banking services, and also lists some of the other services offered nowadays by commercial banks. Many of the new services are a direct result of increased competition between banks and other financial institutions, as well as the availability of new tools such as EDP.

Although some variation from one bank to another exists in the number and depth of services provided, the banks, through the services they provide, have a major economic function in the community where they operate. The bank has a significant role in providing the mechanism for members of the community to execute their business and monetary needs. At the same time most banks are also active in the further developing of the business structure and the community.

2. Developments in the Banking Industry

a. Numbers and Outside Competition. At the end of 1966, there were 14,291 banks in the United States (F.D.I.C., 1967, p.4). The large majority of them (13,784) are commercial banks, which by law are allowed to offer all available types of banking services.

They are often referred to as the "Full Service Bank." The remaining 507 institutions are mutual savings banks which are restricted to providing saving applications and services related to saving, such as life insurance, safe deposits, etc.

The financial system in the United States, of which the commercial banks are a major segment, changes constantly with the appearance of new financial institutions and the change of character of existing institutions. In addition to competition from mutual savings banks, the commercial bank faces stiff competition from a variety of financial institutions including: Credit Unions, Savings and Loan Associations, Personal Finance Companies, Sales Finance Companies, Industrial Loan Companies, Money Order Companies and others. Industry people are often warned that unless they adapt to change quickly and adequately, they will inevitably lose their share of the total market. To some extent it has already happened to commercial banks as indicated by Professor Robinson:

At the opening of the twentieth century commercial banks were, by a very wide margin, the leading financial institutions in the United States. Whether measured by size or by the qualitative importance of the financial services they rendered, they were considerably more important than all other types of financial institutions combined. Since that time, commercial banks have grown, but they have not grown as rapidly as other financial institutions. Commercial banks have lost somewhat in the competitive race. A number of other types of financial institutions are now enjoying a considerably more rapid rate of growth. (Robinson, 1962, pp. 21-22)

b. Changing Trends. An important reason for the increase in the supply of financial-banking services has been the drastic change in the demand for banking services. From an institute for the rich members of the community and business world, the bank has changed

to an institute catering to all segments of society. This is especially true of the small bank, which found it difficult to compete effectively with the large banks for the big business accounts and thus had to concentrate on the smaller accounts. At the same time some researchers observe an increase in the sophistication of both individuals and corporate managers which puts pressure on the banking industry to increase and improve services. (Yavitz, 1967, p. 6)

Stiffer competition and the increase in demand for banking services resulted in a sharp increase of the number of commercial banking offices as can be seen in Table 3.2. At the same time the number of commercial banks in the United States has declined sharply from its acme in the early 1920's. The decline in the number of banks before the mid-1930's was largely due to business failures which resulted in the banks' closing. Since World War II,

TABLE 3.2

PEOPLE AND BANKING OFFICES* 1955 - 1965

YEAR	NUMBER OF BANKING OFFICES	POPULATION (in 1000)	PEOPLE PER BANK OFFICE
1965	29,736	193,795	6,517
1960	24,103	179,992	7,468
1955	20,818	165,068	7,929

PERCENTAGE
OF CHANGE

1955-1965	+42.83	+17.40	-17.81
1960-1965	+23.37	+ 7.66	-12.74

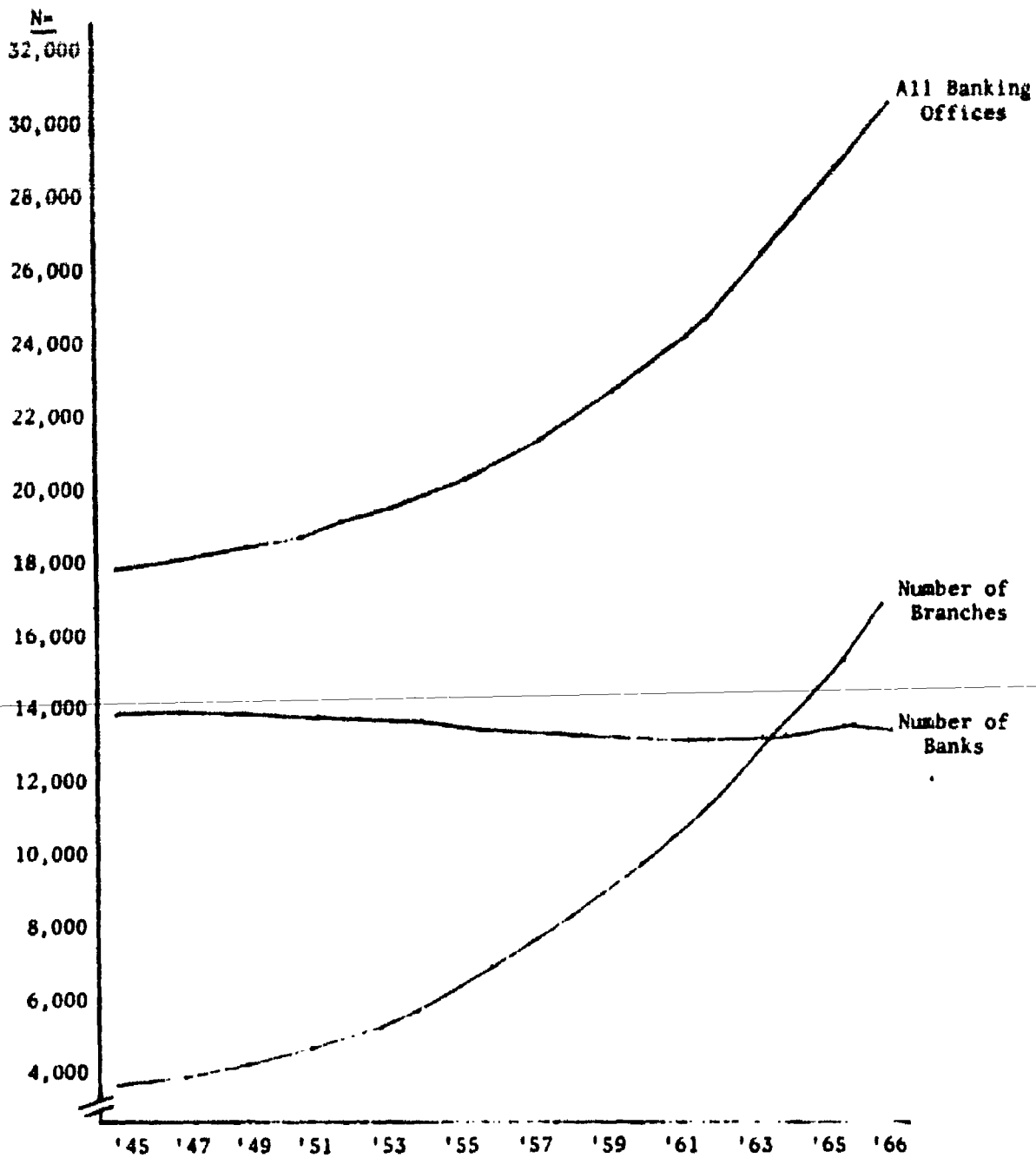
Source: NASSB, 1967, pp. 137-139

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the decline in the number of banks has been relatively slow, with the number of commercial banks decreasing from 14,183 in 1948 to 13,784 in 1966. The decrease in the last several years was due mainly to mergers. While the number of banks decreased slightly, there was an enormous increase in the number of branches opened since World War II (see figure 3.1). In 1966 alone, 1,159 new branches opened their doors to the public while the total number of banks decreased by 33. This trend of opening additional branches, at a yearly rate of 10.1 percent since 1961, paralleled the move into the suburbs and the increase in services of banks. Yet, the biggest change in banking was not the change in the absolute number but the shift in the nature of operations.

Traditionally, commercial banks concentrated on demand deposits as the main source of funds, and prior to the 1960's, non-bank institutions generally enjoyed a distinct advantage over commercial banks in their ability to attract savings, by being permitted to pay higher interest rates. In 1955, this trend started to change and commercial banks put increasing efforts in attracting time and savings deposits. Today these deposits are almost equal in size to the demand deposits (see Table 3.3). The trend was a result of both the increased competition and the increased sophistication of depositors who tried to get a higher return for their money. As a result, banks which now had to pay interest on a large portion of their funds felt increasing pressures on their earnings ratio and were motivated to find more efficient and profitable uses for the funds (see section A5)

FIGURE 3.1
GROWTH OF BANK OFFICES, BANKS AND BRANCHES
OF COMMERCIAL BANKS 1945-1966



Source: NASSB, 1967, p. 97-99

TABLE 3.3

CHANGES IN DEPOSITS STRUCTURE AND SIZE IN INSURED COMMERCIAL BANKS

	TOTAL BUSINESS AND PERSONAL DEPOSITS (millions of \$)	PERCENTAGE HELD IN			GROWTH OVER 5 YEAR PERIODS IN PERCENTAGE		
		DEMAND DEPOSITS	TIME & SAVING DEPOSITS	MISC. ITEMS	TOTAL DEPOSITS	DEMAND DEPOSITS	TIME & SAVING DEPOSITS
1966	293,565	49.16	48.45	2.39	44.55	16.87	90.80
1965	275,205	50.54	47.31	2.15	46.37	19.27	94.80
1960	188,016	62.02	35.55	2.43	18.89	7.60	45.64
1955	158,145	68.52	29.02	2.46	24.04	20.42	52.70
1950	127,480	70.59	27.13	2.28	22.01	23.94	18.05
1945	104,486	69.49	28.04	2.47	-	-	-

*Growth 1961-1966

Source: NASB, 1967, p. 190 and F.D.I.C. Call Report No. 78 p. 15

3. Structure of the Commercial Banking Industry

a. Type of Charter and Supervision. Banks must get a charter in order to operate, and they can choose one of two types. Since the passing of the National Banking Act in 1894, they can 1) seek a national charter, or 2) apply for a charter from the state in which the head office is to be located. (A.I.B., 1966, p. 303)

Close to 65 percent of the commercial banks in the United States are state banks. The size of an average state bank is less than half the size of a national bank. As a result, the state banks own only 42 percent of the total commercial bank assets (Table 3.4). At the present time,

The essential difference between National and State banks is that State banks have retained a choice, an option, in accepting federal regulation. This choice is a State bank's desire to join the Federal Reserve System or to operate with Federal Deposit Insurance. Some State banks have elected to become Federal Reserve member banks; others have not, but have elected to operate with insurance; and a few State banks have elected to operate without insurance. However, all State banks--regardless of what form of federal regulation they have accepted--are required to be chartered and regulated by their respective state authorities. (NASSB, 1965, p. 5)

The above statement presents a simplified view of the actual complex pattern of bank supervision which is described in the following paragraph:

National banks are subject to the rulings of the Comptroller of the Currency, the Federal Reserve, and the F.D.I.C., and in certain matters such as branching, they are subject to the appropriate state laws. State-chartered member banks come under the jurisdiction of the Federal Reserve, the F.D.I.C. and one of the 50 state banking commissioners; insured non-members are

TABLE 3.4
NUMBER OF BANKS, ASSETS, CLASSIFIED BY TYPE OF BANK
June, 1966

Dollars in Millions

Class of Bank	Number	Percent Of All Banks	Total Assets	Percent Of Total Assets	Average Bank Size
ALL BANKS	14,328	100.00%	\$447,788	100.00%	
Commercial	13,821	96.46	388,373	86.73	28.1
Mutuals	507	3.53	59,415	13.27	117.2
NATIONAL BANKS	4,811	33.58	226,050	50.48	47.0
STATE BANKS (1)	9,010	62.88	162,323	36.25	18.0
FR Members	1,382	9.64	95,767	21.39	69.3
Non-Members	7,366	51.41	63,091	14.09	8.6
Non-Insured	262	1.83	3,465	.77	13.2

58.20%
41.80
24.66
16.24
.90

34.81%
65.19
10.00
53.30
1.89

(1) Mutuals Excluded

Percent of all commercial banks, and all commercial assets.

SOURCES: NASSB, 1967, P.3

regulated by the F.D.I.C. and the states; the few hundred non-insured banks are subject only to state regulations. Finally, the United States Justice Department is concerned with the merger of any banks which raises questions of monopoly under the anti-trust acts, and the Securities and Exchange Commission has jurisdiction over certain investment practices. (AIB, 1966, pp. 323-324)

Over the last 11 years, state banks had considerable less growth in their assets and deposits compared to the rate of growth of all commercial banks (see Table 3.5). This had an effect on the relative size of the banks and will be discussed in more detail below.

b. Size of Commercial Banks. An accepted measurement of the size of banks is the deposit size. Although there are as many as 13,784 commercial banks in the United States, 9,658 of them account for less than 12 percent of the total assets and deposits (Table 3.6). These are the banks with total deposits of less than \$10 million. The top 722 banks in the country account for 71.4 percent of total assets and 70.3 percent of the deposits. The present study concentrates on the middle size group of close to 3,000 banks between the sizes of \$10-50 million and in section A.4 the general characteristics of these banks are discussed.

As one might expect, the innovation in the EDP area started among the larger banks which had begun to experiment with automatic data processing in the early 1950's, and today all the banks with deposits of over \$500 million and over 95 percent of the banks with deposits over \$100 million use some type of EDP services. (see Table 3.12) Smaller banks were slower in adapting computer

TABLE 3.5
ASSETS GROWTH OF COMMERCIAL BANKS

YEAR	Total Asset (in Million \$)		ASSETS OF STATE BANKS AS % OF ALL BANK'S ASSETS	Percentage Increase Over Previous 5 Years	
	ALL COMMERCIAL BANKS	STATE COMMERCIAL BANKS		ALL BANKS	STATE BANKS
1966	\$406,515	\$169,914	41.8	45.4*	32.0*
1965	378,899	158,636	42.0	46.6	33.2
1960	258,359	119,099	46.2	22.0	21.0
1955	211,831	98,419	46.5	24.7	35.0

*Change for 1966-1961

SOURCE: NASSB, 1967, P. 149

TABLE 3.6
COMMERCIAL INSURED BANKS GROUPED ACCORDING TO SIZE (1965)

SIZE OF DEPOSIT GROUP	NUMBER OF BANKS		TOTAL DEPOSITS		TOTAL ASSETS	
	NUMBER	PERCENT	IN MILLION \$	PERCENT	IN MILLION \$	PERCENT
ALL	13,366	100.00	330,309	100.00	373,995	100.00
UNDER \$10 MILLION	9,658	72.26	39,067	11.83	43,362	11.59
\$10-50 MILLION	2,986	12.34	58,917	17.84	64,998	17.38
OVER \$50 MILLION	722	5.40	232,326	70.33	265,635	71.03

Source: F.D.I.C. Annual Report, 1965, p.145

services and, for the majority of them, the transfer from conventional equipment to EDP still lies ahead. While the smaller banks (under \$10 million) can, in many cases, afford to postpone their decision to automate for the time being or simplify it considerably by limiting it to demand deposit only, the banks between \$10-50 million are feeling the pressure of paper work. It is expected that over the next five years 45 percent of them will switch to automation of one type or another.

c. Unit Versus Branch Banking. Only a few years ago it would have been common to read in a text book dealing with banks the following statement:

The business of banking in the United States is conducted to a considerable extent by unit banks, that is, by banks the physical location of which is limited to one site. Branch banking is practiced in a certain number of states and urban areas, but nevertheless, unit banking is the most common form of bank organization in our system. (Robinson, 1962, p. 8)

While the majority of banks in the United States (75.87 percent) are still unit banks without branches, the trend is changing rapidly as can be seen in Table 3.7. The percentage of banks operating branches increased from only 8.25 percent in 1945 to 24.13 percent in 1965 and continues to grow. This becomes even more significant if we remember that only 16 states permit state-wide branch banking, and 17 additional states permit a limited branch banking, while 17 other states, including most of the midwest, permit only unit banking. Another limit on branch banking is the long procedure required for getting permission to open new branches from the national and state supervisory authorities.

TABLE 3.7
CHANGE IN THE TYPE C BANKING OFFICES (1940-1965)

YEAR	UNIT BANKS	AS A % OF ALL BANKS	BANKS OPERATING BRANCHES	AS A % OF ALL BANKS
1965	10,855	75.87	3,453	24.13
1960	11,391	81.45	2,594	18.55
1955	12,353	86.74	1,889	13.26
1950	13,246	90.42	1,404	9.58
1945	13,472	91.75	1,212	8.25
1940	13,868	93.00	1,044	7.00

SOURCE: NAASB, 1967, p.101

Still it is evident that the number of banks with branches is increasing, which in turn has a direct effect on operations and the use of ED. . A latter part (section A.5) will emphasize the pressure on bank managers to utilize the funds they have in an optimistic way, which in turn pushes them to centralization of operation and fund handling where the computer becomes most helpful.

d. Location of Bank. As one would expect, most of the larger banks are located in or around the big cities. Of the small banks under \$10 million the great majority are in states permitting only unit banking or limited branches, and, for the most part, are located in small towns or villages. The banks between \$10-50 million are located mainly in small towns or suburbs of large cities, although a considerable number in this size group can be found also in larger cities, particularly on the West Coast. The distribution of the banks included in this study is given in table 3.8.

There are four main influences resulting from the location of the bank.

1. Influence of seasonal fluctuations, which can effect the demand for loans, size of deposits, amount of paper work, utilization of manpower and equipment.
2. Influence of business cycles which is felt specifically in areas where the economy depends on a limited number of industries and employers.

TABLE 3-8
LOCATION OF BANKS INCLUDED IN STUDY
BY AREA AND TYPE OF COMMUNITY

Type of Community*	Area Location			
	East	Midwest	West	All
Small Town-Industrial economy	-	2	3	5
Small Town-Mixed Industrial & Agricultural Economy	6	2	-	8
Suburban	2	1	2	5
City	-	1	4	5
All	8	6	9	23

*As described in F.D.I.C. reports

3. Growth potential of the area, which effects future planning and expansions.
4. Competition from other banks, which depends on the size and number of competitors compared to the economic potential of the area, and the aggressiveness of the other banks in getting more business.

In Chapter VII these influences will be further considered when examining the results of the field study.

4. Organization and Characteristics of the Small Commercial Bank

The following are some of the characteristics of a small commercial bank. They will vary, of course, from one bank to another, but they are typical of the large majority of banks included in this study.

a. Ownership. Three major types of ownership prevail among small commercial banks. The first is family-owned banks where one or two families control the stock of the bank. In most cases, members of the family will actually act as chief executives in the bank, although in some cases executive positions are held by professional management not related to the owners. The second form is a holding company which owns several banks in the area or state. This form of ownership is popular in several states where unit banking or limited banking exists. The third form is diversified ownership where no single group or individual is in control of the majority of stocks. Banks which opened in the last few years tend to have this type of ownership. Table 3.9 gives the distribution for the banks included in this study.

TABLE 3-9

OWNERSHIP OF BANKS PARTICIPATING IN STUDY

Majority of stock owned by one family	6
Majority of stock owned by directors	1
Public owned - no single stock holder with more than 10 per cent of stock	14
Owned by a Holding Company	<u>2</u>
Total	23

The owners are represented in the bank through the Board of Directors whose election, terms of duty and responsibilities are also subject to examination by the supervising agencies.¹ In most banks participating in this study it was discovered that the role and influence of the Board of Directors as a group on developing EDP in the bank was rather limited.

b. Organization.

1. The total staff in a small bank usually ranges from 30 to 120 people, depending on whether or not the bank has branches, and if so, how many. The average number for 1965 (not including part-time or maintenance people) was 49.2 employees including an average of 9.9 officers. (F.D.I.C., 1966, p.157)
2. In addition to the top executive officers, senior management includes one to three senior managers who supervise the operations and loan functions. Just under this level, there are four to fifteen junior officers, some of whom have purely clerical or line functions, having received their titles in recognition for long service.
3. There is little specialization among officers and most of them are required to know the operations of all the services offered and to be able to fill in for each other.

¹ A detailed description of the functions and responsibilities of bank board members can be found in Reed, 1963, ch. 2.

4. The atmosphere and working conditions are less formal at all the levels below the top executive officer.
5. The operation officer, who is usually a member of the senior management, and his assistant, if he has one, make the operational, day-to-day decisions. Senior officers discuss policy decisions informally, often reaching decisions with little or no documentation.
6. The bank operations involve a lot of repetitive work, which requires accuracy and speed in processing data.

c. Personnel.

1. In most banks, the great majority of clerical workers and tellers are women with little or no ambition to advance to management positions.
2. In a study of bank employees, Chris Argyris found that many of them prefer to work in relative isolation and to have a great deal of control over what they do. (Champion and Dager, 1967, p. 99)
3. A recent study describes bank employees as:

...typically submissive, particularly among the female staff. Strikes, slow-downs, and similar erratic behaviors of union members and other employee organizations are rare if not unknown within the banking systems.

However, resistance can take other forms--distrust of bank management, a lack of cooperation, a tendency to become sloppy and inaccurate in the performance of a job. (Champion and Dager, 1967, p. 100)

4. Many of the older employees had no college education, and the levels of salaries in the small bank were low as compared with those in other industries and businesses. In recent years, salaries increased steadily and although a gap still exists between salaries in banking, especially in the smaller banks, and other service organizations, it has been decreasing slowly. (Yavitz, 1967, Ch. 2)
5. The line of progress for management used to be from clerical jobs, through teller lines, to supervisory jobs, and finally to management jobs. Most would start working immediately following high school graduation, or junior college, and would take many years to reach management levels.
6. Officers tend to view themselves as having a life career in a small bank. If they changed organizations, it would usually be to another small bank. At the same time it is not uncommon for officers from larger banks to move into positions in smaller banks.
7. Bank employees, especially top management, are typically long term, permanent citizens of their community, and are reluctant to change communities.

d. Role in Community.

1. The small banker usually knows his community, and the tie between a bank and its trade area is very close. Moreover, a considerable amount of customer relationships are based on personal knowledge of the customer.
2. The top executives of the bank especially in small communities, are respected citizens who often have influence in community affairs.
3. The top executive officer, with the exception of those in banks owned by holding companies or by larger banks, is usually an individualist who is proud of his bank and its position in the community. He wants to keep his bank independent, and usually has some ownership interests in the bank.

5. The Bank's Financial Structure

a. Assets and Liability Structure. Commercial bank earnings

are the result of the size and type of assets held, the return on these assets, and the charges imposed for performance of various services. The two major groups of assets are loans and investments in government papers or other securities. Table 3.10 indicates that in banks of the size between \$10 million and \$50 million loans amount to close to 50 percent of total assets which is less than the average for the industry as a whole. Loans made by banks of this size are usually small to medium size, and while the larger banks compete heavily in this category of loans, the

smaller banks present only an insignificant competition to larger banks in the area of big loans of over \$100,000. The result is that the small bank usually has a relatively large number of individual loans on its books, which are subject to small payments and an increasing amount of paperwork. Increased competition in the area of small to medium-size loans and close supervision from regulatory agencies with regard to bad loans should push the banker to try to achieve better analysis of the demand for loans and evaluation of potential customers. Here, records about individual customers, personnel knowledge, and analysis of trends in the trade area can be very helpful. While in the past, personnel knowledge used to be the main source of evaluation, increases in volume and number of loans push the loan officer to rely more on written records and organizational memory, an area in which the computer is most efficient.

In the area of other investments banks are restricted by law and regulation as to the papers they can invest in and amounts invested, but nonetheless, they still have to make periodic decisions as to how much, in what and when to invest. In the small banks the volume usually does not justify doing their own research on those questions and, therefore, the computer is expected to be of little use in this area to the small bank, which will usually rely on the consulting services of the correspondent bank or an investment company.

Fixed assets have always been a minor item in the assets composition of commercial banks (see Table 3.10) although it has been increasing slightly over recent years with the move to open

TABLE 3.10

MAJOR SELECTED ASSETS AND LIABILITIES PER \$100 OF
TOTAL ASSETS OF INSURED COMMERCIAL BANKS (1955)

SIZE OF DEPOSITS	NO. OF BANKS	ASSETS				LIABILITIES			
		U.S. GOV'T & OTHER SECURITIES	LOANS	EQUIPMENT AND FIXED ASSETS		DEPOSITS			CAPITAL ACCOUNTS
						ALL	DEMAND	SAVING & TIME	
ALL BANKS	13,361	27.64	53.53	2.71		88.32	48.99	39.33	7.96
UNDER \$10 MILLION	9,658	37.56	46.50	1.56		90.09	49.40	40.69	8.98
10-50 MILLION	2,986	34.93	49.87	1.95		90.64	46.75	43.89	7.57
OVER \$50 MILLION	722	24.23	55.57	3.06		87.45	49.52	37.93	7.88

SOURCE: F.D.I.C. Annual Report, 1965, Table 110

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additional branches and renovate the existing facilities (Porat & Vaughan, 1967). Supervising agencies keep a close eye on any spending for fixed assets, and as a result, bankers prefer to lease rather than purchase equipment such as bookkeeping machines or computers. A typical example is one of the cases in this study where the president of the bank preferred to purchase the computer, feeling it would have tax advantages, but decided, finally, to lease it in order to avoid questions and pressures from the supervising agencies. Decisions on major investments in assets or commitments of assets of any type usually require an approval of the Board of Directors. As a result, even in banks where the decision to use EDP services is considered an operational one, the Board is likely to be consulted or at least informed.

As indicated earlier, the main source of funds in the commercial bank are deposits which amount to slightly over 90 percent in the smaller banks. In recent years the drive has been to increase the saving and time deposit portion, as can be seen in Table 3.10 and is emphasized in the following statement:

Commercial banking has intensified its competition for peoples' savings. Not only has this resulted in higher rates of interest paid, and thus the need for higher yields on loans and investments, but it has led to the development of new tools. The credit card is one. Another is the Time CD (Certificate of Deposit), actually an old 'tool' being put to greater use. (NAASB, 1967, p. 159)

Banks are very conservative in issuing new stock and since 1951 over 80 percent of the increase in capital was due to increase of retained earnings rather than new stock issues. This happened for several reasons which were summarized by Professor Reed:

The amount of stock issued by small banks, the cost of complying with regulations, and the amount of activity in these stocks prohibit their being registered on national exchanges, and even the cost of distributing stock in over-the-counter markets may be quite substantial. Another important reason for the reluctance of banks to issue common stock is that the issuance of new stock may not materially increase their earning power; in fact, there is a greater possibility that it may affect existing stockholders adversely. This is primarily because of the basic function of bank capital. (Reed, 1963, p. 521)

Because additional capital can be used only to a limited degree for addition of fixed assets, it is used mainly to give a more secure base to other liabilities and as a reserve against losses. Therefore, the decision to invest in EDP equipment is not necessarily related to the capital structure but rather to operational problems and expense structure.

b. Income, Expenses and Profits. Compared to other industries the business of banking is based on more modest but also more assured profits. The main sources of income in order of importance are income on loans, interest on United States Government obligations and other securities and income from service charges. Figure 3.2 represents the proportions of the various sources of income, depending on the size of the bank. We notice that the larger the bank, the larger is the proportion of income derived from loans, while the proportion of income from United States obligations and other securities decreases. This represents a trend toward investing more funds in the loan application, initiated after World War II by the larger banks, and which the smaller banks are following at a slower pace. The income from service charges is proportionately highest

in banks of the \$10-50 million size, amounting to six to seven percent of total revenues, which equals over 25 percent of net operating earnings.

The expenses of commercial banks are, to a great extent, fixed, especially in the short run, for the following reasons:

Banks, with public utilities, are affected with a certain degree of public interest, and the capacity to serve the public must be available at all times. Banks are not in a position to produce for inventory, suspend operations, or reduce their labor force appreciably, as are some industries. Therefore, banks' expenses in the short run are not closely correlated with the volume of business done or with gross profits.
(Reed, 1963, p. 494)

Still, bank management has some control over expenses in the long run, mainly through improvement of organization structure, departmentalization and introduction of better equipment and processing systems, where EDP is having a considerable impact.

Interest on time and savings deposits amount to 40 percent of total operating expenses, while over 50 percent of the operating expenses are in such items as salaries, equipment, and systems.

Yet it is surprising how few banks utilize cost accounting systems to control and allocate cost. Only two banks, among close to 60 small banks visited during the last year, had a cost accounting system in operation, and in one of the two the cashier admitted he never uses the system and doesn't believe in it, as it was left to him by his predecessors.

Profitability measurement is a difficult task in small banks. One reason is that there are no good cost data available. For

another, the non-operating transactions affect profits considerably, and finally, it is difficult to assess the exact amount of capital due to the existence of large reserve funds. The supervising agencies try to keep a close watch on both ends of the profit scale and will investigate both situations if profits are too low or too high from a given standard. This pushes the banker to try to achieve steady profits rather than maximum profits and, over the long run, to be competitive, profit-wise, with other bankers in his state or across the nation.

8. The Decision to Automate Facing the Small Bank

In a study conducted in banks and insurance companies, the following features were emphasized:

Information Features:

- large volume of activities,
- standardized procedures which were programmable.

Organizational Features:

- important activities built around transactions or computation,
- large clerical and staff groups (in routine work) characterized by high turnover who are difficult to hire and retain,
- large middle management groups committed to many routine activities. (Burack, 1966, p. 43)

In banking, with the enormous increase in the number of checking accounts and checks written, the pressure of paper work was first felt in the demand deposit area. The number of checks written annually has risen from 5.3 billion in 1945 to just under 12.7 billion in 1960, to 17 billion in 1965, and is expected, by

conservative estimates, to be in excess of 22.7 billion per year in 1970. (See Table 3.11) Because each check passes through 2-1/3 banks, on the average, and may be handled up to 20 times before being returned to the person who wrote it, paper work threatened to flood the banks. (Wiener, 1962, p. 990) The increase was a result of two trends. The first was an increase in the number of checks

TABLE 3.11

NUMBER OF ACCOUNTS AND CHECKS IN DEMAND DEPOSITS

YEAR	NO. OF DEMAND DEPOSITS ACCOUNTS (Millions)	TOTAL NUMBER OF CHECKS (Billions)	NO. OF CHECKS CLEARED PER ACCOUNT PER MONTH
1975*	92.0	29.0	263
1970*	78.0	22.7	242
1965	**	17.0	**
1964	70.9	16.0	188
1960	**	12.7	**
1955	52.2	9.5	152
1945	35.6	5.3	124

* Forecast

** Data not available

Source 1945-1965: Anderson (et al) p. 68-69
1970-1975: Wiener, (1962)

written per account which increased by 52 percent from 1945 to 1964, and the second was the increase in the number of accounts whose number doubled in the area of demand deposits between 1945 to 1964 and which is expected to increase by another 30 percent by 1975. These changes increased the amount of paper work which was further accompanied by an increased velocity of deposit turnover. According to a study by Professor P. Nadler the turnover of deposits in New York City banks increased from 25 time per annum in 1946 to 78 times per annum in 1962. (Nadler, 1964, p. 53)

As a result:

The check-processing department has emerged in the past 20 years as the largest department in the average bank in terms of personnel and equipment investment costs. Encoders, proof machines, sorters, and computer systems, together with expensive staffs to man them, comprise the major investment in dollars and talent by the banking industry to stay abreast of the flood of checks today. There are only a few banks in the country today where the "factory" operation of check processing is not a significant concern for bank management. (Anderson, 1966, p. 67)

But the increase in paper work was also felt in other areas of banking.

Changes in investment and loan policies between 1950 and 1960 also caused shifts from activities requiring relatively little processing to those requiring a great deal. For example, investments in bonds, which require little handling by bank employees, became much less important in relation to loans, which require much more paper work. Consumer installment loans, which require the most handling, more than doubled in volume during the period. (Wiener, 1962, p.990)

One area in which the pressure is greatest is the area of operations where, with increased volume and shortage of manpower, the accuracy decreased and delays occurred in completing reports and keeping up

with the transactions. A problem to which even more attention was given was the increasing cost of operations. In 1960, the Federal Reserve Board observed that:

If inflating costs continued to pinch profits, banking may have trouble getting enough additional capital in the future. Retained earnings would be a smaller source and the sale of additional earnings would be a smaller source and the sale of additional stock might be more difficult. Investors tend to put their money where it will earn the highest return. They may slight banking in favor of other industries with a better profit record. Banking must raise many billions of dollars of new capital in the coming decade in order to keep pace with our growing economy. If it doesn't, the quality of banking services could suffer, and this could, in the end, impinge on our nation's ability to grow.

Many bankers, therefore, are looking to mechanization as a method of stabilizing costs and preserving profits. Mechanization can reduce the need for additional labor and increase overall efficiency to boot. (FRB, 1960, p. 4)

However, the major breakthrough in electronic check processing did not come until 1959, when final specifications for the printing of checks coded with Magnetic Ink Character Recognition (MICR) numerals were agreed upon and issued by the American Bankers Association. The most serious problem for the banks at that time was to find an efficient way to number the accounts and identify them. Many banks did not have numbers for their customers' accounts, and this held automation back for some time, and still does for many of the smaller banks.

Bankers were also hesitant to move into automation for other reasons, as was observed by George W. Mitchell, member of the Board of Governors of the Federal Reserve System, in a 1966 speech before a national bankers' convention devoted to automation:

For bankers these (EDP) handling methods are novel. They are scientific developments conceived and perfected completely outside of the banking industry.

They do not employ skills or expertise common to banking, indeed they have an almost alchemistic aura in contrast to the image or reality of banking as we know it.

In addition, there was strong feeling among bankers in the early 60's that computers were only for the big banks, and opinions such as the following were wide spread:

In smaller banks with several thousand checking accounts, the use of semi-automatic bookkeeping machines may constitute the highest level of automation to be reached. This equipment should permit staff reductions sufficient to offset machine costs plus increased check imprinting charges to be absorbed. There probably will be little economic justification for these banks to proceed further with automation on an individual basis. (Aldom, et al, 1963, p. 49)

A complete re-orientation of management thinking, plus increasing operational and competitive pressures had to occur before the idea of computer use in small business could be accepted by people running the bank. Management had to be exposed to frequent warnings, such as the following one, in order to be persuaded to consider automation.

Management of small enterprises, as well as those of medium-sized ones, who aim not only at survival but at healthy growth and development, cannot avoid their preoccupation with automation of the total operation, comprising physical and clerical processes and particularly management decision making and control. (Moller, 1964, p. 50)

By 1966, only 17.7 percent of the 13,250 small banks in the United States used some type of computer services, either their own computers or off-premises computers. (ABA, 1966) Industry projections (Table 3.12) indicate that within the next five years, approximately 4,600 of the small banks not using computer services at the present time will start to do so, and if this projection proves to be correct, it means that 39 percent of the small banks are going to face, within

TABLE 3.12

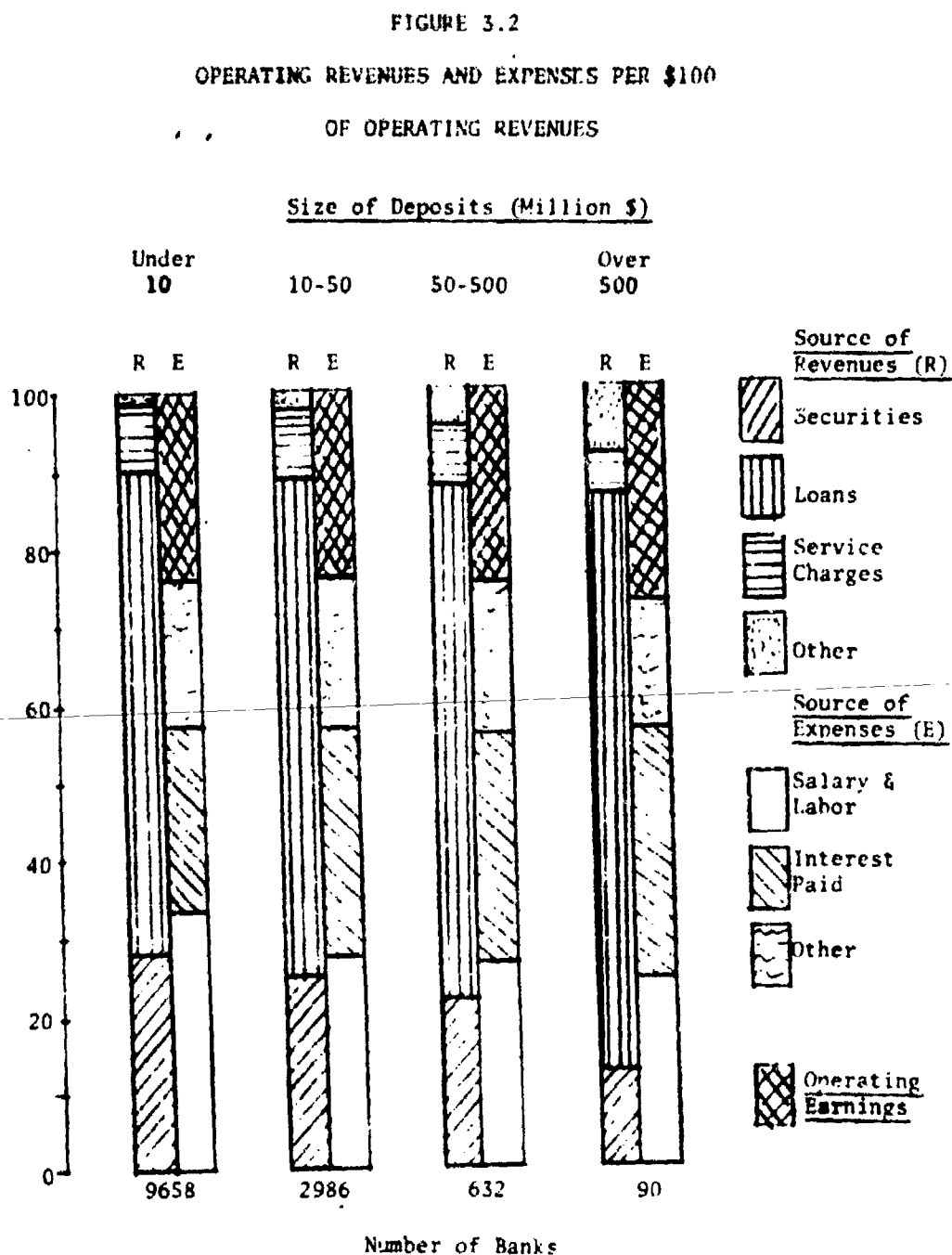
PROJECTION OF THE PERCENT OFAUTOMATED COMMERCIAL BANKSBY DEPOSIT SIZE

<u>DEPOSIT SIZE</u> <u>(\$M)</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
Under \$10	11%	19%	25%	31%	37%	43%
\$10 to \$49	39%	57%	69%	74%	79%	84%
\$50 to \$99	79%	88%	95%	96%	98%	99%
\$100 to \$499	95%	98%	99%	99%	100%	100%
\$500 & over	100%	100%	100%	100%	100%	100%
All banks	21%	31%	39%	44%	49%	55%
						100%

NOTE: Automated banks include those which own or rent computers and those which use off-premise computer service arrangements (i.e. correspondent banks, service bureaus, joint venture holding companies, etc.)

SOURCE: Projection from 1966 A.B.A.
National Automation Survey

the next five years, the decision of When? How? What to automate?
and How to evaluate the computer's effect on their organization.



IV. RESEARCH METHODS

A. Methods of Data Collection

The nature of the population involved in the study, the problem under investigation, and the resources available forced reliance on after-the-fact data collection and analysis. Only in a few cases has there been the opportunity to observe the decision-making process while it occurred; and even then it was limited to a few isolated cases, making it difficult to arrive at generalizations.

The methods of data collection used were: study of written records, interviews and questionnaires. Prior to the field study itself a pilot study covering six banks was conducted and the results were used to test and clean up the data collection instruments.

1. Study of Written Records

The two main types of written records used were information compiled by the F.D.I.C. and records in the banks. The F.D.I.C. information, which was supplemented by written records of other available governmental and professional sources, supplied the data for identifying the environment and provided the data on the bank's development both in general and EDP areas, as well as in management operations and evaluation.

To the author's disappointment, there was little information available in the banks in the form of written records. In most of the banks, no records were kept during the decision process; but in those cases where they were available, they were examined and integrated into the analysis.

2. Field Interviews

Interviews were conducted with the management of each bank and other key people involved in the decision process. The interview is the most appropriate technique for revealing information about complex, emotionally laden subjects and for probing perceptions and attitudes that may underlie an expressed opinion. Other advantages are that the interview gives greater flexibility and offers more coverage of the subject than do questionnaires. In addition, the interviewing situation offers a better opportunity than the questionnaire to appraise the validity of the report and identify the correct persons to be questioned (Schltiz et al, 1965).

The approach used was the focused interview (Merton et al, 1956) in which a structured, but somewhat flexible schedule was followed, allowing the interview to be adjusted to the role the interviewee held during the decision period.

3. Questionnaires

Questionnaires were used only for supplying supplementary information from the interviewees. In some areas where the interviewee was asked to evaluate several different possibilities, a written questionnaire (Appendix C) was completed by him as part of the interview. Tests of statistical significance using χ^2 distribution and t test were applied to the results where it was deemed necessary.

4. Possible Limitations

An argument often raised against the effectiveness of analyzing past events is that the interviewee may tell you what he wants you to know rather than what happened. To answer such an argument, one has to

look at the four major ways available to describe a decision process. The first is to say how it is believed a decision should be made. This is the normative approach which gets wide coverage in articles and text books. The second is to hypothesize how a decision process does occur based on the general experience of the writer. The behavioral theory of Cyert and March examined in this study is a good representative of the latter approach. The third one is to describe how a decision process actually occurred, which is difficult, if not impossible, to record correctly in real life situations. Even if the process had been observed during the decision period itself, biases would appear. The fourth one, which was used in this study, is to try to get as close as possible to the actual events by cross-interviewing several participants and by getting as much background data as possible. The end result might still be what people say happened rather than what actually happened, but to some degree, this is inevitable whenever such complex decisions are examined in other than laboratory situations.

It has been emphasized that it is not the main purpose of the study to arrive at a normative decision model, although some normative suggestions are included in the summary. The writer, rather, follows the advice of Selltitz, Jahoda, Deutsch and Cook (1965) who suggested that:

Scientists working in relatively unformulated areas, where there is little experience to serve as a guide, have found the intensive study of selected examples to be a particularly fruitful method for simulating insights and suggesting hypotheses for research. (p. 59)

The above authors also make it clear that the purpose of their approach is not just to collect data under what is sometimes called the "case study" approach, but also to define three major differences between the "case study" and "intensive" approaches.

1. The first difference lies in the attitude of the investigator involved in the intensive study; it is one of alert receptivity, of seeking rather than testing.
2. The second difference is the intensity of the study group, incident, or situation selected for investigation. One attempts, in the intensive study, to obtain sufficient information to characterize and explain both the unique features of the case being studied and those which it shares with other cases.
3. The third difference is the reliance on the integrative powers of the investigator involved in the intensive study; that is, his ability to draw together many diverse bits of information into a unified interpretation. (p. 60)

B. The Field Sample

The data collection for the study was carried out in connection with a larger automation study supported by the F.D.I.C. As a result, only banks meeting the following qualifications were considered:

1. Must be a state bank
2. Must be examined by the F.D.I.C.
3. Must be cleared by the F.D.I.C. regarding special financial or management problems which would affect the results.

In addition, the following selection rules applied:

4. Must be a commercial bank
5. Must have \$10-50 million in deposits.

This study's interest lies with the small bank and, based on the experience of Government bank examiners and the staff members of the American Banking Association, it was suggested that the upper limit be banks having \$50 million in deposits. It was also found necessary to establish a minimum level of deposits at \$10 million. Banks with deposits of less than \$10 million are usually small country banks or very new banks having a limited management team and no specialization of employees which would allow examination of organizational influences. In the under \$10 million bank, there are usually only one or two management people, a fact which imposes difficulties on the study of decision processes.

6. Must have a management team of four or more people
7. Must have more than one person involved in the decision process
8. Must have been willing to cooperate in the study and have the people who were significantly involved in the decision process available for interviews.

The bank's location has been considered, but due to the difficulty in obtaining enough banks in one geographical area which meet the other criteria, the sample has been selected almost nationwide.

As outlined in Table 4.1, fifteen of the banks participating in the study are already using EDP services. Of the remaining eight, four already made a decision to use EDP while the remaining four have decided against it for the time being and have no definite plans for the next two years. In Appendix B the environmental data for all the banks participating in the study are summarized.

TABLE 4.1
BANKS PARTICIPATING IN STUDY
CLASSIFIED BY PRESENT EDP ARRANGEMENTS

1. Have EDP on premises	8
2. Use off-premises service	5
a. Correspondent bank	4
b. Service bureau	1
3. Participate in joint venture	2
4. No EDP at present time	8
a. Plan to use EDP within 18 months	4
b. No plans set	4
TOTAL	<u>23</u>

V. PHASES IN THE DECISION PROCESS

The purposes of this chapter are to examine and summarize the data collected in the field and to trace the sequential phases involved in the decision process. In the first section, attention is given to the triggering cues which stimulate the decision to automate. Those motivating a change to automation in business, generally analyzed in the literature, precede data on reasons for automation in the banking industry. In the remainder of the chapter, the phases experienced in the decision process are identified. The first is the initial search occurring in the bank where the issues involved are defined, the goals and expectations are set, and the general responsibilities are allocated among the participants in the process. The second phase is one of information collection and is often identified as the feasibility study. It is followed by an evaluation phase which ends with a decision to choose a specific course of action.

A. Triggering Cues Initiating the Decision Process

1. General Reasons for Automation

Discussing the reasons for converting to EDP is a favorite subject for writers in the area of automation. Most of the approaches taken are from the economic-technical point of view, such as the one presented by John Postly (1960).

Computers and their associated peripheral hardware can be introduced into data processing systems in order to achieve one or more of three kinds of objectives. These objectives do indeed overlap, but are sufficiently distinct to discuss separately. They are: (1) to deal with increased complexity in data processing, (2) to deal with increased volumes in data processing, and (3) to reduce data processing costs for a given level of complexity and volume. All these objectives usually involve increased timeliness and accuracy requirements. (p. 10)

In many cases, the reasons for automation are expressed as a single factor of cost reduction. This was stressed in one recent study by D. Sanders (1966).

Simple cost reduction is one of the main benefits of EDP, and was one of the two objectives most sought by the small sampled firms. Costs are usually reduced in one or more of the following ways:

- (1) A reduction in clerical, non-clerical, or supervisory labor charges;
- (2) A reduction in equipment, rental or capital costs;
- (3) A reduction in floor space required for data processing;
- (4) A reduction in the cost of forms and other office materials;
- (5) A reduction in the duplication of records which is felt in the reduced costs mentioned above;
- (6) A reduction in training expenses required in some jobs which are downgraded.

In addition, although the total cost may remain unchanged in a firm, the average or per-unit cost of processing the paper required may be reduced by the firm's newly gained ability to increase data processing production with no change in total costs of labor or equipment. (p. 36)

Other studies introduce a wider range of reasons such as those found in one of the few books whose subject was automation in banking:

A number of basic factors usually determine management's decision to enter the area of automatic data processing. These may be summarized as follows:

- (1) Anticipated reductions in operating costs
- (2) Existence of potential applications
- (3) Competition
- (4) Systems improvement, including greater control, better management information, and speed of processing
- (5) Research projects covering potential future application, including the area of operations research
- (6) Demands for new services (Aldom et al, 1963, p. 51)

Similar expectations are summarized in the Dale (1964) study, which concentrated specifically on the decision to automate:

- (1) Layout. New EDP installations are expected to begin paying their way after a gradual changeover from old procedures. There is an expected payout in terms of better utilization as well as lower operating costs.
- (2) Meeting Shortage of Personnel. Growth of personnel requirements on specific routines....appear to be increasing continuously, making it impossible to obtain the required number of people in some labor markets, and the computer is expected to make growth possible without encountering labor shortages.
-
- (4) Customer Services. Improved customer benefits, such as prompter billing, speedier answers to questions and more efficient service, are expected from the combination of computers and internal improvements.
-
- (6) Other Expectations. The computer may at one time have been installed as a status symbol, but this expectation is strictly tangential, if that. (Pp. 11-12)

All the above examples emphasize the technical-economic factor and give little attention to factors influenced by the organizational environment and social and political system. Most writers also failed to make the distinction between the short-term and the long-term cues. Examples of short-term triggering cues are: temporary space shortage, temporary personnel shortage, pressures from the outside sources, etc. The longer term cues, as listed by Judson, (1967) were influenced by management's desire to:

1. Improve the product offered--in the case of a bank, the package of services offered.
2. Improve volume.
3. Improve profitability.
4. Improve the public image.
5. Improve human relationships within the organization in terms of better teamwork, less friction and less diversion of human energies towards activities that are non-productive, and better opportunities for the employees to realize to the full their potential capabilities.
6. Improve the ability of the organization to cope with anticipated future conditions and problems such as changes in the market, changes in the technology of equipment and methods, and changes in the size and nature of the organization itself. (Pp. 6-7)

2. Reasons for Initiation of a Decision Process in the Individual Bank

In this section, the specific triggering cues for the individual banks will be discussed and an answer will be sought to two major questions.

1. What initiates the decision process?
2. Who initiates the decision process?

In Chapter I, Section B, the forces pressuring the banking industry to automate were discussed. For the individual bank, pressure to automate may result for one of two reasons: The bank may "feel difficulties" which the computer might be able to alleviate, or the bank may be looking toward future development in the banking industry in general and specifically in the individual bank. The first can be defined as short-term cues which mainly fall under the heading of Operational Pressures, while the second can be defined as long-term cues falling under the heading of Policy Planning.

In a recent survey by the American Banking Association, the participating banks which neither used EDF services nor had plans

to do so were asked to indicate why they did not feel a need for automation. The results for the total sample of banks and for the responding banks with a deposit size of \$10-50 million are given in Table 5.1.

The most important reason given by close to sixty per cent of the total sample and fifty per cent of the \$10-50 million banks was that the present system of bookkeeping and operation is adequate for the bank. One-third of the small banks surveyed responded that they had adopted a "wait and see" policy, while only sixteen per cent

TABLE 5.1

REASONS GIVEN BY BANKERS FOR NOT USING OR PLANNING TO USE EDP SERVICES

	All Banks N=1642		Bank Size \$10 - \$49 Million N=322	
	No.	Percent	No.	Percent
Present system is adequate	976	59.4	162	50.3
Present equipment is still being amortized	336	20.4	84	26.1
Applications in our bank are too small for computer processing	565	34.4	52	16.2
No computer facilities are available to us within a reasonable distance	253	15.4	39	12.1
We have adopted a "wait and see" attitude	457	27.8	107	33.2
A study indicated that a computer service was not available at this time	210	12.8	67	20.8
No response	71	4.3	22	13.9

Source: ABA Automation Survey, 1966

of these banks frankly stated that they believed their bank to be too small for computer processing. The above results indicate that the majority of the respondents decided not to use EDP services mainly because they did not feel the immediate pressure to do so, or were waiting for further developments, rather than because they felt EDP is not suitable or feasible for their operations.

The importance of short-term operational pressures was emphasized in the present study where fifteen of the nineteen banks either using EDP services or planning to do so within the next 18 months indicated that operational problems were the major cause for considering automation (Table 5.2). Three of the remaining four banks had decided to use automation from the day the bank opened or very shortly after, feeling that it would prevent future operational problems with personnel and equipment.

TABLE 5.2

NUMBER OF BANKS RESPONDING TO THE QUESTION
"WHAT WERE THE REASONS FOR CONSIDERING AUTOMATION?" *

	<u>Main Reason</u>	<u>Secondary Reason</u>
Operational Problems	15	13
Bookkeeping Equipment Problems	5	4
Difficulties in procuring increasing volumes	4	-
Bookkeeping Personnel Problems	3	7
Increasing cost of bookkeeping operation	2	-
Increasing number of errors in bookkeeping	1	2
Desire to avoid future Operational Problems	3	-
Need to meet services offered by competition	1	2

* Does not include the four banks with no plans for EDP.

The two main operational pressures were in the area of equipment and personnel. Before the arrival of computers, the majority of banks used NCR or Burroughs Corporation posting-machines. At present, the manufacturers do not encourage purchasing new machines and the major source of supply is the market of used equipment. Many of the banks used the same machines for eight to nine years or bought them used in the first place. Some of the banks had obsolete machines which had to be replaced anyhow, and that motivated them to consider EDP. Other banks suffered from an increase of maintenance problems because increased volumes resulted in the overloading of existing equipment.

Closely related to the problem of equipment is the problem of personnel. As indicated in Chapter III, Section A, many banks suffer from a high turnover of women employees. This is a problem since women traditionally constitute the majority of employees in the bookkeeping departments. The conventional bookkeeping machines required the operator to have a certain amount of expertise, gained through on-the-job training lasting on the average 6-8 months, before the employee was able to utilize the equipment efficiently. With turnover reaching 25 to 35 per cent per year in the bookkeeping departments, processing problems developed which resulted in delays of posting and an increasing percentage of errors. Another personnel problem mentioned by several bankers was the problem of rising labor costs. The increase in minimum wages was felt most strongly in the conventional bookkeeping department where wages were traditionally low.

The combination of decreasing efficiency, increasing costs and increasing volumes were the main triggering cues for the majority

of banks participating in the study. Their response to the question of why they started to consider automation was usually "We had to-do-it" rather than "We planned it as part of the development of the bank." In the four banks that did not have immediate plans for automation, the main reason given for not automating was that management was satisfied with the existing situation and hesitated to get involved in a long process of decision and change.

The data lead to the following proposition:

Proposition No. 1: The main reason for considering automation is operational pressures. Long-term planning considerations cause the bank to "sit and wait" while immediate problems force it to initiate the decision process.

3. Who Initiates the Process

Computers have been used in banking since the mid-fifties. In the beginning, they were limited to the larger banks in the country, but in the last five years, medium and small banks have begun utilizing computer services as well. In addition to the general exposure of the public to literature and news about expansion of EDP services, professional literature, conventions and meetings with other bankers directed the bankers' attention to EDP services. The professional associations like American Banking Association (ABA) and National Association of Bank Auditors and Controllers (NABAC) have had, since the early sixties, special research departments and projects concerned with automation research.

In 1960, the ABA issued its check standards under the common machines language. This established a uniform format for the use of magnetic-ink character recognition (MICR) and was considered to be one of the most important milestones toward automation (Yavitz, 1967, Ch. 2).

As can be seen from the above developments, automation was brought to the attention of most bankers several years ago. For that reason it is difficult to establish the exact date when the idea of automating a specific bank first occurred to its management. When asked about it, most bankers replied by stating they have thought about automation for several years but could not quote an exact date when the idea was first mentioned. It is easier to establish when, why and by whom the first serious step toward considering automation was made.

Many bankers had operational problems for some time before they started to investigate the possibility of automation. In most cases, it was the combination of a specific proposal by an outsider plus operational problems that motivated the decision. In 16 out of the 22 banks from which answers were received, the first proposal came from a source outside the bank (Table 5.3), and in all but one of those cases it was from an outsider trying to sell computer equipment or services to the bank. In one isolated case it was a banker who took the initiative in calling together other bankers in the area for the purpose of establishing a joint venture.

In the six situations where the process was initiated by an insider, the individual was the operations officer or the president of the bank. When the process was initiated by the president, it turned out that he had been closely involved in day-to-day operations, and considered himself responsible for the supervision of operations in the bank.

Proposition No. 2: a) Although bankers are aware of the existence of EDP services in their industry, it takes special circumstances to initiate a decision to use such services. b) In most cases, it takes a combination of operational pressures and the approach by an outside supplier of EDP equipment or services to initiate the decision process.

TABLE 5.3

THE FIRST SERIOUS PROPOSAL TO CONSIDER EDP SERVICES
FOR THE BANK WAS MADE BY:

<u>Person Inside Bank</u>		<u>6</u>
President	3	
Operation Officer	3	
<u>Person or Group Outside the Bank</u>		<u>16</u>
A Computer Manufacturer	5	
An Off-Premises Service I) Another Bank	5	
II) Service Bureau	5	
Other Banker in Area	1	

B. The Initial Search-Some Basic Decisions

1. Possible Approaches to Automation

Once the management of a bank is motivated to consider automation, it has to define its decision in terms of goals and expectations. The decision maker can view the problem facing him from one of several aspects which are presented here in the order of their impact on the organization.

1. He can view it as a decision regarding only a change of equipment. The present bookkeeping machines would be replaced by different ones or eliminated altogether by transferring the work to an off-premises service.
2. He can view it as a decision affecting only the bookkeeping department. Changes would occur only within the bookkeeping department while other departments in the bank would continue to operate in the same fashion as before the conversion.
3. He can view it as a decision involving only the information system and the operational procedures for existing services.
4. He can view it as a decision involving expansion of bank services and changes in management orientation.

Which of the following categories best characterizes the decision made in the individual bank will depend on what the decision maker's

goals and expectations are. In the ABA survey mentioned above, 133 banks having deposits of \$10-49 million classified seven factors according to their impact on the decision (Table 5.4). The most important factor was the desire to improve the internal system of operation (reported by 71.4 per cent of the bank). This was followed by the desire to freeze or reduce cost (63.9 per cent) and improve management operations. (57.1 per cent). In the present study, a similarly oriented question was directed toward the importance attached to various items at the time the decision

TABLE 5.4

FACTORS INFLUENCING THE DECISION TO AUTOMATE

(Banks Size \$10-49 million, N=133)

Factors	Percentage of Total Responses to Factor				
	Major Factor	Minor Factor	No Factor	No Response	Total
Improve Internal System	71.43	18.80	4.51	5.26	100.0
Freeze or Reduce Operating Costs	63.91	25.56	3.76	6.77	100.0
Improve Management Reports	57.14	27.82	6.77	8.27	100.0
Increase Flexibility in Handling New Business	42.86	38.35	9.77	9.02	100.0
Enable Bank to Offer Additional Services	40.00	36.09	14.29	19.57	100.0
Meet Competition	36.34	37.59	17.29	9.77	100.0
Tighten Audit and Control	21.05	48.85	21.80	8.27	100.0

Source: ABA 1966 Automation Study

to automate had been considered (Table 5.5). The areas of data processing and information were rated the most important, and such items as supplying accurate information, increasing speed of operations and supplying more information were emphasized.

When the responses of the bank's chief executive were compared to those of other senior officers, including the senior operations officers, some statistically significant differences were found. The senior management was much more concerned with operational problems than were the banks' presidents. The former ranked as more important such items as "replacement of obsolete bookkeeping" (significant statistical difference at $\alpha < 0.05$ level), "need to supply more information" (significant difference at $\alpha < 0.05$ level) and "achievement of improved management control over operations" (at $\alpha < 0.025$ level). The presidents' group scored higher on such items as "meet competition from other banks" or "reduce labor needs for the bank."

2. EDP Knowledge in the Bank

Most bankers had very little previous knowledge about any aspect of EDP. Some had read articles about it in trade magazines or in the general press, and some had visited other banks that use EDP services, but even these lacked the knowhow needed to evaluate EDP and to anticipate its impact on the bank. Only in three of the banks visited were there persons who had received some knowledge about EDP through previous work in other banks or courses taken in the operation of EDP. In the remaining twenty banks the decision process gathered

TABLE 5.5

IMPORTANCE ATTACHED TO ITEMS MOTIVATING
THE DECISION TO AUTOMATE*

	NUMBER OF BANKS RESPOND	MEAN	STANDARD DEVIATION
1. Supply more accurate information	22	6.77	1.31
2. Increase speed of operations	22	6.68	1.49
3. Achieve improved management control over operations	18	6.44	1.15
4. Supply more information	22	6.41	1.14
5. Improve customer services	22	6.36	1.14
6. Offer more services to customers	22	6.18	1.59
7. Reduce labor needs	22	6.09	1.72
8. Reduce costs	22	5.55	1.71
9. Replace obsolete bookkeeping	21	5.52	2.23
10. Meet competition from other banks	22	5.23	1.90
11. Achieve improved management control over employees	22	5.00	1.77
12. Increase prestige of the bank	22	3.91	1.74

* The following scale was used

1	2	3	4	5	6	7	8	9
not important at all		only of little importance		important to some extent		quite important		most important

momentum without anyone in the bank knowing much about EDP. Twelve of the twenty banks took some action to increase the EDP knowhow among the bank's staff. As can be seen in Table 5.6 all of the eight banks having on-premises facilities had, by the time of the conversion, at least one management person with some degree of EDP knowhow. At the same time, of the five banks using off-premises facilities, three had no one in the bank with any significant EDP knowhow and had made their decision based only on information supplied by outsiders. In the case of the two banks belonging to a joint venture, once the initial decision to establish the venture was made, but before details were worked out or equipment ordered, an EDP expert was hired as a manager for the proposed center.

Proposition No. 3: a) The management of small banks, for the most part, initiates the decision of using or not using EDP, whether or not there are people on the staff who have any previous EDP knowledge. b) In banks where the initial inclination is to choose an on-premises arrangement there will be a stronger drive to add people with EDP knowhow to the staff even before a final decision is made.

3. Goals and Expectations

The limited financial knowhow among management and the pressure of operational problems causes management to define the goals of EDP mainly in operational terms. In Table 5.7 twenty of the participating banks show a reduction or prevention of operational pressures and problems to be the main goal of a change to EDP. Only six of the banks mentioned the expansion of bank services among the expected goals, while the remaining banks did not associate the decision to use EDP with the expansion of services. Some, however, mentioned it as a

TABLE 5.6
EDP KNOWLEDGE IN THE BANKS
BEFORE AND DURING THE DECISION PERIOD

Type of Arrangement	Number of Banks in Group	Initial Situation			Action Taken			
		Banks Not Having People with EDP Knowledge	One Person with Partial EDP Knowledge	Hired Person with EDP Knowledge	Gave EDP Training to One Person in Bank	Combined Inshop Training with Outside Hiring	Nobody with EDP Knowledge	
Banks with no EDP at present	8	6	-	-	-	-	8	
Banks with on-premises system	8	6	2	4	2	2	-	
Banks using off-premises service	5	4	1	1	1	-	3	
Banks belonging to joint venture	2	2	-	1	-	1	-	
Total sample	23	20	3	6	3	3	11	

TABLE 5.7
GOALS EXPECTED TO BE ACHIEVED THROUGH THE USE OF EDP SERVICES*

	N	REDUCE OR PREVENT OPERATIONAL PROBLEM	REDUCE COST OF OPERATION	PRODUCE PROFIT	EXPAND SERVICES
No plans for EDP	4	2	2	-	1
Plan EDP with 18 months	4	4	-	-	-
On-premises EDP	8	7	-	4	5
Off-premises EDP	5	5	1	-	-
Belong to joint venture	2	2	-	-	-
Total	23	20	3	4	6

* Some banks stated more than one goal.

long-term undefined possibility seen as a by-product, rather than as an expected goal. Four banks, all of them with on-premises equipment, stated that one of their main goals in converting to EDP was to increase profits by selling computer services.

It is interesting to note that the goal of cost reduction was mentioned by only three banks, two of which had no plans for EDP at the time of the study. It seems that once the banks start to collect information about the possibilities of EDP, they soon discover that, at best, they might be able to prevent a rise in cost, but in most cases, the cost is likely to be even greater. Thus, the decision of whether or not to convert quickly ceases to be based solely on cost reduction.

As a consequence of limited EDP knowledge, false expectations exist regarding the impact which the decision to use EDP will have on the organization and the information system. Sixteen of the banks expected that the conversion would effect only one department in the bank, the bookkeeping department (Table 5.8). Only three of them expected it would effect the whole organization. In Chapter VI evidence is presented which shows the conversion actually effects more than just the bookkeeping department.

An important advantage of the computer is the extremely high speed with which it processes and summarizes data and produces reports. Therefore, the introduction of the computer is expected to produce significant changes in the information system of an organization. In Section A the desire for additional information was mentioned as one of the triggering cues. It was surprising, then, to find that, while fourteen of the banks indicated an expected change in the information system, only five of these regarded the actual change

TABLE 5.8

EXPECTATIONS OF WHAT THE CONVERSION IMPACT WILL BE ON THE BANK

	N	Department Impact			Information Effect			
		Effect Bkkg. Dept. Only	Effect Whole Bank	Don't Know	Should Improve Considerably	Should Improve To Some Degree	No Change	Don't Know
No plans for EDP	4	-	1	3	-	1	1	2
Plan EDP within 18 months	4	3	-	1	-	-	2	2
On-premises EDP	8	6	2	-	4	4	-	-
Off-premises EDP	5	5	-	-	-	3	2	-
Belong to Joint Venture	2	2	-	-	1	1	-	-
Total Sample	23	16	3	4	5	9	5	4

as a major one bringing considerable improvements to the system (Table 5.8). Of the five banks which did not expect any impact of the information system, four were banks using or planning to use off-premises services.

Proposition No. 4: Most small banks are concerned, primarily, with improvements in the bookkeeping department and view the information changes as a by-product of secondary importance. a) Bankers expect the computer to have a significant impact only on the department most effected by its introduction - the bookkeeping department. b) There exists an expectation that the computer will improve the information system, although not necessarily causing significant changes.

4. Deciding What to Convert

One of the first decisions management faces is determining which applications to implement first. In most cases, the decision is a direct consequence of the operational pressures existing in the bank. The majority of banks approach the issue by choosing one application at a time, the most popular being demand deposit accounting which, in most banks, accounts for the majority of the paperwork in the bookkeeping department. Of the nineteen banks, ten decided to convert demand deposits first and two decided to start with savings where the main problem is the calculation of interest and preparation of income tax forms (See Table 5.9). Six of the remaining seven banks initially laid out plans for the conversion of two applications at once or one closely following the other. Once the decision makers chose the specific function, they would proceed to determine the type of arrangement they preferred and start collecting information.

TABLE 5.9

MAKING PLANS FOR CONVERTING APPLICATIONS TO EDP

	<u>Number of Banks</u>
Initially planning one application only - Demand Deposit	10
Initially planning one application only - Savings Deposits	2
Initially planning two applications - Demand and Time Deposits	4
Initially planning two applications - Demand Deposits and Proof and Trust	2
Initially planning four applications	1

Proposition No. 5: a) The approach taken by bankers in deciding which applications to convert is done sequentially by planning and converting one or two related applications one at a time rather than several at once. b) Deciding on which application to implement first seems to most bankers to be a pre-determined decision, influenced by operational factors regarding the present system.

5. Available Forms of Automation

The small bank can choose between two major types of EDP services: on-premises computer services and off-premises computer services. The first group includes banks which have their own

equipment on the bank premises or at a nearby location. The computer department is one of the bank's departments, and the entire cost of operation, equipment and personnel are covered by the bank regardless of volume. The computer itself may be bought or leased. The second group of off-premises services has a larger variety of possible arrangements: 1) using another bank's computer, usually their correspondent's; 2) using a service bureau; 3) belonging to a joint venture; and 4) using the computer facilities of the holding company, if the bank is owned by one.

The 1966 ABA automation survey shows that, while slightly over half of the total number of responding banks have on-premises equipment, only close to 40 per cent of the banks with deposits of \$10-49 million have their own facilities (See Table 5.10). More banks in this size group (8.66 per cent) belong to joint ventures, or use service bureaus (13.56 per cent) than in the total sample (6.71 per cent and 11.17 per cent respectively). The big difference lies in the use of correspondent bank services where 38.4 per cent of banks in the above group use such services compared to only 30.8 per cent in the total sample. The differences between the various arrangements are outlined below.

a. Leasing or Purchasing a Computer. Acquiring one's own computer involves the most complex decisions of all. Management must consider the problems involved in setting up a new department, contracting for equipment, and hiring or training people with skills not common to the banking industry. These exist in addition to the regular problems facing the decision maker who chooses an off-

TABLE 5.10

TYPE OF COMPUTER ARRANGEMENT USED OR PLANNED TO BE USED BY
BANKS WHICH HAVE MADE THEIR DECISION

(Percent of total respondents in group)

Type of Arrangement	All Banks N=1342	Banks Size \$10-49 Million N=531
Operate on-premises computer	51.27	39.36
Belong to a joint-venture	6.71	8.66
Use off-premises service	42.03	51.98
a) Correspondent bank	30.85	38.42
b) Service bureau (including holding company)	11.17	13.56

Source: ABA 1966 Automation Survey

premises arrangement. Whether or not the bank decides to lease or purchase the equipment, the decision to use on-premises computers demands a much higher commitment of resources in people and money.

Most of the bankers who decide to acquire their own computers do so for a negative reason; they do not trust the off-premises services, especially if they are offered by another bank. In six of the eight banks that have their own computers, management stated that they did not seriously consider the possibility of using an outside service. Four of the six explained that the main reason for such an attitude was the fear that the larger banks providing the services would gain too much competitive advantage as a result of being able

to look at the work processed. The remaining two banks were primarily concerned that an off-premises service would not be able to give them enough flexibility and attention. Of the eight banks which do not use EDP services at present, five indicated that they are against using a correspondent bank service because they wish to keep certain information confidential. Similar reactions were given by the two banks who chose to belong to a joint venture and by the one choosing a service bureau arrangement. All three banks felt that the arrangement they chose gave them better control of the operation and enabled them to prevent information leakage to competitors. Another reason often mentioned by bankers who object to using the EDP services of another bank is the fear that customers will lose respect for a bank which has to use the processing services of another, especially if both banks are located in the same town. For that reason two of the four banks using a correspondent bank's EDP services preferred to use the facilities of banks located 50-100 miles away although banks in the same town offered competitive services.

Proposition No. 6: There is a considerable group among small bank managers which does not trust the EDP services offered by larger banks for: a) fear of revealing competitive secrets, and b) fear of losing their prestige among those customers who prefer an independent bank.

b. Using a Correspondent Bank Service. Using a correspondent bank service is probably the simplest form of automation available. The preparations which the bank must make in order to automate are minimal and often the correspondent bank stands ready to assist, at every step, the bank which is automating. In most cases, the correspondent bank will take programs which it has already had in use

and apply these in the new bank without modifications or with minimal ones. However, the system which the correspondent bank has developed may not be optimum for the subject bank. Yet, in most cases, they are forced to adopt it. Herein lies one of the potential drawbacks of using a correspondent service. In a real sense, then, the ultimate effectiveness of the automation will depend on the quality of the correspondent's service rather than on the bank which is automating.

The chief advantage of using a correspondent service is that the bank which is automating is not required to have a staff member who is familiar in detail with computer programming and systems work, although such a person is, of course, desirable. Moreover, the bank benefits from the learning experience of the correspondent and, at the same time, saves money on personnel. All this assumes, of course, that the correspondent has developed an effective systems group and some efficient programs. This is an assumption which is often difficult to verify; however, a bank can shop around and compare services offered by correspondents and come up with some kind of satisfactory answer.

In recent years more and more large banks with EDP facilities have launched an aggressive drive to solicit the processing business of small banks. The larger banks often employ special salesmen who try to solicit business for the computer department and frequently offer their services to banks in a radius of up to 300 miles. The transfer of the documents is done by cars, although a few banks use helicopters or small plane service. It is expected that within a

few years the use of remote control data stations will become more feasible, cost-wise, which should eliminate many of the problems of the transportation of documents.

There are several reasons why the small bank, despite its reservations, finally decides to use a correspondent bank service. One important reason mentioned above is the relative simplicity of the conversion. The small bank uses the programs developed by the larger bank and can take advantage of the knowhow accumulated. Another important reason is the long-lasting relationship which often exists between the small bank and its correspondent. If the small banker has been satisfied with his past relationship with the correspondent, he will be tempted to consult it again in new areas of operation, rather than develop new relationships with a service bureau, or get involved in the organizational and financial problem resulting from establishing on premises EDP services.

c. Using a Service Bureau. Using a service bureau is similar in many respects to using a correspondent service. The service bureau has usually developed some competence in working with other banks and, therefore, has a stock set of canned programs which it can apply. The service bureau may have the added advantage of having had more extensive experience in general computer work than a correspondent bank. On the other hand, one might argue that the correspondent's experience would be more relevant and, therefore, better for the bank.

In some areas there are service bureaus which specialize in banking automation services, and from discussions with bankers

around the country, these service bureaus tend to provide better services than service bureaus where data processing in banks is only one of several jobs. The major complaint against the latter group is that they often fail to appreciate the specific requirements of the banker.

d. Using a Holding Company Computer Center. This arrangement may be regarded as a specialized form of the preceding two arrangements. In many cases, the bank which is closely held will not have the option of choosing the nature of its automation program. Typically, the decision to have a computing center which will service all companies held by the holding company is made at a high level in the parent company without consulting individual member companies.

There is, however, a disadvantage in using a holding company center: most holding company centers have the objective of balancing the service for all their member companies. Consequently, a given member bank may discover that his specific needs are not met by the computer center. Rarely, then, will a holding company center feel compelled to compete with the nature of the service offered by a correspondent or a service bureau.

e. Participation in a Joint Venture. The 1967 directory of bank joint-venture computer centers lists twenty-seven joint ventures owned by 212 participating banks (including fifty-five savings banks). The majority of those centers have ten or less participating banks and, with the exception of one center with a membership of fifty-two savings banks, average 6.5 banks per center. With the exception of the

largest center the average size of bank assets represented is \$310 million per center, with the average bank assets of the individual bank being \$48 million.

The joint venture was held up for several years as the ideal solution for the small bank which cannot afford its own computer but which desires to get deeply involved in automation. Evidence is accumulating, however, that joint ventures involve some very tough problems which in some cases seem to be insurmountable. Not the least of these problems is the very first task of arriving at an agreement as to the nature of the joint venture and the degree of participation of each of the banks involved. Even though the banks which enter into the joint venture are usually close geographically, they typically have very different individual circumstances in terms of the market they pursue and their goals. For example, one bank may wish to promote time deposits, but may have little interest in consumer loans, while another bank might be promoting demand deposits and at the same time be heavily involved in consumer loans. In such a case where the resources which can be committed to a joint venture are naturally limited, there must be compromises on the part of each bank. These compromises are sometimes difficult and painful to achieve.

The other outstanding difficulty has to do with the competitive position of the banks. The joint venture itself is based upon cooperation and the pooling of resources. At the same time, however, the banks which are cooperating are competing. It is extremely difficult for a member bank to overcome the feelings of propriety which it will

naturally feel for a concept or a program which it develops. It is necessary then to establish some guidelines in the very beginning of a joint venture which specify who will participate in what programs and who will foot the bill. The simplest agreement, of course, would be to have all programs available to all banks, but in cases where this agreement has been made, it is known that some banks have been reluctant to develop programs which they desired because they were unwilling to have the other banks reap the advantages.

In any case, a bank's commitment to the whole process of automation is greater in a joint venture than in the three other off-premises forms described. A center must be established, machines must be purchased or leased, people must be hired to design the programs and run the machines, and the entire venture must be managed.

6. Choosing the Type of Arrangement

The banks participating in the study were asked to indicate which service arrangements were considered by the decision makers. Of the eight banks which chose on-premises arrangements, only one bank considered at all the use of an off-premises arrangement. Of the two banks participating in a joint venture, one did not investigate any other arrangement while the other at first considered the possibility of using the services of a correspondent bank. Among the four banks choosing a correspondent arrangement, two considered using a service bureau, while the other two did not investigate alternative possibilities. The bank using the service bureau inquired briefly about the possibility of using a correspondent but never progressed enough to solicit a formal proposal.

Among the four banks which plan to use EDP services within 18 months, two considered only one type of arrangement while the remaining banks considered two types each. Of the total group of 19 banks, only five gave any consideration to more than one type of arrangement, but none considered more than two different types. In the following section the effect of the limited arrangements considered on the final evaluation and decision are discussed.

Proposition No. 7: One of the first decisions made is in regard to the type of arrangement to be considered. The decision maker usually prefers one specific type of arrangement and proceeds to collect information only on this specific type.

C. Collecting the Information - The Feasibility Study

1. The People Involved

Once the initial interest in automation is established, the bank then proceeds to collect information on the specific alternatives. While the first serious proposal is, in most cases, made by an outside agent, usually a salesman for the equipment manufacturer or the service provider, the initiative from there on has to be taken by officers within the bank. Three main roles which need to be performed can be identified as follows:

a. Guiding the Decision Process. This role is usually fulfilled by one of the officers who is most interested in automating the bank. He is the one who is promoting the idea of automation and trying to get a positive decision toward automation. As long as there

is no such person in the bank, the idea of using EDP does not have a chance to materialize. Usually the person with this role is directly involved in the daily operation work. In some cases, though, he might be the president himself, and then the motives might be influenced by more than just operations.

b. Supporting the Activity. Unless the person who guides the process is the president of the bank himself, he will need support for the idea from the president and other senior officers. The number of supporters and their roles will depend on the specific power structure of the bank and the way in which important decisions are made. In banks where the president is the main force behind policy decision, it is essential that he be one of the main supporters of the idea, especially during the stages of evaluation and final decisions. At earlier stages, at least the passive support of the president is needed to allow the person guiding the process to proceed with the necessary action.

In banks where policy decisions are made by a group of senior officers rather than by a single man, passive support of the majority of the group is needed in the early stages and active support during the final stages.

c. Collecting the Information. In the small bank with a limited management staff, this role will often be fulfilled by the same person(s) guiding the process. In some cases, he may receive help or delegate part of the job to a junior officer or a supervisor of operations. Because so few people in the bank understand the process of automation, those involved in collecting the information

frequently become the most knowledgeable in the bank on the subject, and in the final decision stages they can have a significant impact on the outcomes.

In Table 5.11 the people who execute the three roles in the participating banks are identified. In the banks having no plans for EDP the main problem was that top management was not willing to support the idea of automation and, inspite of two of the four banks in this group having persons at the senior management level who were interested in automation, the decision process was not initiated. Only in one bank out of the four has any effort been made to collect relevant information for the initial stages of the process.

In the banks where the decision has already been made or is in an advanced stage of planning, the majority of persons guiding the process were operations people. In ten such cases it was the senior operations officer, while in four of them it was a junior operations officer. In all the banks where a junior operations officer guided the process it was done with the strong support of the president of the bank. In five of the six banks where the president guided the process, it was found that he had kept in close touch with daily operations all along, and his interest in automation had developed as part of his daily contact with operational problems. It will be noted that in all but one case the guidance of the process was associated with a single person rather than a group.

In all but one of nineteen banks where there was support for investigating the possibilities of automation, the support came from top management, and in sixteen of the cases, the group of

TABLE 5.11

ROLE OF KEY PEOPLE IN THE BANK DURING THE DECISION PROCESS

Type of Arrangement	N	Guide the Process					Actively Supporting the Idea					Collect Information					
		President	Senior Operation Officer	Junior Operation Officer	President and Senior Operation Officer	Nobody	President	Senior Operation Officer	Members of Board of Directors	Two or more of Senior Management	Nobody	President and Senior Officers	President and Junior Officers	Senior Operation Officer	Senior and Junior Operation Officers	Junior Officer	Nobody
No plans for EDP	4	2				2					4			1			3
Plan within 18 months	4	1	2		1		3			1		1		1	2		
On-premises EDP	8	3	4	1			4		1	3		1		2	3	2	
Off-premises EDP	5		3	2			2	2		1				1	2	2	
Belong to Joint Venture	2	1		1			1			1			1			1	
Total	23	5	11	4	1	2	10	2	1	6	4	2	1	5	7	5	3

supporters included the president of the bank. Only in one case did the main support for automation come from the Board of Directors. In this specific bank, the supporters among the board members were themselves manufacturers and contractors who were acquainted with computer operations and who were interested in having the bank supply computer services, such as payroll, for their own businesses.

The collection of information and the feasibility study were, in most cases, left entirely to the operations people, which involved, in thirteen of the twenty banks, junior officers. In five banks this job was left almost entirely to the junior officers, while in three banks the information collection was carried out by the senior management only.

2. The Feasibility Study

The phase in the decision to convert to EDP that has received the most attention in the literature to date is that which is concerned with the feasibility study. In almost every study or textbook dealing with change to automation, a chapter or section is devoted to the need for, and details of, the feasibility study, and several reasons are given on why it is so important. For example:

"Feasibility studies are essential for three reasons. First, risks resulting from inappropriate or unwise use of EDP can be reduced by a feasibility study. Second, a feasibility study will help the firm avoid the many pitfalls associated with computer usage. Finally, a firm's feasibility study will point the way to advantages and benefits (Both tangible and intangible) through changes in data processing methods." (Sanders, 1966, p. 50.)

Professor Yavitz in his study of automation in commercial banking suggests that a sound feasibility study should include six major steps.

1. A thorough survey should be made of current operating procedures, volume statistics, policies, personnel utilization, and relevant costs.
2. New systems should be developed in rough form only, in no more detail than is needed to determine overall equipment requirements and approximate processing time.
3. Utilizing the second step, broad equipment specifications should be determined and all one-time costs computed.
4. The economic feasibility of the new system should be evaluated on the basis of the first three steps; "before" and "after" costs computed and potential savings projected. It is desirable to be extremely conservative in this phase of the study.
5. Other-than-tangible cost factors, both pro and con, should be presented. Both tangible and intangible benefits should be considered, not only for the immediate future, but for several years ahead. Often a period as long as ten years is considered, using the best available forecasts and estimates of future operational requirements.
6. Finally, a step-by-step program and timetable should be presented for the full implementation of the new system. (Yavitz, 1967, Pp. 32-33)

This approach can be summarized in the following steps:

1. Define the objectives
2. Take inventory of the present system with regard to cost, people, information generated, speed, accuracy and problems resulting from present system
3. Design a system that will achieve the objectives and resolve the problems facing the bank
4. Solicit proposals that will fit the proposed system

5. Evaluate the proposals and the impact of adopting them from the economic, technical and organizational aspects.

While most writers agree about the necessity of such a study, evidence is accumulating that many small firms do not conduct a formal feasibility study. In a recent study, it was revealed that out of 100 small firms in several industries only 49 have conducted a formal study (Sanders, 1966, p.45), and the figures obtained in the present study point out an even lower percentage.

It was mentioned in Section A and B that most banks first decide if and why they are interested in automation, develop preferences for a specific type of arrangement and only then proceed to collect the specific information for making the decision. Being a relatively informal organization, the bank rarely formalizes its objectives during the initial search. The only cases where this was done were instances when the person guiding the process was a junior officer and was required to report the developments in writing to his supporters among the senior officers.

Due to the minimum amount of EDP knowledge in the small bank, the people guiding the process or having the responsibility for collecting the information are not in a position to design the system most suitable for their organization. Only in two of the banks was such an effort made. In the first, this was done by a computer expert who was brought into the bank to establish and manage the on-premises facilities. In the other case, it was done by the manager of the joint venture with the help of a consulting firm. A proposed system was outlined before proposals from manufacturers were solicited.

This leaves the persons involved in the decision process with two main functions during the information collection phase: that of taking inventory of the present system, and that of soliciting proposals. This could still provide the bank with most of the benefits of a full-scale feasibility study, and when asked about it, each of the nineteen banks indicated that some data were collected before a final decision was made. But closer observation showed that only three of the banks conducted what could be considered an organized and formal feasibility study.

a. Evaluating one's own system. Fourteen of the banks left the initiative of data collection concerning their own operations to outside salesmen who were interested in selling them the service or equipment. Whatever information was collected inside the bank was done in response to a request by an outsider. As a result, in those fourteen banks, either no records of the data collected were kept, or they were in the form of some handwritten figures on scattered pieces of papers.

There are several explanations why this is so:

1. Only one bank out of the 23 included in the study had a cost accounting system, and even there the system became effective only after the decision to install a computer was made. Because of the lack of cost data, it was difficult to establish the exact cost of segments of the pre-computer operation system and to determine exactly what changes would occur as a result of automation.

2. The bankers typically neglected the investigation of the information system with regard to reports, records and movement of information. The feeling of most of the persons responsible for collecting the information was that the bank was small enough for them to know all the details of the present information system without formally writing it down, and the end consequence was that very little attention was paid in the final evaluation to the information aspects.
3. The small bank has little recorded information on the market it is serving and its future prospectives. The senior officers know their customers well, but the bank as a whole lacks the ability to make forecasts about future growth. The result is that the needs for automation are often based on the present volumes and conditions rather than on those of the future. Considering that in on-premises installation, the time difference between decision and actual conversion is often over a year, this approach can cause significant difficulties. In two of the banks where efforts were made to estimate future growth, the actual growth turned out to be twice as much as expected, and within six months of the installation, the need was felt for equipment with greater capacity.

In part, these difficulties also arise from the special circumstances under which the information is collected. Regardless of the organizational level of the person responsible for the study, most authorities are in agreement that there are certain characteristics which he must

possess. According to one source, the most important qualities which the responsible party should have are:

- (1) Thorough knowledge of the company's policies.
 - (2) Ability and desire to stick to endless details, and persistence enough to see the job through.
 - (3) Ability to organize, direct and supervise others.
 - (4) Knowledge of accounting systems and records retention.
 - (5) Ability to visualize installation requirements.
 - (6) Knowledge of cost of operating an EDP system.
- (Perry, 1963, Pp. 49-50)

Except in the cases where a new person was especially hired to do the job or a consultant was employed, the people responsible for the information collection did not have the sufficient knowledge to do a thorough job. As indicated in Table 5.6, only nine of the banks hired a person with EDP knowledge to help in the decision and run the operation. At the same time, only three bank's made any use of an outside consultant, while the rest relied solely on their own or the supplier's knowledge.

Another difficulty was that in all but one case, the persons responsible for the information collection had to do it in addition to their regular duties in the bank and could not devote their full time or attention to information collection and evaluation.

Proposition No. 8: The use of outside consultants in data collection and evaluation is almost non-existent, despite the lack of technical and system knowhow among the decision makers in the bank.

b. Soliciting Outside Proposals. Service providers and computer manufacturers are active in trying to solicit customers.

In Table 5.3 it was indicated that in the case of 16 out of 20 banks, the initiation of the automation decision process was attributed to an agent outside the bank. Yet by the time it

came to the stage of soliciting proposals for final decisions each bank had only a limited number to choose from, as can be seen in Table 5.12. Ten of the fifteen banks had only a single proposal for consideration and another four had two proposals to choose from. Only in one case, that of a joint venture, did the decision makers have a total of five detailed proposals in front of them. Although the average number of contacts with outside suppliers was 4.1 for each bank, in the final stages only an average of two proposals per bank were considered. This occurred for several reasons.

1. An early decision having been made by the banks about the specific type of arrangement they were interested in. Once such a preference

TABLE 5.12

NUMBER OF PROPOSALS SUBMITTED TO THE BANKS FOR EVALUATION

Type of Arrangement	N	Number of Detailed Proposals Submitted and Considered				
		1	2	3	4	5
On-premises system	8	5	2	1		
Off-premises system	5	2	2		1	
Joint Venture	2			1		1
Total	15	7	4	2	1	1

was indicated by the senior management, serious proposals concerning the service or equipment procedures of other types of arrangements were discouraged.

1. Salesmen's time involved in preparing the proposal.
The development of each proposal, especially for those interested in on-premises arrangements, takes considerable time and effort on behalf of the salesmen. Because of the difficulty involved in getting cost and flow data concerning the conventional system, many salesmen are willing to spend the time involved only if they get some encouraging signs from management that their proposal has a reasonable chance of being accepted. This factor becomes less important if the bank is considering the use of a correspondent bank service for which the proposal is usually much simpler and shorter.
3. Reluctance of bank officers to spend time supplying the needed data. Due to the lack of written records, most of the information collected by an outsider has to be done in face-to-face meetings with the operations people in the bank who are often reluctant to spend any considerable amount of time dealing with several different salesmen.
4. Personal biases of the decision makers. The persons guiding the process and those providing the support often have personal preferences for a specific proposal.

In some cases, these biases are revealed only in the final stage of the decision (to be further discussed in the following section), but often the salesmen know about them in an early stage of the proposal development and decide to drop out of the race.

c. Field Visits. Visits to existing installations are very popular and are made by all the people involved in the decision process whether they are in the role of guiding the process, providing support or collecting information. A few years ago the trend was to invite the bank representatives to visit an exhibition center, usually located in a manufacturing plant or sales office. But the bankers often resented the idea of being shown a demonstration and preferred to see the equipment in actual operational conditions. Therefore, almost all visits today, for bankers interested in on-premises arrangement, are made to installations operated by other banks. In the case where an off-premises service is considered, visits are arranged to the correspondent bank or service bureau.

Such visits were arranged in all the participating banks; and, in most cases, the entire senior management, even those not directly involved, took part in them. The usefulness of such visits for anything but impressing the visitors is doubtful. In a short visit, lasting only a few hours, the person without previous EDP knowledge has little chance of understanding what is happening and learning about operational procedures and problems

involved. In five of the participating banks, members of the Board of Directors were also invited to visit EDP installations and, based on their short visit, made their decision to approve the automation plan.

More useful than the short visits to installations are the short training periods to which bank representatives are invited even before the bank makes its decision. The programs range from three days to two weeks, and are offered mainly to the operations officers in the bank. The person guiding the process will, in most cases, be invited to at least one such program, if the salesmen feel there is a possibility that the bank will use an on-premises arrangement. In such programs, the participants learn more about the equipment capabilities, problems of conversion, and development of programs. In several of the banks participating in the study, the information the bankers accumulated during the program was all that they knew about EDP, and thus it influenced their final decision considerably.

Proposition No. 9: The feasibility study in the small bank is at best only a partial one concentrating on the cost aspect and neglecting organizational and system aspects.

Proposition No. 10: The data collection is restrained by internal conditions in the bank and results in a limited number of proposals for final consideration.

D. Evaluation and Making the Decision

Once the people involved in the process feel they have the information they need to make the decision, the moment of commitment approaches. By this time, for most bankers, the decision is not

whether to start using EDP, but rather, which specific proposal to choose. The decision makers know by now what type of arrangement they are going to use and what will be the first application converted. In those cases where the president's role had been one of giving support rather than guiding the process, he will, at this point, usually step in and take an active part in the final decision. In most cases, the Board of Directors will be advised on the developments, but they will not be called upon to give formal approval until after the actual choice has been made by the management of the bank.

1. On-Premises Arrangement

As indicated in the previous section, the decision maker might have to choose from one to three different proposals from equipment suppliers. Of the numerous computer manufacturers on the market, the five leading ones, IBM, Burroughs, NCR, G.E. and RCA supply over 98 per cent of the computers used in banking (See Table 5.13), with a sixth company, Honeywell, making its first step in this specialized market. When we consider only computers suitable for the small banks, the choice is practically narrowed down to three manufacturers, IBM, Burroughs and NCR, because the other two mainly offer larger computers which the small bank either cannot afford or does not need. IBM has a distinct lead among the three and has, for years, supplied over half of all the computers to the banking industry. Being the leader in the market, IBM can often offer services that the other manufacturers find hard to match. This is especially felt

TABLE 5.13
COMPUTER CONFIGURATION BANKS USE BY MANUFACTURERS: (in percentage)

	Banks having on premises EDP N=619*	Banks having \$10-49 million N=381**
IBM	58.00%	57.74%
Burroughs	20.03	16.93
NCR	11.79	13.38
G.E.	7.27	8.40
RCA	1.13	2.36
Others	1.78	1.57

* All sizes

** Including banks using off-premise arrangements

SOURCE: ABA, 1966, Automation Survey

in the areas of training facilities, maintenance service and back-up equipment. IBM also offers the best sales organization, with trained and experienced salesmen who have a back-up of large sales offices for preparation of offers and solutions for intermediate problems. As was described by one bank president:

"We received formal proposals from IBM and another manufacturer. The salesmen of the other manufacturer would telephone us once in a while to find if we had already made our decision. The IBM people visited us three times a week, explaining the proposal to various officers in the bank, suggesting help in analyzing it and consulting with the officer responsible for the data collection. They would suggest changes and additions in the proposal, and by the time the final decision had to be made, all were in favor of the IBM proposal."

But being the largest and most active can sometimes backfire, as happened in the following two cases. In the first situation, the president of one bank described the final decision as follows:

"The bank was haunted by salesmen, specifically from IBM and to a lesser degree from NCR. But after a short time, NCR estimated that the bank was too small for their system, and therefore, dropped their efforts to sell them a computer when we asked Burroughs to submit a proposal. The bank established an operations committee which was supposed to look into the various computer proposals. The IBM people met with various staff people, including branch managers, operations people and the president and presented their ideas before this group....The feeling of the people in the bank was that all they were getting out of the meeting was just their evaluation of two sales pitches, rather than two systems. People in the bank were leaning toward IBM because IBM had sold the idea that they were the only one who could provide a similar service. They also indicated that the area was an IBM area and the bank could not afford being an island by itself. I felt resentment towards IBM because I believed that the service problem was not that much of an issue....The bank was about to make a decision to choose IBM when I realized that the other people were working on the two different sales presentations rather than two systems. The feeling of the people was that if you decided IBM, no one would criticize you for making such a decision even if it is wrong. I pushed them to reconsider the whole decision. Visits were organized to various computer installations and the whole decision was re-evaluated. As a result of the re-evaluation, we decided to choose Burroughs rather than IBM, although we were the first bank in this area to choose them."

In the second case, the president summarized it the following way:

"I was very impressed with the IBM organization, but they also scared me. We don't want our customer to feel we treat them as numbers, and don't want to be treated this way by our supplier."

This bank decided finally to choose another supplier although the president indicated he believed the IBM offer was just as good.

Still, because of its size and services offered, IBM received the most consideration when the various proposals were considered, as is seen in Table 5.14.

TABLE 5.14

MEAN CONSIDERATION GIVEN TO VARIOUS MANUFACTURERS OF EDP EQUIPMENT*

	Eight Banks Using On-Premises Equipment	Two Banks Using Joint Venture	Two Banks Planning To Use EDP	All Twelve Banks
IBM	7.7	7.7	2.0	7.9
Burroughs	5.4	8.0	6.5	6.0
NCR	4.1	6.7	4.5	4.6
RCA	2.0	3.0	4.0	2.5
GE	1.6	1.0	3.0	1.7

* The following scale was used:

1	2	3	4	5	6	7	8	9
not considered at all		only briefly considered	considered to some degree			seriously considered		most seriously considered

The description of the amount of consideration given to IBM as compared with other manufacturers varied, depending on the level of management. Compared to the senior management, the junior management in the participating banks felt that IBM equipment was given more serious consideration. On the scale employed, the mean response for junior management was 8.20, compared with 6.82 by senior management (a statistically significant difference at $\alpha < .05$ level). The dominant role of IBM in the computer market (See Table 5.13), may have influenced the answers of the junior management group, leading

them to believe that IBM was considered more than it actually was. Of the ten banks which made their decision to use EDP equipment on-premises or in a joint venture, six decided on IBM equipment, three on Burroughs and one on NCR equipment.

The reasons for the final choice varied among the banks, but it is important to note that the cost factor was not the only one considered or even the most important one. The main reasons for choosing one type of equipment over another were:

1. Experience with the bookkeeping equipment the bank used before the arrival of the computer. Three of the banks preferred to choose the equipment of the same manufacturer that supplied them their bookkeeping equipment in the past because they were satisfied with the service he offered. A fourth bank refused to consider a specific manufacturer because it felt the experience with the old bookkeeping equipment was disappointing.
2. Relative strength of the specific manufacturer in the area. Due to the lack of technical knowledge of the equipment, many small banks have to make the choice with insufficient data. Here, the influence of uncertainty avoidance was strongly felt. The decision maker will be inclined to choose a manufacturer of a machine that has already been used in the area, preferably by another bank, and about which no complaints were heard. Four of the banks mentioned this as one of the reasons for their final choice.

3. Previous acquaintance with the specific equipment.

If the person guiding the process or one of the main supporters had been exposed to the equipment, and had favorable impressions, he would push for choosing this type of computer. In one bank, one interviewee involved in the decision described it as follows:

"We chose IBM after our operations officer returned from a three-week course to which he was invited by IBM. He came back so impressed that we had no choice."

A similar explanation was given by two other people interviewed in the same bank. In two other banks, a specific computer was chosen because one of the people involved in the final decision had been exposed to the same type of equipment in other banks.

4. Promises of help in installation, programming, and service. The written proposals of the various manufacturers are usually almost identical in the description of the services offered to the bank using their equipment. The difference often lies in the oral promises made by the salesmen. All will usually add additional promises to help, especially during the conversion time, which were not specified in the written proposal or contract. Here the personal trust of the decision maker in the sales representative, and the image the salesman gives during his contacts with people in the bank can make a difference in the final choice.

5. The specific cost arrangements. Although mentioned last, it is one of the more important factors as long as considerable cost differences exist.

2. Off-Premises Arrangement

The choice here is simpler than the previous one. The bank looking for an off-premises arrangement has already, at this stage, a strong bias toward choosing a specific proposal. The main factor influencing the decisions are:

1. Previous acquaintance with the service provider. Two of the four banks choosing a correspondent bank indicated that, from the beginning, only one offer was seriously considered, although in one case more were submitted. In both cases, the service provider was a large correspondent bank which had helped the subject banks on various occasions in other matters and, therefore, had a leading place in the race to offer computer services.
2. Pre-determined bias against some proposals. It was mentioned in Section B that many bankers fear their competition will have an advantage if the latter processes their work. Therefore, proposals submitted by banks in the same competitive area are frequently eliminated in the final stage. This factor played a major role in the decision of three of the banks that had already decided on a specific service and in the decision of two of those planning to automate within 18 months.

3. The reputation the service providers have established for themselves. If the service bureau or the bank is already providing satisfactory services to other banks in the area, they will have a distinct advantage over a new service bureau or bank just starting to sell such services.
4. Cost of service. While equipment manufacturers will usually not offer discounts, the off-premises service provider will often do so to meet a competitor's offer. Therefore, there will be little price differential among the various offers, and price will not be a major factor in the final phases of the decision.

Other factors, such as the type of reports to be supplied and help in the conversion are sometimes discussed, but they play only a secondary role in the final decision.

3. Joint Venture Arrangement

A bank facing the decision to join a cooperative effort faces two different decisions at this stage. The first and most important is the decision of whether or not to join the other banks and participate in the venture. A positive answer may mean a large commitment of capital, as well as an adjustment of management philosophy, as dependence on decisions made by several banks must be substituted for independent action. In both joint ventures participating in this study, there were banks that decided at this stage not to join because they didn't feel ready to commit themselves to the special requirement of a joint venture. This left the remaining banks with a decision of whether to continue, at

at this stage so committed to the idea of using EDP through a joint venture that they decided to stay in.

The second decision is the choice of the specific equipment. This is handled in a similar way to that of banks deciding on on-premises arrangements.

4. Who Makes the Final Choice

In Section C, three different roles in the decision process were identified; the guiding of the process, the providing of support and the collection of information. All three roles were performed by members of the staff who favor the idea of automation. A fourth role can now be identified, the role of opposers to automation among senior management.¹ Of the 19 banks which had already made their decisions, only four indicated that there was some degree of opposition to the use of computer services among senior management. In all four cases, the opposition came from officers who were not directly connected with operation and who were minimally involved in the decision process up to the final stage of decision. Three of them were in banks that decided to get on-premises equipment and, in all three cases, the opposers believed the bank was too small to get its own equipment and that the project would be too costly for the bank. In the fourth case, the

¹Opposition among other members of the staff usually becomes evident only after the decision was made and will be discussed in Chapters VI and VIII.

decision presented was the use of a correspondent bank service and opposition grew on the previously mentioned ground that the bank would lose the confidence of the customers.

In two of the cases, the opposition was strong and influential enough to postpone the final decision for six to eight months, but the final decision was not changed in any of the cases from the one favored by the person guiding the decision process.

As mentioned earlier the final decision is made by management rather than by the Board of Directors. Only in one case out of fifteen did the Board of Directors show enough opposition to the decision presented by the management to cause the postponement of the conversion for three months. When more data were presented to the Board, it approved the decision.

In most cases the person guiding the process favors a specific proposal and presents this specific one only. In eight out of the fifteen banks that made their decision, only one proposal was brought for final approval, although in several of them information was collected on more than one proposal.

During the information collection phase, the junior officers involved in the process often accumulate the most knowhow in the bank with regard to the data. Yet the decision is made by the senior management and depends mainly on the way the information is presented to them. In two banks where junior officers were heavily involved in the collection of information, they felt that the information presented for the final decision was misleading and that a different type of arrangement should be considered. But in

both cases, the interviewer was told that they were not consulted in the final stage: did they take the initiative to present their opinions.

Proposition No. 11: a) The final choice of a specific proposal from among several presenting similar costs depends on personal preference and non-economic or technological factors. b) The final decision is a biased one. (See p. 16).

Proposition No. 12: When the moment of electing a proposal arrives, the decision maker depends on the format in which the proposal is presented by the person guiding the process, and will apply the rules of minimum search and uncertainty avoidance in making his decision (See p. 15).

VI. EXECUTING THE DECISION

Once the decisions of choosing a specific proposal and launching an automation program have been made, the bank must plan and execute the conversion to EDP. Up to this stage the involvement was generally limited to the senior management of the bank, the operations officers and the supervisors. Other employees usually learned that automation had been considered for the bank only through rumors or private discussions with those involved. Executing the decision calls for a more active role on the behalf of most employees, and in this chapter their involvement in the conversion will be discussed.

The first section in this chapter deals with the planning of the conversion, and reviews the subjects that were neglected during the decision process and the steps taken during the planning phase. The second section reviews the execution of the conversion, the problems that develop and their cause. In the final section of the chapter the bank's evaluation of the decision process and execution is presented, with an emphasis on the impact different evaluations have on further utilization of EDP systems in the bank.

A. What is Involved

Many of the bank officers involved in the decision process believe that once the decision to choose a certain proposal has been made, the whole issue of conversion becomes an operational

problem which should be left to the people directly involved, mainly the operations officers. Due to the way the decision process was handled in most banks, the people responsible for the conversion often discovered that some issues which are essential for a successful conversion were left unanswered. Several of them, when interviewed, considered the decision process, up to this point, as the easier part of the change compared to what had to be done during the planning and execution of the change.

Typical topics which were hardly touched by the decision makers until after the decision had been made were:

1. Resistance to changes from three different groups: management not directly involved in the decision process, non-management employees, and finally customers. The questions included under the topic of resistance to change are: a) why does it develop; b) what forms does it take; and c) what is the best way to deal with it.
2. Need for training in the bank. It was emphasized several times in Chapter V that the small bank suffers from lack of knowledge of the technical and operational aspects of EDP. For those banks that use an off-premises arrangement the need for technical knowledge declines, somewhat, once the decision has been made, as the service provider takes care of most of the equipment problems. On the other hand, for the banks moving in the direction of on-premises computer, the need for technical EDP skills increases once the planning starts. In all cases there exists the need for opera-

tional training of those employees whose jobs will be effected by the conversion.

3. Studying the organization. Because of the fact that during the decision process only limited effort was put into the investigation of the existing process, the person(s) responsible for the conversion has to collect information on the existing system before he proceeds to the planning of the change. A detailed analysis of current operations indicating the flow of information from its entrance into the system to its final disposition has to take place. The sources of data, where and how they can be obtained, have to be determined as well as who is going to be effected. Although members of the staff know all this information, putting it on paper for conversion purposes can take considerable time.

4. Time commitment on behalf of management and employees.

Regardless of the form of automation chosen, the conversion planning and execution require considerable amounts of time, especially on the part of the operations people. During the decision process the people involved usually continued with their regular daily activities in the bank. Once the decision was made those directly involved found that the demand on their time increased steadily and unless they devoted all their time to the conversion, the process would suffer during the execution of the conversion.

Each of the four areas is discussed below.

1. Resistance to Change

Employee resistance to change is generally considered to exist in every organization, and is an important inhibiting factor in the adoption of technological change. Professors Mann and Hoffman believe that most technological changes involve a cyclical process which runs as follows:

- (1) "The human problems are rarely recognized by the top executives until the change procedure has begun.
- (2) During this initial period certain groups and individuals begin to express misgivings about the new functions they will be expected to perform.
- (3) Faced with this problem of human resistance, the changers assume that insufficient understanding is the cause, and the emphasis shifts from technical problems to ways of increasing the flow of information to those involved in the change.
- (4) With the personnel problems diminished through increased communication and participation, the changers once again turn their attention to technical areas only to have personnel problems emerge once again. And so the process goes." (Mann and Hoffman, 1960, Pp. 194-195)

In many respects most of the banks followed a similar cycle during the period of planning and executing the conversion. In most of the banks the degree of resistance to change was described as minimal at the employees level and was only a secondary issue among management. But of the fifteen banks which executed the decision, twelve reported some degree of resistance (See Table 6.1). In eleven of the banks the resistance involved management people, while in six of them, employees were involved. It is important to note that

TABLE 6.1

NUMBER OF BANKS WHERE RESISTANCE WAS FELT DURING THE CHANGE TO EDP

Type of Bank	N	Employees Resistance Only	Management Resistance Only	Management and Employees Resistance	No Expressed Resistance
Using on-premises EDP	8	-	4	3	1
Using off-premises EDP	5	1	-	2	2
Belonging to a joint venture	2	-	1	1	-
Total	15	1	5	6	3

in every bank it was made clear to all employees that even if jobs were eliminated as a result of the conversion, no one would be fired or laid-off. Thus, an important cause for resistance was eliminated from the start. In one bank, however, during the early stages of information collection one of the people involved in the process mentioned during a lunch break that if the computer were used many jobs would be eliminated. According to the president of the bank, rumors started and many employees became restless. The rumors spread to other banks in the area and finally reached the president of the subject bank through another banker. He had to call a meeting of all employees to promise that regardless of the decision made about the computer no one would lose his job.

a. Causes for Resistance. In the banks where resistance occurred, it was attributed to three major factors: the lack of information among the employees not involved in the process;

resistance to learning new operation methods and new techniques; and the fear of losing prestige and power in the structure.

Many writers have warned about the importance of providing information about the change. Statements such as "being in on... company information is also a high area in fulfillment of needs of personnel in lower management," (Porter, 1961, p. 18) or, "Resistance can be expected if the nature of the change is not made clear to the people who are going to be influenced by the change" (Zander, 1950, p. 10) appear in almost every article or book dealing with change. It was surprising, therefore, to discover how little information was furnished to employees during the process. Only in one bank were the employees given formal notice before the decision was made about the possibility of automation. In over half of the banks, the post-decision information supplied to employees was limited to the technical aspects of the conversion and lacked an explanation describing the impact on the bank as a whole. In most banks, whenever information was given out to the employees, it was done through the initiative of the person(s) responsible for the conversion in response to a specific problem rather than as part of planned policy by top management.

The second cause was even more evident in the banks visited. The conversion to EDP means that the employees must get adjusted to changes in input forms, new methods of processing material, and new forms of output. The most significant change is in the area of customers' records. Whereas information used to be posted on ledger sheets, with one sheet for each customer, as a result of EDP, items are now posted in a daily journal. If more than information on the latest balance is sought for a specific customer, the employee must

go back to previous journals. This can be inconvenient when a specific transaction has to be investigated.

Employees in the bookkeeping department were the most affected as some of them had to move into new jobs, or adjust to new working conditions. Complaints were especially heard from the old-time employees, who had spent all their working lives using the same system.

There were fewer cases where fears of losing authority, power or prestige caused resistance. But in the five banks where such resistance was evident, considerable problems erupted in the execution of the conversion. In three of the five banks in which on-premises EDP was installed, the head of bookkeeping or the officer responsible for operations felt that his job had been taken over by the person in charge of the computer who was, in every case, younger and newer in the bank. In two of them, the head of bookkeeping finally resigned from the bank, while in the third, the operations officer was, for all practical reasons, by-passed and, instead, the computer man dealt directly with the senior vice-president. In two of the banks, the objection came from the branch people who were afraid of the centralization features of automation. One bank combatted the resistance by finally putting the branch managers on the planning committee for conversion.

In all five banks, where the third type of resistance existed, top management, i.e. the president or senior vice-president, had to become involved before the problems were solved.

b. Forms of Resistance. In the banks reporting resistance, various forms of it were evident.

- a. Insufficient attention given to preparation of inputs for the computer which resulted in errors and delays. This was the most prevalent complaint by the operation people responsible for the conversion. Although it might have been caused also by insufficient or ineffective training, several of the officers interviewed attributed it to resistance rather than training.
- b. In-shop complaints accusing the computer of making mistakes or of not performing the jobs promised. The complaints were circulated among the employees concerned and, in some cases, were also expressed to top management. In the former case, it worked mainly to reduce morale, while in the latter, in at least two banks, it caused enough concern that top management made inquiries among the computer people.
- c. Ignoring the computer output. This form of resistance was attributed mainly to management personnel, whose resistance was more passive in nature. Those taking this attitude preferred to use the old sources of information and would consult computer output only when forced by circumstances.

A fourth form of resistance, that of complaining to customers about the usefulness of the computer, was reported in large banks,¹ but was not evident in most of the small banks. The employees of the small banks preferred to direct their dissatisfaction internally rather than externally. One explanation might be found in the

¹Unpublished study of a large metropolitan bank by Vaughan & Porat, 1966.

family type relationship within the smaller bank, (See Chapter III) where the employees feel greater loyalty to the organization and prefer to solve their problems within the organization, giving the customers an image of a single unit.

Proposition No. 13: a) Resistance to EDP change in most banks is sharply reduced due to the no-layoff-due-to-technology policy which is almost unanimously adopted. b) Employees generally are not formally and systematically informed about the automation program. c) Resistance due to change of distribution of authority and responsibility is the most difficult to overcome and requires action by top management. d) Other problems of resistance are usually handled informally at the operations level rather than formally at top management level.

c. Customer Resistance. The move toward automation had two major effects on customers. The first was that accounts were numbered for identification purposes instead of using the name of the account as an identifying device. The second was the introduction of encoded checks and deposit slips which could be used only for the specific account bearing the encoded number on the check or deposit slip. In the early days of automation, many customers were dissatisfied with those two innovations, especially the second one. Together with early programming problems in some banks, the two changes caused an undetermined number of customers to move from automated banks to non-automated ones.

In the last couple of years, this form of customer resistance almost disappeared. Bankers will still mention cases of a few stubborn customers who refuse to use encoded checks or deposit slips, but it has ceased to be a serious problem for banks. Only in one bank did customers' resistance become a serious problem when the bank changed the form of the monthly statement from a detailed one to one listing only the beginning and end balances and number of transactions, often

called the "Bob Tail" statement. The bank was located in a small town where the two other banks kept using a full statement, and because of customers' objections and transfer of accounts to rival banks, the bank had to return within six months to the use of the full statement.

Proposition No. 14: As long as the form of reports to customers and accuracy of reports are not drastically changed, customer resistance can be expected to be minimal. The conversion can therefore be considered as an internal affair having little impact in the short-run on customer relations.

2. Training for EDP

Following the decision to use a given arrangement, the need for various types of training and education arises in the bank. The need for training varies with the level of the employee, his job in the bank and the specific arrangement chosen. There are, however, certain training issues which are common to all banks deciding to automate. They can be divided into two separate areas. The first is general knowledge of what the computer is doing and what it can do for the bank, and the second is training in those aspects of the person's job which will be effected by the conversion.

In a recent study (Table 6.2) 396 bank officers in banks which converted to EDP were asked what types of training would be most useful at various levels in the bank. Their opinions were that at the management level, general understanding of computer capabilities is most important and this was closely followed by the need to learn how to read and interpret computer output. On the clerical level, training in preparation of input for the computer was described as most needed and was followed by the need to learn to read and interpret computer output. The supervisors, who usually

TABLE 6.2

TYPE OF TRAINING RECOMMENDED BY OFFICERS
IN BANKS THAT CONVERTED TO EDP

(N=396)

Type of training	Clerical	Supervisory	Management
Reading and interpreting computer output	5.60	6.96	6.76
Preparing computer output	6.30	6.28	4.20
Basic Programming	3.61	5.27	4.54
Capabilities of the computer	3.70	6.40	6.89

The figures represent means based on the following scale.

Not needed at all	1	2	3	4	5	6	7	8	9	Essential training

Source: F.D.I.C., Unpublished study results, 1967.

are the first to receive output from the computer before it is further distributed up or down the organizational hierarchy indicated the most needed training to be the interpretation of output followed by training in order to understand the capabilities of the computer and training in preparation of input.

Although the above results indicate that the desire for training exists, very little was actually done in the banks. Especially lacking was the training in those banks using off-premises services. In none of the five banks in this group was any formal training program conducted. The closest thing to training was the explanation of the new output forms to the supervisors and tellers, and the preparation of input to those directly effected. No training or briefing was given regarding the capabilities of the computer or its information aspects. In the two banks belonging to a joint venture, the computer center managers took the initiative to visit the participating banks and explain the basic features in the system. But only in one of the two were all the officers required to attend those meetings.

In banks using on-premises services, a certain amount of training was required and given in the computer department. This training was technical in nature and directed toward non-management employees in areas such as keypunching and input preparation. Many of the banks in this group tried to rely on existing employees to staff the new computer department. All of them offered aptitude tests to those employees interested in learning about EDP, and those scoring the highest were given on-the-job training or were asked to attend EDP night courses given by local chapters of the professional associations. In two of the banks this effort to utilize "in house" resources had serious consequences for the bank, for the people chosen

proved to be incapable of doing the job, and the success of the conversion was in doubt until an outsider was brought in to manage the computer center. As was the case of the banks using off-premises services, none of the banks in this group made any effort to train or educate management people in the use of information and reports. A typical description of these situations was given by one computer manager who was brought from the outside to run the center.

"I feel that the people in the bank do not know how to use the computer reports, or what they are supposed to request from me. I know of several reports that would be useful to the people on the floor but they never ask for it, and I am not going to push it down to them."

In another bank using off-premises computers, the cashier summarized the situation.

"We do not have anyone (at middle or top officer level) who has had experience with computers or knows how to use them. We surely could use such an officer, but I don't suppose it will happen in the near future."

The main reason for not having sufficient training is not because of the lack of places to get such knowledge. It is more a result of the lack of consideration given to the subject by the decision makers and top management, and the lack of understanding of the importance of the issue.

Proposition No. 15: a) Training and educational programs in EDP receive only minor attention from the decision makers; b) It is limited to solving technical-operational problems rather than increasing the understanding and utilisation of the computer in the bank.

3. Studying the Organization

The person(s) planning the conversion should aim to achieve a combination of several goals. One is to utilize the conversion period for executing those changes which will be of most value in increasing efficiency and reducing cost. A second is to minimize those changes that might arouse resistance from employees. The third is to plan a conversion which can be executed as smoothly as possible with minimum negative effects. In each conversion the ideal plan to achieve the optimum combination of goals might vary depending on local circumstances. Yet, in every case a careful mapping of how the present system looks, how the converted system will look and what changes are necessary will help considerably in achieving these goals.

The following are some of the items for which information is needed:

1. The reports and output received under the old system and those requested from the computer.
2. The forms used for recording information and transactions and preparing inputs for the processing unit.
3. The volumes of data flow at various periods of time.
4. The routing of data flow.
5. Roles of the various employees involved in the process, the functions they fulfill, the skills they need under the old system and those needed under the automated system.
6. The time factor involved in various phases of the process, such as reports due, statements cycling, etc.

7. The supplies on hand and those needed for the conversion and post-conversion periods.
8. The types of equipment to be eliminated, changed, or added as a result of the conversion.
9. Cost of the conversion plan and execution.
10. Responsibility of management and non-management employees under the old system, during the conversion and once the system is automated.

In the four banks using a correspondent bank service, the data collection on the above items was carried out under the instructions of the service provider. The role of the subject bank became a relatively passive one, that of supplying the information and following the instructions of the service provider. The only difficulty mentioned was that certain types of information were not readily available, making it difficult for the planner who had to work without them.

For the eight banks using on-premises arrangements, the information collection became more involved and problematical. The people responsible had to design their own system, and even where help was received from the equipment manufacturers, the burden fell mainly on the people inside the bank. In three of the banks where new people were hired to execute the conversion and manage the new facilities, some difficulties in obtaining all the necessary data were expressed. In four of the banks the people responsible stated that information collection was, at this phase, lacking and, as such, had caused inefficiencies during the conversion period. The inability to do a good job in studying one's own organization was explained by the inexperience of the person(s) responsible for the job, the time

pressure under which the conversion was planned and, finally, the lack of understanding of what the new system was supposed to achieve.

4. Commitment of Resources and Time

The length of time between the decision to use EDP and the first successful run on the computer depends on several factors:

1. The type of arrangement chosen by the bank.
2. The need felt among the decision makers in the banks as to when computer services are needed.
3. The amount of resources in money and people invested in the conversion process.

From Table 6.3 we note that the average length of time needed for executing the decision was shortest in the bank using an off-premises arrangement. It should be noted that the bank that converted within a month and a half after the decision ran into considerable problems and had to convert the same function

TABLE 6.3

LENGTH OF TIME BETWEEN THE FINAL DECISION
TO AUTOMATE AND THE FIRST CONVERSION

Type of Bank	N	Average Length in Month	Range in Months
On-premises EDP	8	13.2	0.5 - 17.0
Off-premises EDP	5	3.8	1.5 - 5.0
Joint Venture	2	10.5	8.0 - 13.0
Total	15	8.7	1.5 - 17.0

twice.² But the remaining four banks had only minor problems during the conversion which were not attributed to the time element. The main reason being that in the four cases the service provider had considerable experience in converting other banks, and unexpected problems were minimal.

In comparison it took the banks using on-premises arrangements an average of 13.2 months to achieve the first successful run. The main reason was the time required for supplying the equipment from the manufacturer, as the average length of time between the arrival of the equipment and the first run was close to three months.

During the period between the decision and the conversion, at least one person in the bank had to spend all his time on conversion planning and preparation. In most of the banks additional people were involved full or part-time. In the banks having their own computers, an average team of three people was involved in the preparation for the computer, while in the banks using off-premises arrangements the average was 1.5 persons.

This demand on the time of their employees caused, in several banks, complaints from top management and the operations people. The nature of bank operations is such that most of the work has to be done on a daily basis and cannot be postponed for longer periods, and the removal of key operations people from the daily operations caused pressure on other employees and management.

²See pp. 141-143

5. Who is Responsible for the Conversion?

At the beginning of the chapter it was indicated that in many of the banks the senior decision makers considered their jobs complete once they had chosen a specific arrangement. At this point, they felt, the problem becomes an operational one and should be handled by the operations people. This attitude opposes the one taken by many management consultants and experts in the field. In a study by McKinsey and Company of 27 large firms, one of the major conclusions was that "computer-systems success is more heavily dependent on executive leadership than on any other factor. No company achieved above-average results without the active participation of management." (Garrity, 1963, p. 13)

In six out of the ten banks in the present study, the planning of the conversion was done by a junior officer, and only in two cases by a senior officer (Table 6.4). In nine of the fifteen banks, the major responsibility for planning or coordinating the conversion was removed from the person guiding the process prior to the decision, and transferred to persons at a lower level or to newly hired people who were EDP experts but lacked familiarity with the bank.

All four banks that decided to use a correspondent bank computer left the entire planning to the representative of the service provider, and had only a liaison man in the bank to coordinate the activities.

In all but two banks the planning and responsibility of execution was the work of a single person in the bank (Table 6.4). Only in two banks was a committee formed to plan the conversion.

TABLE 6.1

PLANNING THE CONVERSION

Type of Bank	N	Person Guiding the Decision Process also Responsible for Planning		Major Part of Planning Done by			
		Yes	No	Committee	Senior Operation Officer	Junior Operation Officer	Outsider
Using on-premises EDP	3	1	7	2	2	4	-
Using off-premises EDP	5	4	1	-	-	1	4
Belong to a joint venture	2	1	1	-	-	1	1
Total	15	6	9	2	2	6	5

Proposition No. 16: The use of outside help during the conversion period is limited to help and advice received from the service or equipment supplier. No effort is made to recruit any other help or advice.

Proposition No. 17: The planning and execution of the conversion is perceived as an operational problem. Senior management, outside the operation department, plays a passive role during this period.

B. The Conversion Period

1. Possible Approaches to the Conversion Problem

When a conversion is planned, a number of decisions have to be made with respect to the approach taken in executing the conversion. Several of these decisions are common to all banks, regardless of what type of arrangement is used, while others are directly related to the specific arrangement chosen.

Those decisions common to all banks include : following questions:

- a) Should an exact time table and step-by-step conversion plan be outlined or should the problems be approached one at a time, moving to a next step only if the previous one is satisfactory, with no time constraint?
- b) Should the conversion of a given application be done in sections or should the whole function be converted at once.
- c) Should there be a parallel run of the old system until the new system runs smoothly, or should the conventional system be dropped at the time the new system starts operating?

- d) Should more than one function be planned for conversion at the same time?

In banks using on-premises EDP or belonging to a joint venture the following questions arise:

- e) For a given function should the center utilize existing systems and programs (canned programs) or should it write new programs based on its own needs?

In banks belonging to a joint venture one further question arises:

- f) Should all the banks belonging to the center convert a given function at the same time, and if not, in what order and over what period of time?

Some of the above questions were already covered in earlier sections and will be mentioned here only briefly; others will be discussed in more detail below.

a. Detailed plan or the "stepping-stone" approach. Only in rare cases was any specific time table discussed during the decision period. In some cases a general idea of the dates for conversion was given, but in others the decision to automate was more of an approval of the idea and the specific arrangement rather than an approval of a plan and a timetable. For the banks ordering on-premises equipment, the date of conversion is often determined by the delivery date of the equipment, while by those using off-premises service it is often determined by the service provider.

Although it would be expected that a detailed timetable would be set, in order to avoid the cost involved in keeping idle equipment, over half of the banks preferred not to establish

such a timetable, or to feel committed to one even if it was established. This was especially true among the banks that decided to convert in sections, determining the conversion date for each section only after the conversion of the previous section was successfully completed.

b. Converting by sections or all at once. Both approaches have their advantages and disadvantages. When a bank chooses to convert a given function by sections, the possibility of "bugs" in the program effecting the daily operations is limited to only part of the accounts involved. Another advantage of this approach is that the staff involved learns as it moves along with the conversion and can improve the system throughout the conversion. The disadvantage is that operations of a given function are separated into two systems which require two different staffs, causing problems similar to the one evident when a parallel run is used.

Of the 15 banks, eight chose to convert a given function at once, while of the remaining seven, four converted the first function by sections according to the ledger books and three converted by applying it to one branch at a time. No significant difference in the success of a conversion could be attributed to the approach taken by the banks.

c. The use of parallel run. The parallel run of the old and new systems is used to check the new system for errors and the old system can be utilized as a back-up if difficulties develop in the automated one. There are two major disadvantages for using a parallel run. One is that each item or document has to be processed twice.

This puts a time and resources pressure on the bank, especially if the conversion is of demand deposits where output is needed overnight. The second is the problem of balancing the outputs of the two systems for comparison purposes.

Seven of the banks did not use any parallel run, while of the remaining eight banks which tried to utilize it, three had to drop it within a short time because of the difficulties mentioned above. It was generally agreed among the bankers that the utility of a parallel run for more than an initial check of the output is doubtful at best.

d. How many functions to convert at once. As was mentioned in Chapter V, most banks make an automation plan for only one function at a time. Of the seven banks which decided initially to convert more than one application, six started to plan the conversion of the second application only after they felt the first was running successfully. Only in one of the banks were the two applications converted simultaneously and on the advice of the correspondent bank providing the service.

e. Usage of "canned" systems and programs. This question applies only to banks using on-premises EDP or belonging to a joint venture. None of the ten banks in these groups used exclusively canned programs, although four of them modified existing programs for their own use. Six of the banks started their system design almost from scratch. They believed their problems to be different from those for which the canned programs were written, and that it would take too much time and effort to modify the existing programs.

All of the banks had started their programming efforts before the equipment itself had arrived, but only one had completed and tested the programs on someone else's EDP before the installation of its own

equipment. This bank was ready to convert as soon as it received the computer. The writing of one's own programs proved to require considerable time, always more than was originally anticipated. At the same time it helped the people directly involved to study the new system and its use.

f. Which bank to convert first. In both banks belonging to a joint venture, the conversion of individual banks was done one at a time, and in both cases the bank closest to the computer center, geographically, was the first to be converted. As it turned out, every bank in the two groups was willing to give another bank the honor of the first conversion and that of cleaning the "bugs" from the program. While lengthy discussions might be spent on determining the order, its impact was not considered by the banks to be of major importance.

2. What Goes Wrong in a Conversion and Why

In several of the participating banks, problems developed during the actual conversion. In most of them, the problems were related to the inexperience of the employees of the bank in preparing the input for the computer rather than to the system itself. While in three of the banks it took several weeks to overcome such problems, in most of the others it was solved within a few days.

Two of the banks experienced much more serious problems and one of the two cases is described below in order to outline some of the mistakes made before the conversion started.

The bank which decided to use a new service bureau attempted the first conversion only 45 days after the decision was made. Planning

the conversion was left to a supervisor hired during the decision period specifically for the purpose of supervising the automated functions in the bank. The following interview quotes explain what happened.

The auditor of the bank gave the following details:

"We tried to convert all the accounts at once at the close of a business day in the middle of the week. And the next morning, after working all night, we discovered we would never be able to do it. We discovered we didn't have the appropriate forms set up and were missing the appropriate information to do such a conversion. Our biggest discovery was that our ledger accounts were not numbered, and we had first to number them, and then plan the conversion. We had to tell the executive vice-president in the morning that we couldn't do it."

The executive vice-president who, like the auditor, had no previous EDP experience explained:

"The conversion was planned by the supervisor of demand deposits, the cashier and the auditor of the bank. I saw myself responsible for the conversion but the work was done by my subordinates rather than by me.

"The first time that we tried to convert was on a Wednesday afternoon, and it did not work because we had too short time to complete the conversion. The second time, we tried to convert on a Friday afternoon which gave us a whole weekend to get the bugs out of the operation. And, the second time we still had a lot of problems which resulted in about 40 per cent rejects, which made it almost impossible to use the computer. For about a week we were not able to return anyone's checks even if it was not paid for, because we feared it might be our mistake rather than an unpaid balance. This was the time when many in the bank suggested dropping automation altogether. But I suggested measures to move to self-posting on-premises and sent it to the computer center afterwards (parallel run). It helped to reduce the percentage of rejects to about five per cent and a few dropped later to only two per cent."

The bookkeeping supervisor, the only person in the bank with previous EDP experience, saw it from a different point of view.

"I was very dissatisfied with the help we received from the computer center. I feel that was one of the reasons we had to do the conversion twice. I feel that some of the problems in the first conversion were a result of the initially bad system which the bank operated before the computer time. I believe that if this system would have been better there wouldn't have been that many problems in the conversion."

This interviewee was not sure who the officer responsible for the conversion was. He thought it might have been the cashier but said it was never clarified.

After the first attempt to convert failed, several officers, including the cashier and the auditor, wanted to return to the manual system and drop the EDP idea altogether. They claimed that the bank accounts were off by \$6,000, although it turned out that the actual difference was closer to \$100. When the senior management discovered it was possible to reduce the number of rejects and that the differences were minimal, they overruled the objections of middle management and decided to go on with the conversion.

The above quotes and other evidence points toward some of the mistakes made in this case:

- a) The lack of recognized authority at the top level, which would supervise or closely follow the execution of the decision.
- b) The inexperience of a new person in the bank who was not familiar with this bank's operations.
- c) Lack of experience of the service provider.
- d) Lack of detailed planning of the conversion.
- e) Time constraint imposed by the short span of time between making the decision until the first conversion.

C. Post Evaluation of the Process³

None of the banks visited conducted any formal post-evaluation of the decision process or of the results achieved. Therefore, it was necessary to rely on opinions of individuals in arriving at the bankers' evaluation of their own decision.

Most critical were the officers in banks moving toward on-premises arrangement. Only in one out of eight banks did the officers interviewed state that they would have done the same if they had to repeat the decision. The major criticism was that not enough time and resources were allocated to the pre-decision investigation and conversion planning. In four of the eight, the people directly involved emphasized that, based on the experience they gained, they would advise others to move much slower. In two other banks serious doubts were voiced about it being the right decision to get their own equipment. The senior operations officer in one of those banks put it this way:

"If I had to start it all over again, I believe I would have been much more cautious and not rush into our own computer operation. I would first survey the area and discuss with other bankers in the area the possibility of a joint venture or some other concentration of efforts in EDP. We imposed too much burden on ourselves by having our own computer."

³This section summarizes the post-evaluation as reflected by the bankers themselves. Chapter VIII will include evaluation of the results and will relate them to the behavioral concepts and the hypothesis discussed in Chapters I and II.

A junior officer in the same bank further expressed his opinions on who should get their own computer.

"...unless you have the money to support a programming staff and systems staff the computer operations is not a big money saving proposition. Of course, you need to be of a certain size before you can afford having such a staff and we are too small...In many cases the people (employees) would tell the customer the computer made a mistake not understanding that the reason it failed is because of operations feeding in incorrect input."

Other criticism was directed toward the education and support solicited during the decision and conversion periods. Several operations people said that as a result of not enough attention given to this subject, they had difficulties utilizing BDP in the best possible way. As one BDP manager put it.

"Our experience to date was not too pleasing. We moved too quickly and the process involved a tremendous amount of work by key people in the bank. Sometimes I feel as if we were working for the computer center rather than vice versa. We were warned this would happen but did not believe it...maybe we should have gone to a correspondent bank."

Although the benefits from using a computer service of a correspondent bank might be less, there seems to exist less dissatisfaction among bankers in this group. None of the four banks using this type of arrangement voiced any criticism or dissatisfaction.

To summarize, the post-evaluation suggestions are mainly directed toward the execution of the decision, and only in a few cases is the decision itself questioned. It is important to note that in the banks included in the study, the whole experience was still new, and, as a result, post-evaluation efforts were limited.

In this and the previous chapter the decision process, the decision itself, and the conversion were reviewed. Based on the data presented in the two chapters, a descriptive decision model is outlined in the following chapter.

VII. THE DECISION MODEL - A DESCRIPTIVE APPROACH

A bank interested in automation has to go through a number of phases before a decision is made. It is assumed that the process can be broken down into a series of sequential actions or questions to be answered. Each bank goes through the process as a whole only once, unless the process was stopped before a positive decision to automate was made. In this case, the bank might start the process again after some time due to the appearance of new triggering cues. Although for the individual bank it is a one-time decision, the various phases and actions are common to the majority of banks going through the process and, therefore, it is believed the decision process can be described in a model.

This chapter includes three sections: the first outlines the model for the decision process up to the point of decision through the conversion of the first application. The middle section describes the process of seeking and getting support. The third section outlines the model from the point of decision through the conversion of the first application. As an example, the decision process followed by three of the banks is presented in appendix D, utilizing the descriptive model outlined in this chapter.

A. Phases in the Decision Process

It is not necessary that a given bank move through all the phases in the model, but it is assumed that the process will

proceed from the starting point (1) and continue following a given route until it reaches one of the two terminal points (19 or 33). A given bank might collapse two successive phases into one when its management describes the specific route they chose. In other cases a given phase might have been irrelevant for the bank and, therefore, the activity at a given phase might be described as zero, but the bank is still following the route and does not need to relate itself to phases not described in the model.

The model was developed in the following way. The actual decision process for each participating bank was outlined in rough form, using the major parts of the process described in Chapter V. These actions were broken down further into phases of two different types. The first one is referred to as an "action" carried out by any of the people involved in the process. The second is a "question" phase where the person(s) involved had to make a positive or negative choice before he could move to the next phase.

The result is the model outlined in Figure 7.1 which consists of 33 phases.²

1. (E) Triggering Cue. A triggering cue is needed to initiate the process. In most cases, it is in the form of a proposal to supply a computer or computing services

¹In the text the number refers to the phase number in the figure. The letter in parentheses refers to the type of activity: A - Action; Q - Question; E - Entry; T - Terminal. Next to the title of each phase the preceding phase(s) is recorded, and in the description of each phase or at the end of it appears the succeeding phase(s).

² Figure 7.1

The different types of phases are indicated as follows:

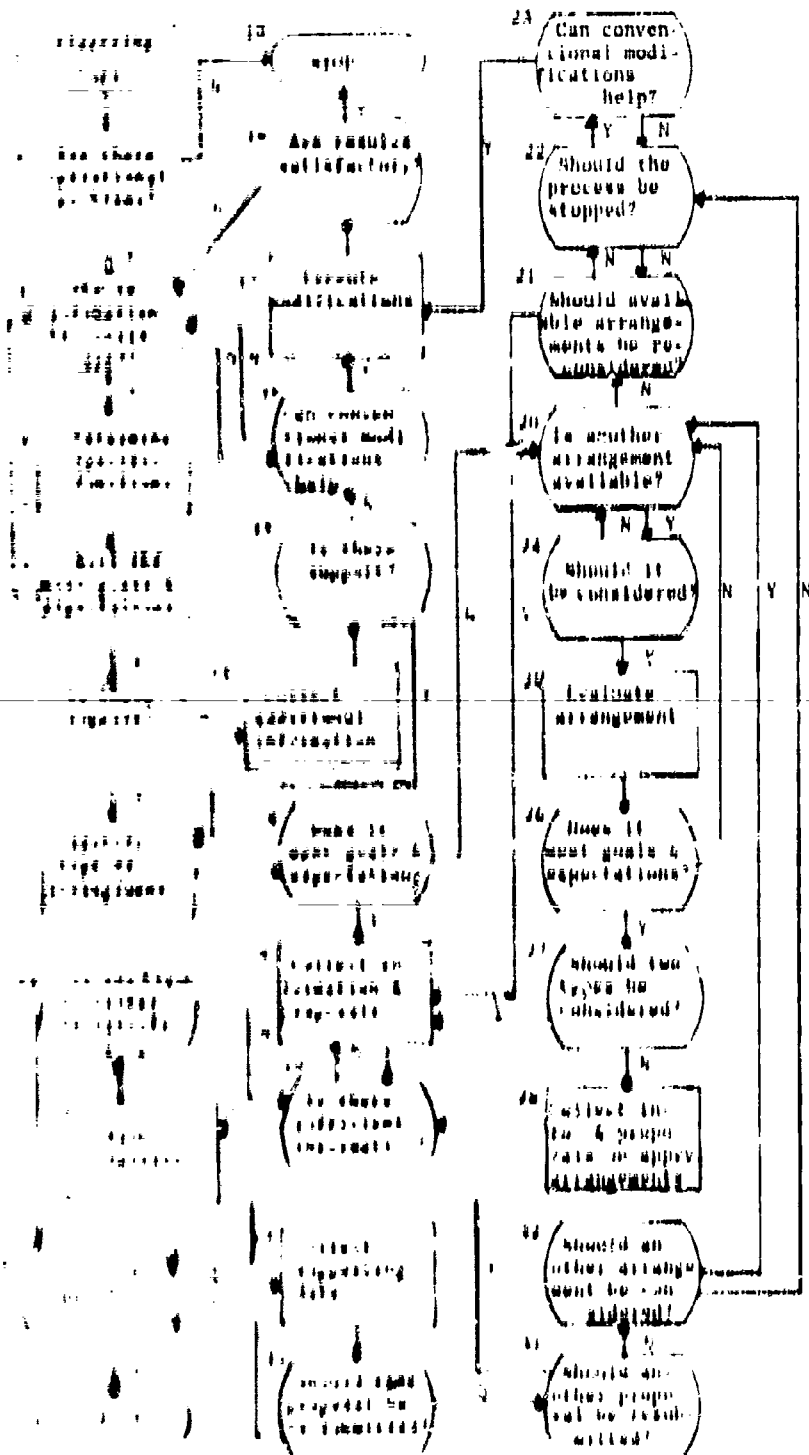
"Action" - a rectangle  with one arrow leading out.

"Question" - an ellipse  with two arrows leading out, one marked Y (for yes) and the other N (for no).

Entry point -  where the process or subprocess starts

Terminal point -  where the process or subprocess ends

FIGURE 7.1
THE DECISION PROCESS²



from a service provider or equipment manufacturer, as was the case in 15 of the 23 banks in this study. (Table 5.3) In the minority of cases no such outside initiative could be identified although it is believed that at least some outside contacts were made in all cases. (Move to #2)

2. (Q) Are their operational problems? (From #1) In Table 5.2 operational problems are identified as the main reason for considering automation in the bank.³ Unless such problems exist at the time the outside contact is made, or it is feared they might soon arise, there is little chance for the process to proceed. (Move to #19 if no; to #3 if yes)

3. (Q) Should automation be considered? (From #2, #5, #16, or #18) This question arises several times throughout the process. In each case the persons involved have to determine their interest in EDP and their willingness to invest the resources of time and money in investigating the possibility of automation. The answer to this question is usually the responsibility of the person guiding the process. The first time he faces it is when operational problems become evident (#2). If he does not consider automation as a possible solution, a move is made toward examining the possibility of modifying the existing system through some other method. (Move to #16)

³The decision process applies to those banks deciding to consider EDP due to operational problems, which is the case for most banks. In the limited number of cases where the bank initiates the process for other reasons some deviations from the described process might occur.

The decision guider might face the question again if he discovers that no other modifications of the existing system are evident (#16 = No) or that the results of the conventional modifications are unsatisfactory (#18 = No).

The question might arise again even if it has been decided to consider automation. This happens after it has been discovered that the solution of automation does not fit the goals and expectations (#5) regarding a specific function.

A positive or negative response to the question depends on several factors discussed in Chapter V, such as the degree of pressure of operational problems, the amount of contact with outside interested parties, the exposure to automation in literature and discussions with other bankers. With the increasing role of EDP in banking it can be assumed that once the operational problems arise and outside contact is made, an increasing number of persons who are facing the questions will decide to answer the question with a yes, thus moving on to phase #4.

This is also the phase where the person involved considers for the first time what he expects from automation and what he believes its impact will be on the bank. (If yes, move to #4; if no, move to #16)

4. (A) Determine Specific Functions. (From #3) It was emphasized on p. 84 that in most cases only one or at most two functions are subject to the initial consideration of automation. In most cases, the selection of functions to be considered for automation is considered an easy one for the person involved and is determined by the operational pressures. (Move to #5).

5. (Q) Will automation meet goals and expectations? (From #4) Once the person guiding the process has decided to consider the possibility of automation he starts to develop a set of goals or expectations. Before support is solicited from top management or other key personnel in the bank, he has to determine whether or not the possibility of automation meets his goals and expectations and those of the men from whom support is requested and needed. If doubts arise at this phase, the whole issue of automation will be reconsidered (Return to #3); otherwise, the next step will be to solicit support of the idea. (Move to #6)

6. (Q) Is there support? (From #5) Up to this phase the only one taking an active part was the person guiding the process, and the activity was limited mainly to a thinking process. In order to develop the process any further, additional persons are needed in the role of support givers. The process through which a support giver decides to give or hold back is described in subprocess A, (See Section B). If the support is given, the next phase is to identify the specific type of arrangements to be considered (to #7); but if there is no support, further

information to justify the basic notion of automation has to be collected (to #14).

7. (A) Identify type of arrangement. (From #6 or #15) The initial consideration of automation (#3) gave the people in the bank some information on what types of automation arrangements are available in a given area. Consideration is given here, not necessarily to a specific supplier of equipment or EDP services, but rather to a type of arrangement such as on-premises or off-premises. In Chapter V, five types of arrangements, four major and one specialized, were reviewed. In some areas not all of the arrangements are available, but in almost all cases there is a choice between more than one possible arrangement.

Usually only one type is selected for consideration at a given time, utilizing in the selection only minimal formal information, and emphasizing informal talks. (Move to #8)

8. (Q) Does the suggested type of arrangement meet goals or expectations? (From #7) The goals and expectations considered are heavily dependent on the general, non-automation goals and expectations of top management in the bank. For example, if top management is suspicious of the larger banks in the area, and has the goal of remaining independent, it will be reluctant to consider a correspondent bank EDP arrangement.⁴

(If yes, move to #9; if no, move to #20).

9. (A) Collect information and proposals. (From #8, #27, #21, or #10) Once the type of arrangement has been chosen, the person guiding the process, possibly with the help of some junior people in the bank, will proceed to solicit specific proposals to supply EDP

⁴The specific goals and expectations are discussed on Pp. 84-93.

services or equipment. The time it takes to complete this phase will depend on the number of proposals solicited and the speed with which such proposals can be submitted by the outsiders. (Move to #10)

10. (Q) Is there enough information? (From #9, #28 or #12) Usually only one or two complete proposals will be submitted (#9 or #28), and the question will arise if this is enough. In most banks only a limited search will be applied, at the end of which the answer will be Yes, moving to #11.

The question of sufficient information might develop at a later stage as a result of difficulties in arriving at a final decision (#12 or #31), in which case the probability of returning for further proposal soliciting will increase. (Move to #9)

11. (A) Evaluate and rank proposals. (From #10) If more than one complete proposal was submitted, the persons guiding the process and gathering the information will summarize them and attach a normative evaluation to each proposal, ranking them from the most to least favorable. (Move to #12)

12. (Q) Is top alternative satisfying? (From #11) Once all existing proposals have been ranked, the highest one receives the most attention before it is submitted for final approval. It is then determined if it satisfies the goals and expectations; and if this is not the case, further information is collected. (return to #10) If the process guider believes the highest ranked proposal is satisfactory, he will submit it for final approval. (to #13)

13. (Q) Is there support? (From #12 or #31) The support giving or withholding decision is made in a similar manner to the one in the early stages of the process. (#6) A positive response completes the decision process (to #33), although if doubts exist or support is rejected, further search for information will be initiated. (to #29)

14. (A) Collect additional information. (From #6) Refusal by top management to back the initiation of the decision process will result in the collection of more information by the person guiding the process. The information collected will depend on the reasons for refusing support and will lead to another attempt to solicit support. (to #15)

15. (Q) Is there support? (From #14) Having failed previously to gain support (#16), this time the support seeker will invest more efforts in presenting his ideas knowing that another refusal to grant support might put an end to the process. Getting support will result in a move into the mainstream of the process (to #7), while a rejection will result in an effort to look for a solution other than automation. (to #16)

16. (Q) Can conventional modifications help? (From #3 or #15) Once the idea of EDP has either been rejected by the process guider (#3), or has failed to gain support from top management (#15), the operations people look for other solutions to improve the present system and reduce their operational problems. If no other solution looks feasible, the whole automation concept will be reconsidered (return to #3); but if another way seems feasible, steps will be taken to utilize it. (to #17)

17. (A) Execute conventional modifications. (From #16 or #23)

This is carried out by the operations people and is followed by an evaluation of the results. (to #18)

18. (A) Are results of conventional modifications satisfactory?

(From #17) If after the modifications the operational pressures still exist, the question of utilizing automation will be raised again (return to #3); but if pressures are relieved, the process will come to a temporary end. (to #19)

19. (T) Stop process. (From #2 or #18) At various phases in the process, there exists the possibility that it will be terminated until new pressures arise. It might be a result of the feeling that operational problems do not actually exist (#2), or were solved satisfactorily in conventional ways. (#18)

20. (Q) Is another type of arrangement available? (From #8, #24, #26 or #32) Having rejected one type of arrangement the person guiding the process has to check if other types are available. If this is the case, the process moves to #24, otherwise the next phase will be #21.

21. (Q) Should the available arrangement be considered? (From #20 or #22) If it is discovered that no other type of arrangement is readily available, a decision has to be made as to whether or not the objections to the available type can be overcome. This will require a re-adjustment of the expectations concerning the utility of a specific arrangement and, in some cases, also an evaluation of goals of individual officers and the bank as a whole. (If yes, move to #9; if no, move to #22)

22. (Q) Should the automation process be stopped? (From #21, #23, or #32)

Once the available types of arrangements have been rejected because they have not met goals and expectations, the whole question of utilizing automation has to be reconsidered. If the differences between goals and expectations and what is available are too large to overcome, the whole idea of automation might be rejected for the time being and other solutions to the operational problems will be considered. (Move to #23) On the other hand, the persons involved might feel at this stage that the bank is already committed to the idea of using EDP, in which case they will move back to reconsider what is available. (Return to #21)

23. (Q) Can conventional modifications help? (From #22) This decision is similar to #16, but the question is asked at a more advanced stage of the process with a yes answer leading to a longer delay in utilizing EDP in the bank. (If yes, move to #17; if no, return to #22)

24. (Q) Should the arrangement be considered? (From #20) If another type of arrangement is available, the person guiding the process decides if he is interested in considering it and if he knows enough about it. (Move to #25) If he rejects the idea, he will return to #20 to look at other types of available arrangements.

25. (A) Evaluate the arrangement. (From #24) Having decided to consider the new type of arrangement, the person guiding the process will make some contacts with outsiders who provide the service or equipment in order to gather more information

about the specific characteristics of this arrangement. With this information he will proceed to decide if it meets goals and expectations. (Move to #26)

26. (Q) Does the type of arrangement meet goals and expectations? (From #25) In a fashion similar to phase #8, a positive answer will lead to #27, a negative one back to #20.

27. (Q) Should two types of arrangements be considered? (From #26) After determining that a second type of arrangement which meets goals and expectations is available, most banks decide to disregard the initially considered type. (Move to #28) In very few cases is it decided to consider both types (Move to #9), for rarely are proposals dealing with more than one type of arrangement collected.

28. (A) Collect information and proposals on approved arrangements. (From #27) Similar to the action taken in phase #9. (Move to #10).

29. (A) Collect supporting information. (From #13) After discovering there is no support for a specific proposal, the person guiding the process will proceed to collect additional supporting data on the highest ranked proposal. This will usually be done with the help of the outsider submitting that proposal. (Move to #30)

30. (Q) Should any proposal be reconsidered? (From #29) The person guiding the process has to evaluate whether or not to try once more to seek approval for the highest ranking proposal. If he decides to do so, he will return to #13. The alternative is to start considering another proposal. (Move to #31)

31. (Q) Should another proposal be considered? (From # 30)

In the case where more than one proposal has been submitted (in #9 or #28), the next highest ranked will now be evaluated, and the process guider will decide whether to submit it for approval or not. (Move to #13) If either no other proposals are available, or objections were raised during the support phase (#13) to the use of the specific type of arrangement, the next move will be to reconsider the type of arrangement. (Move to #32)

32. (Q) Should another type of arrangement be considered? (From #31) Having faced a rejection of one or more proposals, the person guiding the process has to decide whether to reconsider only a new type of arrangement (to #20), or the whole automation idea (to #22). In most cases, the bank is, at this stage, committed to the idea of automation, and it is a rare case when no additional efforts to identify other available possibilities are being made.

33. Approve Decision. (From #13) If support is granted to a specific proposal, it is usually followed by a formal approval of the Board of Directors, and the bank proceeds to the conversion stage.

B. The Support Function (Sub-Process A)

At several phases throughout the decision process (#6, #15, and #13) the person guiding the process seeks open support from key persons in the bank. In addition, at several other phases where he faces a question, he

might decide to investigate informally the amount of existing support for each alternative. Whenever support is sought, the person(s) who is asked to give it must decide whether to do so or hold it back. The decision process followed in such a case is outlined in Figure 7.2 and described below.

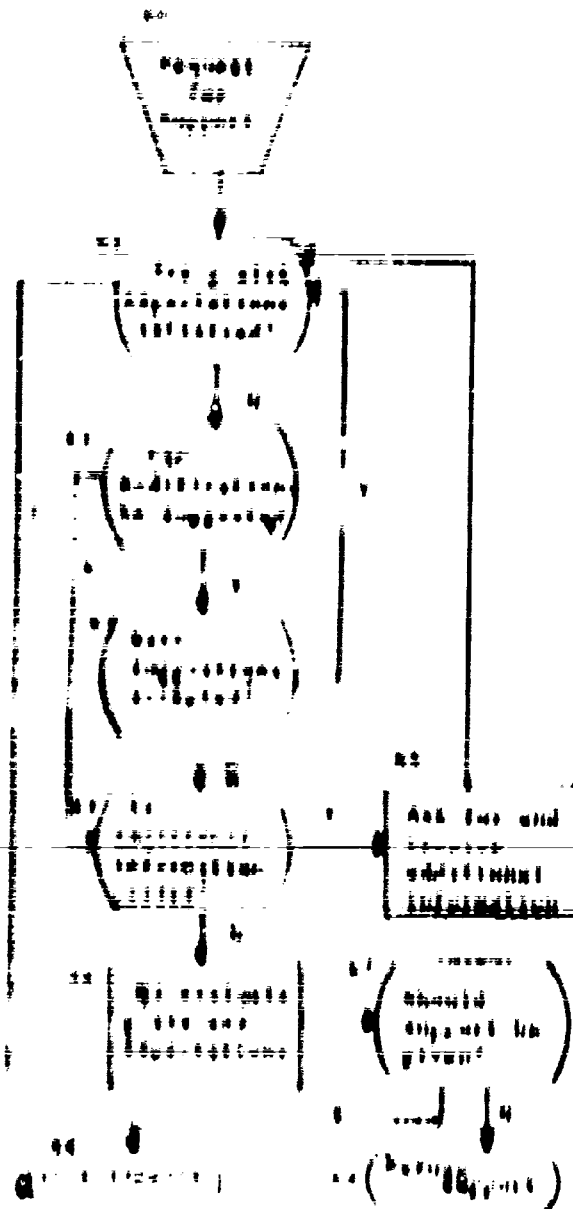
The process followed has similar characteristics to the main decision process and utilizes the major relational concepts of the Cyert and March model (Pp. 14-16).

60. (E) Request for support. The request to give support is initiated by another person in the bank. A formal request may be made, but usually it is done during an informal discussion. (Move to #61)

61. (Q) Are goals and expectations met? (From #60, #63, or #65)
The person asked to give support evaluates how the suggested subject fits his own goals and expectations, as well as those of the bank. In the case where the person asked to give support is the president, it will be difficult to separate the two. In any event, if the decision meets the goals and expectations, support will be given (Move to #68); but if some doubts remain that it does meet goals and expectations, further steps are required. (Move to #62)

62. (Q) Are there suggestions for modifications? (From #61)
The supporter might have immediate suggestions for modifications on the subject which would make it possible for him to support it. If this is the case, he will present suggested modifications to the person asking for the support (Move to #63); otherwise, the possibility of asking for additional information will arise. (Move to #64)

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63. (Q) Are suggestions for modifications accepted? (From #62)

The support giver will determine if his modifications were accepted, in which case he will re-examine the subject to determine if it meets his goals and expectations (Return to #61); otherwise, he will consider asking for additional information.

(Move to #64)

64. (Q) Is additional information needed? (From #62 or #63)

When no modifications can be thought of, or when they have not been met in a satisfactory way, the support giver can delay his decision by asking for additional data on the subject. If he decides to do so, the next phase is #65; otherwise, the move is made to #66.

65. (A) Ask and receive additional information. (From #64)

Following the decision to get additional information, an exchange of data will occur between the support seeker and giver. This will lead to re-examination of the subject regarding goals and expectations. (Return to #61)

66. (A) Re-evaluate goals and expectations. (From #64)

Before making a decision regarding the support, the person involved can consider re-adjusting goals and expectations.

(Move to #67)

67. (Q) Should support be given? (From #66) Based on the re-evaluation of goals and expectations, additional information or possible modifications, the support giver decides whether or not to grant his support at the present time. (If yes, move to #68; if no, move to #69)

68. (T) Give support. (From #61 or #67) The support can be given in various forms. One might be in the form of a private communique to the support seeker. Another might be passive support, where the person guiding the process is allowed to continue his activities although the support giver has not yet made up his mind regarding EDP. In all but one of the nineteen banks, no formal announcement of support was made to the members of the staff, other than the one directly seeking it, but in several banks the news of giving support was leaked to other management people by the support seeker or giver.

69. (T) Reject Support. (From #67) The rejection of support can be total, as was the case in one of the banks having no plans for EDP, or conditioned, as was the case in the other three. In the latter case, the condition might be a time interval after which the subject will be raised again or that of waiting until given circumstances change.

C. The Conversion Process

Chapter VI described the problems the persons responsible for the conversion faced once the decision to choose a specific arrangement was made. In this section, the process, from the time of the decision to the completion of the conversion, is outlined. The various phases are described in Figure 7.3 and discussed below, the main characteristic being that it involves more phases of

"action" and less of "questions." At the same time it will be noted that there is a marked increase in seeking support or approval at various phases in the process.

34. (A) Sign agreement. (From #33) This is done in one of two forms. The first is a contract form used mainly when an off-premises arrangement is utilized. The second is a letter of intent used mainly in on-premises arrangement, which allows the bank to cancel the order for equipment up to a certain date and under given conditions. (Move to #35)

35. (A) Information collection. (From #34 or #37) Due to the lack of complete information available during the decision period, certain items now have to be collected or re-examined.⁵ (Move to #36)

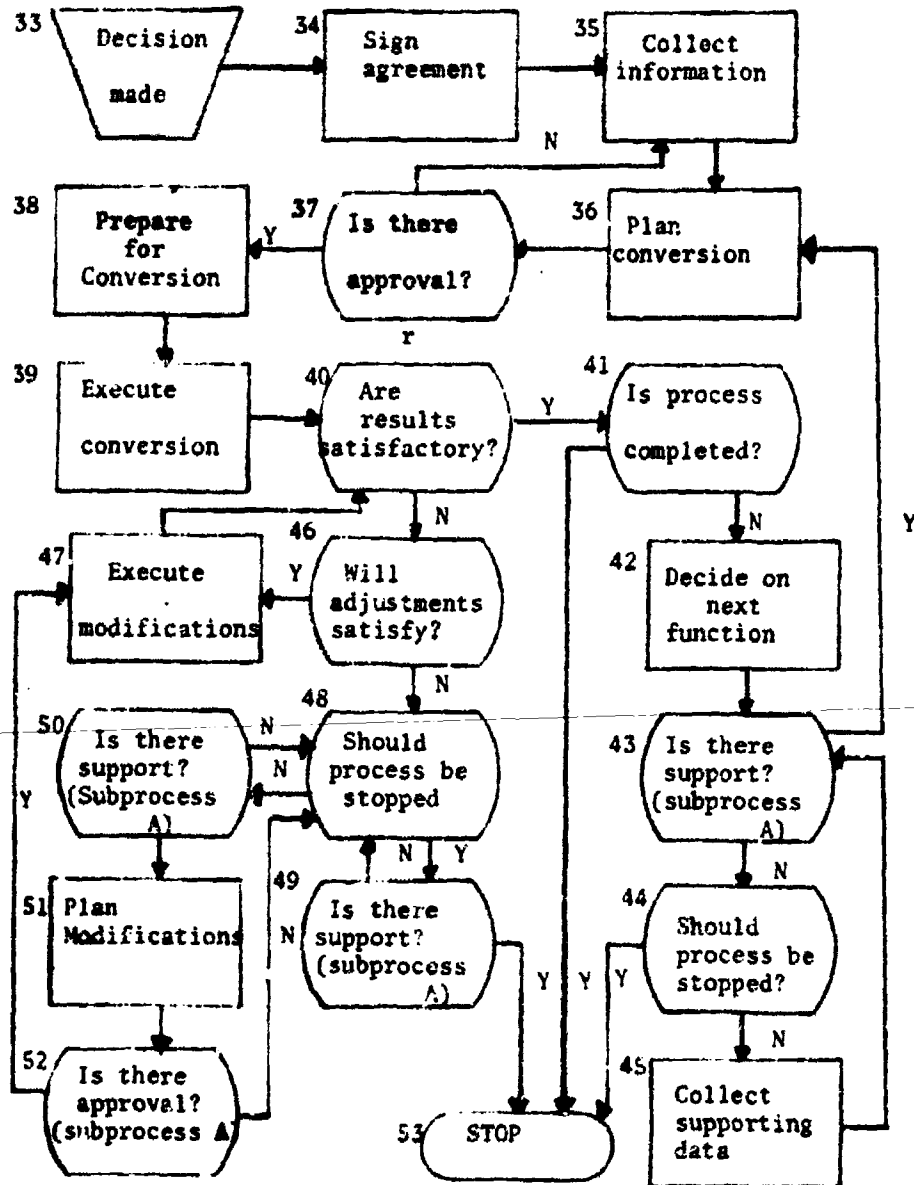
36. (A) Plan conversion. (From #35) The planning of the conversion includes the setting up of a timetable, and in those cases where it is done, the planning of training activities, and a decision about the specific method of conversion. The plan, in most cases, is not a detailed one, and is only partially documented. (Move to #37)

37. (Q) Is there approval? (From #36) The process here is similar to the one described in subprocess A. The main difference being that a larger group of people will be consulted at this stage, including the supervisors directly involved, or even key employees in the bookkeeping department. A high degree of resistance to the plan or lack of support will lead to the

⁵See Pp. 131-133

FIGURE 7.3

THE CONVERSION PROCESS



collection of additional data (return to #35) or the making of minor changes in the conversion plan. (If yes, move to #38)

38. (A) Prepare for conversion. (From #37) Whatever special training or information given to employees was decided upon will be done at this phase. Also, needed forms and inputs for the computer will be prepared. (Move to #39)

39. (A) Execute conversion. (From #38) (Move to #40)

40. (Q) Are results satisfactory? (From #39 or #47) Based on actual results as well as feedback from the biased opinions of other officers and employees in the bank, both the person responsible for the conversion and the top management will evaluate the outcome of the conversion. (If yes, move to #41; if no, move to #46)

41. (Q) Is automation project completed? (From #40) A successful conversion, before or after modifications, will lead to evaluation whether or not there is a need for additional functions to be automated at the present time. If the decision is that such a need exists, the process will continue (to #42); otherwise, it will be terminated. (Move to #53)

42. (A) Decide on next function. (From #41) This decision is made in most cases by the operations officer who was responsible for the execution of the conversion. (Move to #43).

43. (Q) Is there support? (From #42 or #45) Support is sought and given from top management following the process described in subprocess A. (If yes, move to #36; if no, move to #44).

44. (Q) Should process be terminated? (From #43) Following a rejection of support, the person guiding the process determines whether to keep pushing for additional conversion (to #45) or to end the process altogether (to #53).

45. (A) Collect supporting information. (From #44) If the process guider has really become enthusiastic about the use of EDP, he will probably try to get support for additional conversions (to #43) after seeking and presenting additional information to support his goals.

46. (Q) Will modifications satisfy? (From #40) Having encountered problems during the conversion or immediately following it, the person responsible will first try to solve them through modifications in the existing plan (to #47). If this is not feasible or opposition has grown too much to allow independent action, he will move to #48.

47. (A) Execute modifications in conversion. (From #46 or #52) These might be minor (from #46) or major ones (from #52), followed by an evaluation of the results. (Move to #40)

48. (Q) Should automation be stopped? (From #46, #49, #50, or #52) In most cases, this is just a rhetorical question, because at this stage the bank is too committed to the idea of automation to be able to drop it altogether. The process can be slowed down or its dimensions reduced, but it can hardly be dropped. (If yes, move to #49; if no, move to #50)

49. (Q) Is there support? (From #48) Even if the question was brought before top management, only in rare cases will the decision be to stop the process (to #53). In most cases, such an idea will be rejected and the process returned to #48.

50. (Q) Is there support? (From #48) Having been criticized once (at #40), the person responsible, unless he is the president himself, will make sure to gain support before moving any further. (If yes, move to #51; if no, return to #48)

51. (A) Plan improvement. (From #50) Having failed once, the plan this time will be more detailed, and will take longer to execute. It will also be better documented to serve as proof for the efforts made. (to #52)

52. (Q) Is there approval? (From #51) At this phase approval will be harder to get, and compared to the previous times (#37) will involve more examination from top management. (If yes, move to #47; if no return to #48)

53. Stop conversion. (From #41, #44, or #49) The termination of further conversion activity can be considered temporary at best. Once a bank has converted one function, others are apt to follow sooner or later.

VIII. BEHAVIORAL ELEMENTS IN THE DECISION PROCESS

The purpose of this chapter is to relate the results of the field study to the dimensions of the behavioral theory of decision making as described in Chapter II. The analysis and evaluation is broken down into three sections. The first section deals with the elements that combine the social and economic approaches to decision making necessary for examination of a behavioral theory. The key decisions throughout the process are summarized and related to the three major elements: Technological, Economic, and Organizational (see pp. 17-19). The second section deals with the roles taken by the various persons connected with the process both inside and outside the bank. In the final section, the application of the concepts developed by Cyert and March (1963) are related to the results and the appropriate conclusions are drawn.

A. Elements in the Decision Process

1. The Key Decisions

Two of the decisions made can be described as key decisions representing a turning point in the process. The first one is the decision of whether or not to consider automation as a possible solution to existing or future problems. The consideration of automation is dictated by the changing trends and nature of the

banking industry which were emphasized in Chapter III.

Yet in many banks it was, at first, difficult for the person guiding the process to convince top management of the advantages in using EDP. The resistance to the idea was justified by arguments such as: high cost, unsuitable equipment for a small bank, or lack of acceptance by customers. Such arguments were often presented without sufficient information to back them up, and were generally motivated by fear of the unknown and of the need to change. In most cases, there would not be an outright objection to the idea of automation; instead, arguments are presented that the bank is neither ready nor needs it. The objecting officers would state that when the bank will really need EDP, they will be all for it.

Once the decision has been made that the bank should actively consider EDP, the next significant decision is what type of arrangement to choose (Proposition No. 7). During this phase in the process, the ground rules for the final selection are determined and many of the issues involving EDP are clarified. The difficulty in choosing the type of arrangement is due to the influence of biased opinions and expectations that exist among the top management in many small banks. Often two different beliefs, neither of which necessarily has data to support it, are in conflict. The first is suspicion of the services offered by correspondent banks (Proposition No. 6), and the second is the widespread belief that on premises EDP suits only the large banks because of the high costs involved. Being a decision that requires clarifi-

cation of goals and expectations and establishment of preferences, this decision can be considered more significant than the final choice of a specific proposal.

2. The Economic and Technological Elements

Of the three elements outlined in Chapter 11 (pp. 17-19), the one that is mentioned most by bankers is the economic one often referred to as the cost element. Most bankers no longer have the illusion of being able to save considerably on total cost, although they hope to keep the processing cost in line once volumes increase considerably. During the decision making process, costs are often considered; but difficulties exist in comparing them to the cost of the conventional operations system. Due to the lack of cost accounting or budgeting procedures, such costs are often unknown.

The introduction of EDP effects four particular cost categories:

- a. Conversion Costs. These are "one-time" costs arising from the initial system design, additional supplies, and the additional personnel or overtime needed during the conversion period.
- b. Equipment Costs. These costs represent a major factor in on-premise facilities, but also affect banks using off-premise arrangements when it is necessary to acquire supplementary equipment or dispose of the conventional equipment.

c. **Personnel Costs.** These costs include two types: The first is wages and salaries of new employees minus savings due to old jobs not to be refilled. The other type is the cost involved in training and educating employees in operating and/or utilizing the computer.

d. **Operating Costs.** These are the costs that arise from the direct use of the computer system. They can be in the form of fees as in the case of off-premises services or operation costs as in the case of on-premises facilities.

During the decision process attention is given to equipment costs, operating costs and the direct personnel costs. In over half of the participating banks, no consideration was given to the conversion costs, or only rough estimates were made, which proved to be far below the actual costs. In the remaining banks, most of which finally decided on on-premises arrangements, conversion cost estimates were made in more detail. However, in all but three cases, the estimates proved to be below actual costs. Only two of the nineteen banks included the costs of employees' training and education in the estimates made during the decision process.

At the early phases of the process, when the question of whether or not to consider EDP arises (Figure 7.1, #3) or when the type of arrangement is decided upon (#7-8), costs are discussed, but only in an estimated form. Moreover, the figures quoted are based on minimal information. More accurate cost data are usually collected during the proposal collecting phase (#9).

The technological aspect enters the decision process only to a limited extent. When it does, it occurs during the evaluation of the proposals (Figure 7.1, 11). The questions involving the technological aspect arise again after a specific proposal has been chosen, and while the bank prepares for the conversion (Figure 7.3, #35-38). At that stage it is necessary to clarify the questions not answered previously.

3. The Organizational Elements

The organizational elements can be broken down into two. The first is the social one which has effect on the employees' morale, dedication to their work, dedication to the organization and, in turn, efficiency on the job. The second is the political system, which is related to the concepts of status, location in the structure, power, leadership effectiveness and working relationships between the various officers and departments. The effects of changes in both elements can be felt throughout the process and also in the long run, once the change is completed, but there is a considerable difference between the two short and long-term effects as was emphasized by Herbert Simon:

"Many of the initial effects are transitory - important enough to those directly involved at the time and place of change, but of no lasting significance to the society. Other effects are neither apparent nor anticipated when the initial change takes place but flow from it over a period of years through the succession of reactions it produces." (Simon, 1968, p. 27)

During the decision process changes in the number of personnel are considered; but little attention, if any, is given to other organizational elements. In most banks, top management prefers to convince itself that no social or political problems exist. One of the common

expectations is that the change to EDP will have an impact only on the bookkeeping department while the remaining departments and their employees will be unaffected by the change (Proposition No. 4a). Therefore, the only step readily taken in all banks is to assure the employees that no one will lose his job as a result of automation. The lack of attention to the transitory social effects results in an insufficient information feeding to employees throughout the process.¹ In turn, this affects employees' attitudes toward the computer, and toward the persons responsible for operating it, especially if they are new in the bank.

A manager in one of the banks using an on-premises arrangement, who was hired to plan and execute the conversion to EDP and manage the EDP department, described the situation as follows:

"Before I came here I worked in the computer center of a large bank. Initially, I felt there wouldn't be any big problems in communication inside the bank because of the small number of people involved. But, I soon discovered that procedures of submitting input to the computer had to be re-emphasized many times--the need to keep to the manuals and do it exactly like the manual said. Still, we had a lot of problems in getting the material into the computer.

"We have problems with some of the officers in the bank because they are quick to blame us if anything goes wrong on the computer. Generally, they were not willing to accept the computer in the bank as quickly as I expected. Some of them were trying for a long time to catch the machine making mistakes."

Even less attention is paid to the impact EDP will have on the political system. One explanation for such attitudes is that such effects take time to develop and are not easily recognized until after the computer has been used for some time. The group that feels the greatest threat is not that of the older officers (ages 50 and above), but those of middle and younger age (35-45 years old). These officers

¹See Chapter VI

still have 20-30 years of work ahead of them, but already feel that they are being by-passed, because of their lack of EDP knowledge. The majority of officers in small banks who have been in the bank over 10 years entered the management level through clerical jobs, and their formal educations often ended at the high school level, while the new computer people did not start at the bottom. The older managers, who often gained self-confidence from their years of experience, welcome the computer, but at the same time, do not plan to use it or ignore the possible effects EDP will have on the organization and feel their position secure. The middle-aged officers generally lack this self-confidence and tend to show their insecurity by expressing negative attitudes toward the computer and its staff.

B. People in the Process

1. The Different Roles

In Chapter V, three different active roles were identified. The three were: the guiding of the process, the support giving, and the information collection.

Who fulfills the different roles might vary from one bank to another depending on the structure and manner of operations of the bank's management and the type of arrange-

ment preferred. The degree of active participation of the specific role holder varies with each phase of the process as do the types of activity and interaction of the persons directly involved.

The perception of officers within the bank about the degree of influence various people had on the decision process varied according to the organizational level of the officer. At all levels the respondents agreed that the two most influential persons in the process were the president and the operations officer. (See Table 8.1) The main activity of the top executive officer is in the support-giving function, although in a minority of cases, (Table 5.11) he also acts as the process guider. On the other hand, the operations officer takes the responsibility of guiding the process and collecting the information, and is considered by all levels of management as the person with the greatest influence on the decision. At the same time, the presidents' group ranked itself higher on influence (7.00) than was accredited to them by the senior management (6.00), or by junior management (5.33).

When the influence of other officers was questioned, there existed a big discrepancy between the estimation of the junior officers and that of the other two groups. Top management in many of the small banks would like to believe that important decisions such as the one

TABLE 8.1

DEGREE OF INFLUENCE ON THE DECISION PROCESS OF DIFFERENT
PERSONS IN THE BANK AS PERCEIVED BY VARIOUS LEVELS OF MANAGEMENT.*

Influence of	Evaluated by:		
	Presidents N=14 1	Senior Management N=30 2	Junior Management N=14 3
Members of Board of Directors	5.07	4.94	4.29
The bank's president ¹	7.00	6.00	5.33
The operations officer ²	7.43	7.50	6.08
Other officers in the bank ³	5.14	5.68	2.63

1. Statistically significant difference between responses of groups 1 & 3 ($\alpha < .05$)
2. Statistically significant difference between responses of group 3 & (1 + 2) ($\alpha < .025$)
3. Statistically significant difference between responses of group 3 & (1 + 2) ($\alpha < .01$)

*The following scale was used:

1	2	3	4	5	6	7	8	9
not at all		very little		to some extent		to a considerable extent		the most

to utilize EDP, are made by a group of officers rather than by an individual person. But the opinion of the junior officers, supported by observations in the field, was that on major issues, the decision is made by one or at most two persons in the bank. One explanation why the decision to automate is made by individuals rather than by a coalition representing all departments is that, in most cases, automation is initially seen as effecting only the bookkeeping department. As a result, officers in functions such as loans or trust do not regard the decision as having immediate consequences for their departments. When this attitude is combined with a total lack of EDP knowledge, these officers are excluded from the process and, in most banks, show little interest in it until a final decision has been reached.

While the active participation in the process of all but one or two of the senior officers is limited, they still have some indirect influence on the timing of the process and the type of arrangement chosen. With the computer having been used in larger banks for over ten years, and with the increasing attention it has received in professional literature and meetings, it would be natural to expect that the question of utilizing EDP services had been discussed among the officers long before the actual process had started. Such discussions help the person who takes responsibility for guiding the process to assess the attitudes toward EDP among the other officers and decide on the amount and type of support required, but do not increase the amount of involvement of the other officers in the process.

2. Motivation, Expectations, and Goals of the Person Guiding the Process.

Guiding the decision process requires a lot of effort in time and energy on behalf of the person responsible. In most cases, at least at the initial phases of the process, the officer has to carry out the necessary activities in addition to his regular duties in the bank. He receives very little active help from the other officers and has to rely on his own learning to perform a satisfactory job. The question arises then as to what motivates him to take such a job on himself and carry it along.

One reason is the need to solve operational problems. Being faced with increasing problems which result from personnel and equipment difficulties and expanding volumes, the person guiding the process is forced to look for a drastic change that will bring overall improvement rather than just put out fires. Another explanation can be found in the changing role and status of the operations officer in the bank. Until a few years ago, the job of supervising operations was considered to be a low status one, left mainly to junior officers. In the small bank the loan officers were considered to have the highest status and the operations function was seen as a temporary step in climbing to the job of loan officer or as a place for officers not capable of serving in other functions. This was so because supervising operations was seen as a monotonous task, involving only routine and repetitive tasks.

The introduction of EDP is changing this considerably. The operations officer is accumulating knowledge not available to the other officers. He is also becoming the key person in the information network, causing the other officers to become dependent on him. Also in many cases, his involvement with EDP helps him acquire knowledge

in other modern management techniques such as market analysis, or cost and budgeting, and he is in a good position to introduce them to the bank. His status and influence have increased considerably and possibilities for advancement in the operations area itself have improved. One now hears in automated banks fewer statements such as, "Everybody wants to become a loan officer. I cannot get them (the officers) to stay in the operations department.", which were previously common among top management in non-automated banks. Instead, several of the officers in banks utilizing BDP indicated that they now have no desire to move into any other functional area, but prefer to remain in operations. As a result of such developments, operations officers in many banks are willing to take on themselves the extra work and pains involved, hoping it will provide them with increased recognition, status and satisfaction.

3. Outsiders' Influence

One of the questions raised in Chapter I was in regard to the influence of people outside the organization on the decision process. The data shows that, with the exception of banks participating in a joint venture, outside participation is limited to that of the service or equipment suppliers. Only one of the banks using on-premises BDP received help from a consultant, and this was limited to the technical evaluation of the equipment.

In several banks, the operations officer or the president sent for material published by the professional associations, but such information is of a general type and does not offer specific solutions or alternatives. Outside influence is also generated

through visits to computer installations run by or serving other banks. Such visits have a double function; the first is to supply general information about what EDP looks like, mainly to those asked to support the decision, and the second is to gather information on specific arrangements. Almost all of the banks organized such visits, but they were too sporadic to be of much help in the final decision.

The role of service or equipment suppliers is a significant one. In most cases, they are the ones to initiate the process by trying to sell their products to the bank. The salesmen are active mainly during two periods in the process. The first, mentioned above, is at the initiation of the process, and the other is during the information collection and proposed submission phase (Figure 7.1 - #D). Some salesmen may keep active throughout the decision process and visit or call the bank frequently to find out about the progress of the process. They act as the main source of information for the decision makers. Bankers are suspicious of the information the salesmen supply, but they still depend on the economic and technological data given to them. The activities of the outside salesmen not only influence the final decision, but also have a strong impact on the speed with which it is reached.

C. Concepts of the Behavioral Theory

1. Goals, Expectations, and Choice

The choice of the Cyert-March behavioral theory as a framework for the study was based on the emphasis it places on the internal decision process of the business firm. Out of the three variable categories included in the theory, i.e. goals, expectations, and choice, attention was focused here on the process of choice. The other two were discussed only with regard to their effect on the choice process, as the author feels that the existing theory and the research tools used are not equipped to permit a thorough investigation of the goals and expectations. Yet, to the extent that they influence the process, information regarding the two variables has been examined and is summarized below.

a. Goals. Cyert and March consider three major ways in which the objectives of the decision making coalition are determined. These are:

1. The bargaining process by which the composition and general terms of the coalition are fixed,
2. The internal organizational processes of control by which objectives are stabilized and elaborated,

3. The process of adjustment to experience by which coalition agreements are altered in response to environmental changes. (Cyert & March, 1963, p. 29).

The present study reveals that in the small commercial bank, a formal internal bargaining process with regard to the decision to automate does not exist. Opinions influencing the goals are filtered into the process mainly through informal contacts. During the process the only opinions actively represented are those of top management, and those of the operations people. As a result the decision cannot be regarded as a coalition decision representing all major interests in the bank, or even all management interests.

Although individual officers have their own goals and objectives, it is difficult in small organizations such as the commercial banks studied here to talk about departmental objectives. In a sense, this is true also for the pre-computerized operations department, which had the limited task of processing others' work. Yet, the operations people are often the first to develop, during the decision process and especially after the decision has been made, their own goals. Thus they move from a passive role in the bank to an active one, exerting pressure on the other departments to expand services, use more information, etc. Such a trend was more evident in those banks moving toward their own BDP facilities where the need to justify the change was harder felt.

The main means by which the objectives for the process are formed is through the exercising of internal organizational control by the chief executive officer. He does it, in most cases, through the role of support giving.

Once banks face operational problems they are encouraged by the spread of EDP services and the changes in the industry to consider EDP as a solution. In addition, the initial objectives of EDP are rather limited to such objectives as replacement of equipment or reduction of personnel problems. But as more information accumulates, and especially as the operations people gain experience, the objectives slowly expand.

b. Expectations. Cyert and March emphasize that "expectations are by no means independent of such things as hopes and wishes.... As a result, both conscious and unconscious bias in expectations is introduced." (1963, p. 81) In discussing the expectations of EDP in the bank as an organization, their limited nature was emphasized (Proposition No. 4). As a consequence of limited EDP knowledge, false expectations develop minimizing the impact of EDP on the bank and the amount of resources, in time and personnel, needed for the change.

In addition to the organizational expectations, there are also individual expectations which affect the decision process. In the first section the expectations of non-operation officers, often expressed as fears, were mentioned, and in the second section of this chapter the expectations of the persons guiding the process were discussed. But it was difficult to identify clearly the individual expectations because of the reluctance of the individuals involved to discuss them.

c. Choice. Cyert & March integrate both goals and expectations into the choice variable that outlines the process through which the decision is made. The choice is characterized by several features.

1. It breaks the decision into a series of smaller problems, each attended to one at a time.
2. The rules used are simple ones relying on individual "judgment".
3. The choice rules adopt themselves to changes in the environment and in the influence structure. (Cyert & March, 1963, Pp. 99-102)

All three features were evident in studying the process in the small commercial bank and will be discussed in greater detail in the next section which deals with the relational concepts. The one influence on choice that was missing was that of the organization's past experience with a similar decision. Being an innovative, "one-time" type of decision, the main influence on the decision makers had to come from the outside rather than from within the organization.

2. Examining the Relational Concepts

Cyert and March (1963) have suggested four major relational concepts which they believe represent the heart of their behavioral theory of decision making. The four are (a) quasi-resolution of conflict; (b) uncertainty avoidance; (c) problematic search; and (d) organizational learning. In Chapter II each of the concepts was described briefly and in this section the application of each one to the process used in the decision to automate in the small bank will be reviewed.

a. Quasi-Resolution of Conflict. Due to the relatively small size of the organization, departmental conflicts centering around goals either tend to be resolved in the early stages of the conflict, or remain hidden throughout the process without affecting it much. In part, this results from the fact that the small commercial bank usually has a centralized decision-making process, with one or two top executives making or approving all major decisions. During the process two sets of goals have a major influence. The first set belonged to the operations people, and the second set is that of the chief executive officer. In several banks the two could not be separated. In other cases, the conflict of goals was handled through the support-giving process. In only two banks was an effort made to establish a formal mechanism for resolving different goals, and this was in the form of a committee where all functions in the bank, i.e. branches, loans, and operations were represented. In both cases, the committee was eventually overruled and the final decision was made by top management and the operations people.

Another reason for the limited conflict of goals is that many of the officers in functions other than operations expressed uncertainty about the impact of EDP on banking and failed to understand or estimate the future consequences of changing to EDP. Therefore, they refrained from actively participating in the process and their own goals were never exposed.

Possible goal conflict is also reduced by applying the principle of local rationality and by paying attention, sequentially, to goals. The overall goal of changing to EDP is initially limited to solving or preventing operational problems. Only after conversion has started do other goals such as expanding services or using market research tools, start to develop. The overall goals of the organization are then brought up one at a time, with one being satisfied before the next is dealt with. In this way, attention is first paid to such goals as remaining independent of larger banks, maintaining prestige of the bank, etc. These are given attention during the selection of the type of arrangement. The next set of goals, which deals with minimizing cost and increasing efficiency of operations, is considered during the selection of the specific proposal, after the type of arrangement has already been determined.

b. Uncertainty Avoidance. The decision makers, in this study, faced numerous uncertainties which could have influenced the outcome of the decision. For management a major uncertainty lies in the question of whether EDP is a suitable solution for the operational problems of the small bank, and what type of arrangement best fits the organization. To this are added all the technological questions such as what EDP can do and what it should do in the bank, questions for which the decision makers are ill-equipped to give satisfactory answers. Other uncertainties are related to the future of the small bank in the industry as a whole. With the increased talk of a "checkless

society," the easing of branch laws, and banking through computers. the long-term future of the individual small bank is, at best, uncertain. Some bankers feel that the industry is moving toward centralized installations, with the larger banks constantly increasing their share of the market, and wonder if this is the time to invest time and resources in EDP.

Cyert and March (1963, Pp. 119) suggest that organizations adopt two solutions to reduce uncertainty. The first emphasizes short-term reaction to short-term feedback and avoidance of planning where plans depend on predictions of uncertain future events. The second is that of arranging a negotiated environment with other firms in the industry.

In the present study the solution of negotiated environment among individual banks did not apply. Bankers usually tried to keep informed about the automation developments in other banks in their competitive area, but learned only general information. Small banks, in most cases, follow the solutions first used by the larger bank, rather than participate in the vanguard of EDP innovation. Generally, small banks adopt the policy of "wait and see" until short-term pressures force them to consider the decision to automate.

Within the bank, it was found that planning had been minimized to dealing with only the most immediate problems so that uncertainty resulting from long-term planning would be avoided. This also resulted in setting up only limited goals for automation during the initial decision process. The feedback-react procedure entered the decision process mainly after the first conversion had been executed. At this stage, decisions for further actions were made based on the results and satisfaction from the execution of previous decisions. (Figure 7.3)

Prior to the time when the decision to choose a specific proposal is made, the feedback from the environment is limited mainly to that from the support giver to the process guider.

c. Problematic Search. In the framework proposed by Cyert and March, the theory of choice and the theory of search are closely intertwined. (1963, P. 120) The search is a limited one, resulting in a limited number of choices. In the first place, the whole process in the small bank proved to be problem oriented which resulted because of the failure to meet the goal of smooth operations. Rarely does the motivation exist to start an active process if there are no operational problems.

In one aspect the decision to use EDP deviates from the principle of simple-minded search suggested by Cyert and March. The simple-minded search principle should have urged the decision maker to examine conventional modifications rather than consider a major change in systems. The reasons for considering EDP were discussed in Chapter V, and it was shown that in many cases the bank is pressured into considering EDP rather than freely choosing it. Once the bank has decided to consider EDP, the rules of simple-minded search fully apply. At most phases the decision makers examine a single alternative, and consider a second one only if the first one failed to satisfy. The rules of causality in search also apply, preventing it from becoming a planned and thorough search.²

Bias is introduced into the process at various points.

²For the effect of causality, see Cyert & March, 1963, Pp. 121-122.

from the beginning, the bias is evident in the general suspicion towards automation and in the preference of conventional processing methods. Bias resulting from the experience of top management, the impressions made by the salesman, and the interaction of goals and expectations influences the choice of a specific proposal (Proposition No. 11). A third type of bias, affecting the selection of a specific proposal, is reflected in the forms in which various proposals are presented by the information collector and process guider to the persons making the final choice (Proposition No. 12).

d. Organizational Learning. According to Cyert and March the concept of organizational learning is directed toward the adaptation of goals, attention rules and search rules. When problematic search was discussed, it was indicated that the decision to consider the possibility of EDP represents a deviation from the principle of simple-minded search. This was a consequence of adaptation of new attention rules due to the increasing momentum of impact EDP has had on banking in recent years. Yet, the change in attention rules was not a drastic one, as it applied only to the initial consideration of EDP and did not cause a parallel change in the search rules discussed in the previous sections.

Least affected by the decision process were the overall goals of the bank. Adaptation of goals with regard to EDP depended on the experience of other banks, rather than on the learning experience from the bank's previous goals and achievements. In the pre-decision phases the lack of experience with EDP resulted in the setting of only limited goals. Those goals were heavily influenced

by what others proposed to do or have done and evaluating if similar action suited the decision maker's own case. Only after the first conversion did the learning process become internally directed. At this stage, the goals set for the conversion were measured against the results, and future steps were determined based on initial success or failure.

e. Summary. As described above, three of the relational concepts were directly applied to the decision process utilized by the small bank. The concept of problematic search served as a basis in outlining the decision process and arriving at a descriptive model. This was done by utilizing the principles of sequential attention to goals, information, and problems, and the principle of limited search, which does not reach beyond the first satisfactory alternative.

The concept of uncertainty avoidance was helpful in understanding the reasons for the limited scope of the goals which the decision maker attempted to achieve at the early phases of the automation process. With the decrease in uncertainty gained through experience after the first conversion, the goals are often changed and expanded following satisfactory results. The concept of organization learning applies mainly to the post-selection period, and is useful in understanding the decision to expand or limit the automation program past the first conversion.

A concept that has only a limited application to the process is that of quasi-resolution of conflicts. This is more a result of the size of the organization we deal with rather than the content of the specific decision. It can be assumed that in larger banks dealing with the same decision, the concept will become useful in the examination of the process.

IX. SUMMARY AND CONCLUSIONS

The purpose of this study has been to examine the behavioral aspects of the decision-making process in the small commercial bank involved in changing to EDP services. The study was motivated by the current academic interest in the decision-making process, and an effort was made to examine the application of the behavioral theory of the firm to a small organization facing a one-time decision regarding a major change. The study was also motivated by the current development of EDP in the banking industry and the issues a small bank must face when confronted with changes in banking in general and in data processing.

By intensively studying twenty-three small commercial banks, and by inspecting the relevant literature, the author has determined the process that is applied by the banks during the decision to change. The study provides empirical evidence of the actions taken during the process, the people involved and the reasons for their acting in certain ways.

The data are presented in Chapters V and VI, with the major findings summarized in a series of propositions. Based on the data, a descriptive model of the decision and conversion processes is presented in Chapter VII, and the relationship to the behavioral theory of the firm is examined in Chapter VIII.

A. Reviewing the Basic Hypotheses

1. The Role of Outside Agents¹

The first hypothesis stated that the process in the decision to automate is initiated by outside agents. In sixteen of the twenty-two banks, the proposal for introducing automation came from outside persons, and in all cases but one, it was a service or equipment salesman interested in supplying EDP services to the bank. When such a proposal was made, it did not necessarily represent a revolutionary idea to the bankers concerned. EDP had been utilized in banking for over ten years, and throughout this period management of banks not using EDP had been exposed to written and oral sources of information describing EDP and speculating about its future in banking. In the case of some banks, contacts by outsiders trying to interest the bank in EDP had previously been made, but it took, rather, a combination of an approach by outsiders plus internal problems to actively start the process (Proposition No. 2). Therefore, the point at which a bank becomes receptive to an outsider's approach can be designated as the initiation of the decision process.

The relatively small amount of knowledge about EDP accumulated in the bank prior to the start of the decision process, and the avoidance of hiring outside consultants (Proposition No. 8), place

¹The number of each section corresponds with the numbered hypotheses on page 6.

the salesmen in a vital position. In addition to being one of the two major initiating forces, they also influence the decision process by being the sole source of information on the technological elements and, in most cases, the economic elements. During the conversion process, their domination of the action is even more strongly felt (Proposition No. 16) since much of the planning is carried out by them.

2. The Triggering Cues

The second hypothesis stated that the decision to automate a small bank is triggered by operational pressures. Evidence was presented that, with few exceptions, this is correct. The three main operational pressures are: Outdated equipment for processing the work flow; increase in volume of activity; high labor turnover in the bookkeeping department (mainly women) and high labor costs. Little, if any, long-term planning is done in small banks in the area of operations. Based on the sample studied, it can be said that the change to EDP, which represents a major change for the organization, is triggered by short-term pressures rather than long-term planning. Although the structure and role of the banking industry is going through considerable change, the average small banker does not engage in long-term organizational planning for these changes. Instead, he prefers to follow innovations suggested and tested by the large banks.

3. Limited Search and Choice Procedures

The third hypothesis stated that while making the decision banks initiate only a minimal search. The descriptive model outlined in Chapter VII emphasizes the limited search procedure used by small banks when deciding on EDP. The various decisions are reviewed, one at a time, with only one or two alternatives considered each time which restricts the choice procedure. The principle of limited search applies, primarily, to the phase of selection of the type of arrangement, where the decision often turns out to be a qualitative one, rather than one based on quantitative comparisons.

Information collection throughout the process is directed towards satisfying immediate problems rather than conducting an exhaustive, or even systematic, search. Although the process progresses in a similar manner in most banks, it is rarely a formally organized one. The immediate impact of these haphazard solutions is that numerous items, for which information should be collected, are neglected. The conclusion is that the hypothesis is fully supported.

4. The Role of a Coalition

The fourth hypothesis defined the decision process as a coalition solution. The decision to automate is guided in most banks by a single person and, in most cases, the interests of only two groups are represented: Those of top management and those of the operations officers. Although the consequences of the decision effect all departments in the bank in the long run, no evidence was

found indicating that the major financial departments, such as the various loan sections, are represented or show interest in the decision process.

The small commercial bank's key decisions are centralized at the presidential level. As a result, there is felt to be little need to involve all the departments in the decision. Rather, it is thought that enough informal exchange of information keeps everyone informed and allows all sides to be represented in the process. But with regard to EDP, this belief proved to be incorrect.

It was further discovered that officers and employees, with the exception of the one directly involved, had too little knowledge and information to exercise any impact on the process. Therefore, no evidence for support of the concept of coalition solution in this type of decision was found, as the goal conflict actually starts to develop only after the decision has been made and the conversion executed.

5. Uncertainty Avoidance and Minimized Change

This hypothesis stated that the decision makers are guided by the uncertainty avoidance principle, which results in limited innovation during the change. Throughout the study, it was emphasized several times that the people in the bank lack knowledge about EDP, i.e. what it can do; what its impact will be; and what

it should be used for. This lack of understanding results in a high degree of uncertainty about EDP during the decision process. In order to minimize the uncertainty, most bankers set only limited goals for EDP (Proposition No. 4). The initial planning is for equipment change rather than system change, and information improvement is expected but only as a by-product. Small banks are slow in implementing new services or utilizing new types of information, preferring to follow the innovations of the large banks rather than take unknown risks.

The type of community where the bank is located and the level of competition will effect the degree of innovation included in the final solution. Banks in metropolitan areas, or dependent on the business generated by large firms, will be more likely to consider innovative features, while those located in small communities will limit themselves to equipment change. The hypothesis was supported by the data.

6. Attention to the Various Elements

As was expected in the final hypothesis, the decision process mainly focuses on the economic element and, to a lesser degree, on the technical element. Only in the latter phases of the process, and often only after the decision has been made, is attention paid to the social aspects of the change. Many top officers would like to believe that socio-political issues do not exist in small banks.

Top management in the participating banks feels it is possible

to eliminate resistance to change by promising job security and letting information filter down to employees through informal channels. Yet resistance did exist, although it took a more passive form than it would in larger organizations. The effect of such resistance was mainly felt when efforts were made for advanced utilization of the computer, beyond the initial work-processing stage.

Bank managers do not conceive of the computer as effecting the power, authority, and status structure in the bank, and therefore disregard it during the process. The political issues are raised only at a later stage and as a result of an unexpected change in the role of the operations people. Overall, the lack of attention to the socio-political factors will tend to slow down the process of change and make it less efficient rather than stop it. Thus, the hypothesis was found to be correct.

B. Conclusions

The general conclusion which can be reached from this study is that although each bank makes the decision only once, there are sufficient characteristics common to the process, which enable the author to arrive at a general model describing the decision process. The description of the process outlined in this study should assist other bankers facing a similar decision in obtaining a better understanding of the process and what is involved in it.

With respect to the behavioral theory of the firm, the argu-

ments in this study can be summarized by the following statements:

1. It is possible, with some modifications, to apply the principles of the behavioral decision theory to a one-time decision. The modifications needed are mainly in the area of organizational learning.
2. The concept of a coalition-decision which is applicable to large organizations has only a limited application to small centralized organizations such as a commercial bank.
3. The study has demonstrated that it is most useful to use the aid of a model in describing the decision and execution processes. The benefits consist of better understanding of the elements influencing the decision, the role of the participants and the final outcome.
4. The decision process applied by most banks proved to be a result of short-term pressures and utilized a sequential approach to goals, problems and decisions.

From the characteristics of the banking industry and the small bank described in Chapter III, it emerges that we dealt with a relatively conservative and mature industry, and a centralized type of organization. This leaves the question if the same model will be applicable to other types of industries with different structure, rate of development and maturity. Therefore, the applicability of the model should be further examined.

Other future research that is suggested by this study is of two orders. First is the research which will extend the knowledge about the decision to introduce change and the introduction of EDP in the organization. This can include research in several directions:

1. Efforts to simulate the process with the purpose of arriving at a simulation having a predictive power as to what specific decision will be made. Due to the difficulties in quantifying some of the behavioral effects and in generating data on such effects that can be included in a simulation, the simulation will have to depend more on in-depth examination of quantitative items.
2. Construction and examination of a normative model of decision making. In Chapters V and VI some normative interpretations were included and further examination of the optimal process is needed. Such a model can be tested in a bank interested in the possibility of EDP, but which didn't yet start the process. The results can then be compared to those achieved by other banks.
3. Comparative studies conducted in small organizations in other industries facing a similar decision. The present study concentrated on one type of small organization only. The future research should examine the application of the model given here to other types of small business organizations in order to arrive at some broader conclusions regarding differences between small and large organizations.

The second direction is toward further examination of the Cyert and March behavioral theory of decision making. Such research can concentrate on specific parts or concepts in the theory. There is a need for improved tools for: Measuring the individual concepts; modifying those that are found unfit; and utilizing the results for the better understanding of a decision process which combines quantitative and qualitative variables.

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APPENDIX A

BEHAVIORAL APPROACHES TO DECISION MAKING

It is not the purpose of this study to review all the approaches and theories in Behavioral Decision Making. Yet in order to examine the behavioral decision theory of Cyert and March, it will be helpful to review some of the other approaches. The reader will notice that the basic principle in the following three approaches is the notion of the "Stepping Stone", where the decision maker takes one step at a time along a certain route, breaking the decision into a set of sub-decisions. The three approaches are summarized below.

A. C. E. Lindblom (1964, Pp. 64-65) in his article "The Science of Muddling through" suggests an approach called "The Successive Limited Comparisons (Branch)" which has five basic principles:

1. Selection of value goals and the empirical analysis of the needed action are not distinct from one another but are closely intertwined.
2. Means-end analysis is often inappropriate or limited since means and ends are not distinct.
3. The test of a "good" policy is, typically, that various analysts find themselves directly agreeing on a policy (without their concurring necessarily that it is the most appropriate means to an agreed objective).
4. Analysis is drastically limited, as:
 - i. Important possible outcomes are neglected.
 - ii. Important alternative potential policies are neglected.
 - iii. Important affected values are neglected.

5. The succession of comparisons is greatly reduced or reliance on theory is eliminated.

B. In a heuristic model which is directed mainly toward the "innovative decision", W. J. Gore (1964, Ch. 2) suggests four major parts in each decision:

1. The perception phase is the initial step where awareness of the existence of some situation requiring collective concern exists.
2. The Evaluative Set is associated exclusively with problem solving, after the situation has been "established" as one having implications for the organization.
3. Estimation of consequences is the crucial step in decision making.
4. Maneuver for position is a venture into the environment in order to seek external sanction for the proposed response.

C. In a recent article, P. F. Drucker (1967) agrees that elements do not by themselves "make" the decisions. But he feels that unless these elements are used as the stepping stone of the executive's decision process, he will not arrive at a correct, and certainly not at an effective, decision. He calls his six-step approach the "Sequential Steps."

1. The classification of the problem. Is it generic? Is it exceptional and unique? Or is it the first manifestation of a new genus for which a rule has yet to be developed?
2. The definition of the problem. What are we dealing with?
3. The specifications which the answer to the problem must satisfy. What are the "boundary conditions?"

4. The decision regarding what is "right," rather than what is acceptable, in order to meet the boundary conditions. What will fully satisfy the specifications before attention is given to the compromises, adaptations, and concessions needed to make the decision acceptable?

5. The building into the decision of the action necessary to carry it out. What does the action commitment have to be? Who has to know about it?

6. The feedback which tests the validity and effectiveness of the decision against the actual course of events. How is the decision being carried out? Are the assumptions on which it is based appropriate or obsolete? (Fp. 92-93).

APPENDIX B

CHARACTERISTICS OF BANKS PARTICIPATING IN STUDY

Bank Number	Size of Deposits	Area	Type of Community	Size of Community	No. of Management People	Total No. of Employees	No. of Branches	Year Established	Type of Ownership	Ratio of Growth 1964-1966	Profit Ratio 1966	Type EDP Arrangement	No. of Applications EDP	Offering of Customer Services
01	2	E	STM	2	3	3	5	3	P	3	2	NP	-	-
02	2	E	STM	3	2	2	0	3	F	3	2	NP	-	-
03	1	M	STI	2	2	2	3	3	P	3	2	NP	-	-
04	1	N	STI	4	2	2	2	3	P	3	2	NP	-	-
05	2	E	STM	2	3	3	7	3	P	3	2	PL	-	-
06	1	M	STM	2	2	2	2	2	P	3	2	PL	-	-
07	1	E	STM	3	3	2	2	3	P	3	3	PL	-	-
08	1	I	SUB	2	2	2	2	3	P	3	4	PL	-	-
10	2	E	SUB	2	4	5	8	3	H	3	3	ON	3	Y
11	1	W	CIT	3	3	2	0	2	D	3	3	ON	4	N
12	2	W	SUB	2	4	4	0	2	P	3	2	ON	4	Y
13	1	W	SUB	3	2	2	1	1	P	3	2	ON	2	Y
14	1	W	CIT	5	3	3	0	2	P	4	1	ON	3	N
15	1	M	SUB	2	2	2	0	3	D	3	2	ON	5	N
16	1	M	STM	2	2	2	0	3	F	2	2	ON	1	Y

APPENDIX B
CHARACTERISTICS OF BANKS PARTICIPATING IN STUDY (CON'T)

Bank Number	Size of Deposits	Area	Type of Community	Size of Community	No. of Management People	Total No. of Employees	No. of Branches	Year Established	Type of Ownership	Ratio of Growth 1964-1966	Profit Ratio 1966	Type EDP Arrangement	No. of Applications EDP	Offering of Customer Services
17	1	W	ST2	2	2	2	0	3	P	3	2	ON	6	N
20	1	W	CIT	5	3	2	1	1	P	5	1	CB	2	N
21	1	W	CIT	5	2	2	0	1	P	3	1	CB	3	N
22	1	W	ST1	3	3	2	0	3	F	2	2	CB	2	N
23	2	W	ST1	3	3	2	0	3	F	2	3	CB	1	N
24	2	E	STM	1	3	3	3	2	P	3	2	JV	1	N
25	1	E	STM	1	3	2	6	3	P	4	2	JV	1	N
26	2	M	CIT	5	3	4	5	3	F	3	1	SB	2	N

EXPLANATION OF TABLE NOTATIONS

Size of Bank Deposits

- 1 - \$25 million or under
2 - over \$25 million

Area

- E - East
M - Midwest
W - West

Type of Community

- STM - Small Town - mixed
agricultural and in-
dustrial economy
STI - Small Town - Industrial
economy
SUB - Suburban to large city
CIT - City

Size of Community

- 1 - Under 10,000
2 - 10,000-39,999
3 - 40,000-99,999
4 - 100,000-249,999
5 - 250,000-and over

No. of Management employees

- 1 - 1-4
2 - 5-12
3 - 13-20
4 - over 20

Total No. of Employees

- 1 - Under 30
2 - 30-69
3 - 70-109
4 - 110-149
5 - 150 and over

No. of Branches

number indicates the
number of branches

Year Established

- 1 - after 1957
2 - 1945 - 1956
3 - 1944 - or before

Type of Ownership

- F - One family controls
bank
D - Directors control bank
P - Stock widely distributed
among public
H - Owned by Holding Co.

Ratio of Growth 1964-1966

- 1 - Less .90 - Decline
2 - .90 - 1.09 - Stability
3 - 1.10 - 1.49 - Moderate Growth
4 - 1.50 - 1.89 - Fast Growth
5 - over 1.90 - Very Fast Growth

Profit Ratio - net operating
income before

- 1 - Under 1.00 tax as percent
2 - 1.00 - 1.39 of total
3 - 1.40 - 1.79 assets.
4 - 1.80 - 2.19
5 - 2.20 - and over

Type of EDP arrangement

- NP - No immediate plans
PL - Plan to use EDP within
18 months
ON - EDP on premises
CB - EDP off premises-use
correspondent bank
SB - EDP off premises-use
service bureau
JV - EDP off premises-belong
to joint venture

No. of Application on EDP

Number indicates applications
on EDP

Offering non-banking customer
services on EDP

- Y - Yes
N - No

APPENDIX C
SUPPLEMENTARY QUESTIONNAIRE USED IN BANKS

Bank _____

Name _____

Following are a few simple questions relating to the decision to automate in your bank. We will appreciate your answering them at this time.

1. Please indicate the importance attached to each of the following items at the time the decision to automate was considered in your bank.

Use the following scale to assign points for each item.

1	2	3	4	5	6	7	8	9
not important at all		only of little importance		important to some extent		quite important		most important

You can use the same number as many times as necessary.

(Example: If "Reduce cost" was a quite important factor put a 7 next to it, if it was not important at all, put a 1 next to it.)

- _____ Replace obsolete bookkeeping
- _____ Reduce costs
- _____ Reduce labor needs
- _____ Increase speed of operations
- _____ Supply more information
- _____ Supply more accurate information
- _____ Increase prestige of the bank
- _____ Offer more services to customers
- _____ Meet competition from other banks
- _____ Improve customer services
- _____ Achieve improved management control over employees
- _____ Achieve improved management control over operations
- _____ Others (Please specify)
- _____
- _____

2. Please indicate the degree to which the following possible computer arrangements were considered in the decision to automate. (Please use the following scale on questions 2 and 3.)

1	2	3	4	5	6	7	8	9
not considered at all		only briefly considered		considered to some degree		seriously considered		most seriously considered

- ☐ Buying own computer-on premises
☐ Leasing own computer-on premises
☐ Establishing independent computer service company
☐ Using correspondent bank computer
☐ Using holding company or affiliate bank computer (if applicable)
☐ Using a service bureau computer
☐ Establishing a cooperative with other banks
☐ Other arrangements (please specify _____)

3. If you considered getting your own computer equipment, could you please indicate which of the following suppliers were given the greatest attention in the decision. (Please use the same scale as in question 2.)

- ☐ BURROUGHS
☐ CONTROL DATA
☐ G. E.
☐ HONEYWELL
☐ I. B. M.
☐ N. C. R.
☐ R. C. A.
☐ UNIVAC
☐ Other please specify _____

4. Please indicate the extent to which each of the following items con-
tributed to the decision on the present computer arrangement. (Please use
the following scale.)

1	2	3	4	5	6	7	8	9
not considered at all		only briefly considered		considered to some extent		seriously considered		most seriously considered

_____ Cost of service arrangement or system

_____ Space needed

_____ No. of staff needed

_____ Availability of programs

_____ Availability of equipment

_____ Availability of service

_____ Availability of back-up equipment

_____ Capabilities of the equipment

_____ Other _____

5. Please indicate the extent to which each of the following sources
influenced the decision to use the present arrangement. (Please use the
following scale.)

1	2	3	4	5	6	7	8	9
not at all		very little		to some extent		to a considerable extent		the most

_____ Computer salesmen

_____ Correspondent bank management

_____ Outside consultant

_____ The bank President

_____ Member(s) of the Board of Directors

_____ Operation officer of the bank

_____ Head of bookkeeping department

_____ Other officer(s) in the bank

_____ Other bankers in area

_____ Large customers

_____ Published material (journals, newspapers, books, etc.)

_____ Other (please specify _____)

6. Please indicate the extent to which each of the following took an active part in the decision to use the present arrangement. (Please use the following scale.)

1	2	3	4	5	6	7	8	9
not at all		very little		to some extent		to a considerable extent		the most

- _____ Computer salesmen
- _____ Correspondent bank management
- _____ Outside consultant
- _____ The bank President
- _____ Member(s) of Board of Directors
- _____ Operation officer of the bank
- _____ Head of bookkeeping department
- _____ Other officer(s) in the bank
- _____ Other bankers in area
- _____ Large customers
- _____ Other (please specify _____)

APPENDIX D

THE DECISION PROCESS IN THREE BANKS

1. The Northern Bank (01)¹ - no plans at present time

a. Background. The Northern Bank is a \$40 million bank in the northeast of the United States. It was established in the 1920's in an agricultural and industrial community of 20,000 people. The bank's stocks are widely held, mainly by residents of the state. It has achieved a moderate rate of growth over the last few years, and operates five branches located within a radius of thirty miles from the main office. Of the other three banks in the immediate area, one was a branch of a larger bank utilizing EDP, while the two other banks were not using any EDP services.

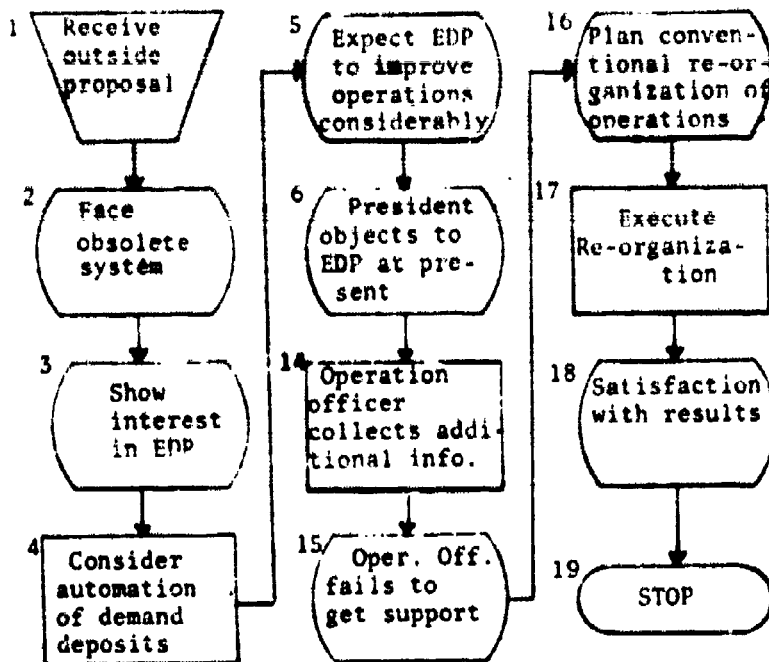
b. The Decision Process. The bank operated a semi-centralized bookkeeping system, with the work of the three branches processed in the main office and the remaining two doing their own bookkeeping. During the second part of 1965, the bank was approached by three computer manufacturers and one other bank in the area, all offering their equipment or services (#1)². At about this time, the bank's operations officer felt that changes were needed in the existing bookkeeping system, which depended too much on hand sorting and the good memory of the employees. During the fall season, which is the most active time of the year for the bank, problems developed in processing the checks and handling funds (#2). The senior

¹The number of each bank corresponds with the number given to the same bank in Appendix B.

²The numbers refer to the phases in the model in Figure 7.1.

FIGURE D-1¹

THE NORTHERN BANK DECISION PROCESS



¹ The numbers next to each box correspond to the phase numbers in Chapter VII.

operations officer, who previously worked for an automated bank, decided to look into the possibility of automation (#3), planning to utilize it, in the first stage, for demand deposits only (#4). The operations officer, who had been in the bank since 1962, believed that automation might improve efficiency in processing the bank's work. Other expected benefits were a lesser dependence on key non-management employees and better management of funds (#5). He also saw a need to change some of the other managers' methods of operation and introduce modern management techniques which would improve the competitive position of the bank.

When the idea of automation was presented for approval to the president of the bank (#6), he rejected it (#69) claiming that the bank was not ready to consider the issue because too much cost was involved in any conversion that would have to be done within the next two years. At the same time the president believed operational problems were not that severe and could be alleviated in ways other than automation (#61). The operations officer continued for some months to meet with the computer manufacturers to get additional information (#14), but could not solicit any further support for the idea of automation (#15). At the beginning of 1966, other ways to improve operations were sought (#16), and by the middle of 1966, the bookkeeping department reorganized by introducing specialization based on the stages in the check processing rather than on groups of accounts (#17). The results were considered so successful (#18) that it was decided to postpone the discussion of automation for at least four years.

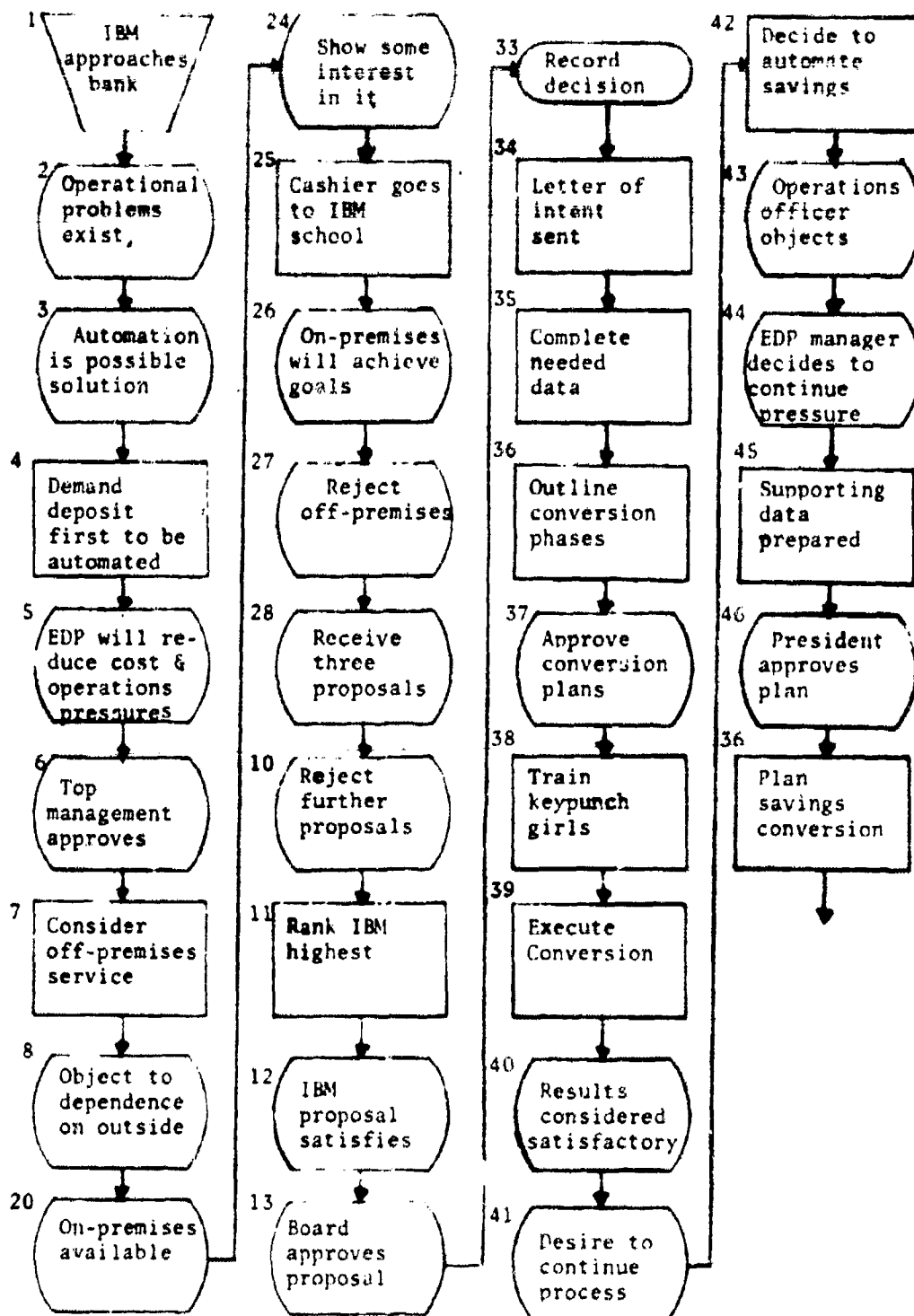
c. Analysis. The bank had three of the four elements needed to launch a decision process: There was a senior person in the bank interested in automating, there were some operational pressures, and there were some outside agents who were interested in providing the services or equipment. The process did not materialize beyond the first phase for two reasons. The first was the lack of support from top management, i.e. the president, and the second was that the operational pressures were not severe enough to require any action beyond the modification of the existing bookkeeping system. In addition, the person guiding the process was considered a "freshman" by the other senior officers who were comfortable with the old system and who disliked the idea of a rapid change.

2. The Western Bank (13) - On-Premises Facilities

a. Background Information. The Western Bank is a \$15 million bank on the west coast. It was established in 1962 in a suburb of a large metropolitan city. The majority of its stocks are held by the members of the Board of Directors, with the chairman of the Board owning close to half of it. It has achieved a moderate rate of growth over the last few years, and operates one branch located in the same suburb. Competition comes mainly from the large banks in the metropolitan area which have branches in the suburb.

FIGURE D 2

THE WESTERN BANK DECISION PROCESS



b. The Decision Process. Shortly after the bank had opened, the bookkeeping department began to have operational problems (#2). The problems were with both the inefficient equipment which required a lot of manual work, and with the absences and high turnover of employees. The bank had some calls from outside service providers, but no serious effort was made until a third operational problem developed. As a result of rapidly increasing volume due to quick initial growth, the accuracy of the output dropped. Then in late 1964, as described by the cashier, "IBM walked through the front door and put it (the suggestion to automate) on our desk." (#1) The cashier and his assistant were interested in the proposal (#3) and began to inquire about automation of demand deposits only (#4). They felt it would reduce costs and improve operations (#5).

The president of the bank and the chairman of the Board did not object to investigating automation (#6), although they did not actively support it. IBM made the original suggestion for the bank to get its own equipment, but the bank first investigated the possibility of having an off-premises source do the work (#7). Estimates were submitted by two correspondent banks and one service bureau, but operations people decided that the price was too high and the return in services insufficient. Top management, when consulted, was reluctant to depend on a potential competitor for services (#8). The operations people decided to look into the possibility of buying their own equipment (#20, 24). By the beginning of 1965, IBM had invited the junior operations officer to a two-week course where he was

exposed to the equipment (#25) and from which he returned with very favorable impressions (#26). He felt that the solution of acquiring equipment would be most suitable for the bank. At this stage the idea of using off-premises EDP was dropped (#27).

Discussions were held with salesmen of two other manufacturers (#28), but were described by management as not serious, and only the IBM proposal was finally submitted for consideration (#10). As one officer remarked, "after the assistant cashier went to the IBM course, we knew that if anyone got the order for equipment it would be IBM". (#11) The IBM proposal was considered by the operations people as most satisfactory (#12), and when presented to the president, the Board's approval was easily obtained (#13) and the decision to sign with IBM (#33) was made in mid-1965.

c. The Conversion Process. In the rental agreement signed with IBM (#34), delivery of equipment was promised within ten months. During this time information on the flow of documents and on the necessary training of employees was collected (#35), and the conversion was planned (#36). Also during this time, the junior operations officer became the cashier of the bank, and a new junior operations officer was hired to supervise both the newly automated and non-automated functions. A second person was hired to run the computer installations. The new junior operations officer objected to the installation of EDP in the bank and was by-passed by the EDP manager, who began to report directly to the cashier. He received approval for the conversion plan (#37). The execution of the conversion (#38) was

completed with the help of IBM, to the general satisfaction of the senior management (#40). The cashier and EDP manager next suggested converting the savings deposits (#42), but the objections of the junior operations officer (#43) postponed the process for several months. Finally, the president supported the cashier, who presented data (#45) suggesting that not only should additional functions be converted, but also a larger computer ordered. Approval of the second conversion was given (#43), and it was in the planning stage (#36) at the time of the writer's visit to the bank.

d. Analysis. Operational pressures plus initiative of outside salesmen caused the bank to consider automation. The process started under the guidance of the operations officer, with the passive approval of top management, and no open resistance. Resistance developed only when a new operations officer feared he was losing control because of the accepted decision.

The bank briefly considered off-premises arrangements but gave serious consideration to only one proposal, the installation of IBM on-premises equipment. The reason was that the people guiding the decision felt it would minimize the uncertainty involved in utilizing any other proposal. The search was simple-minded and biased towards IBM because of the course taken by one of the two persons guiding the process, who at the time of the decision was the only one in the bank having any EDP knowledge.

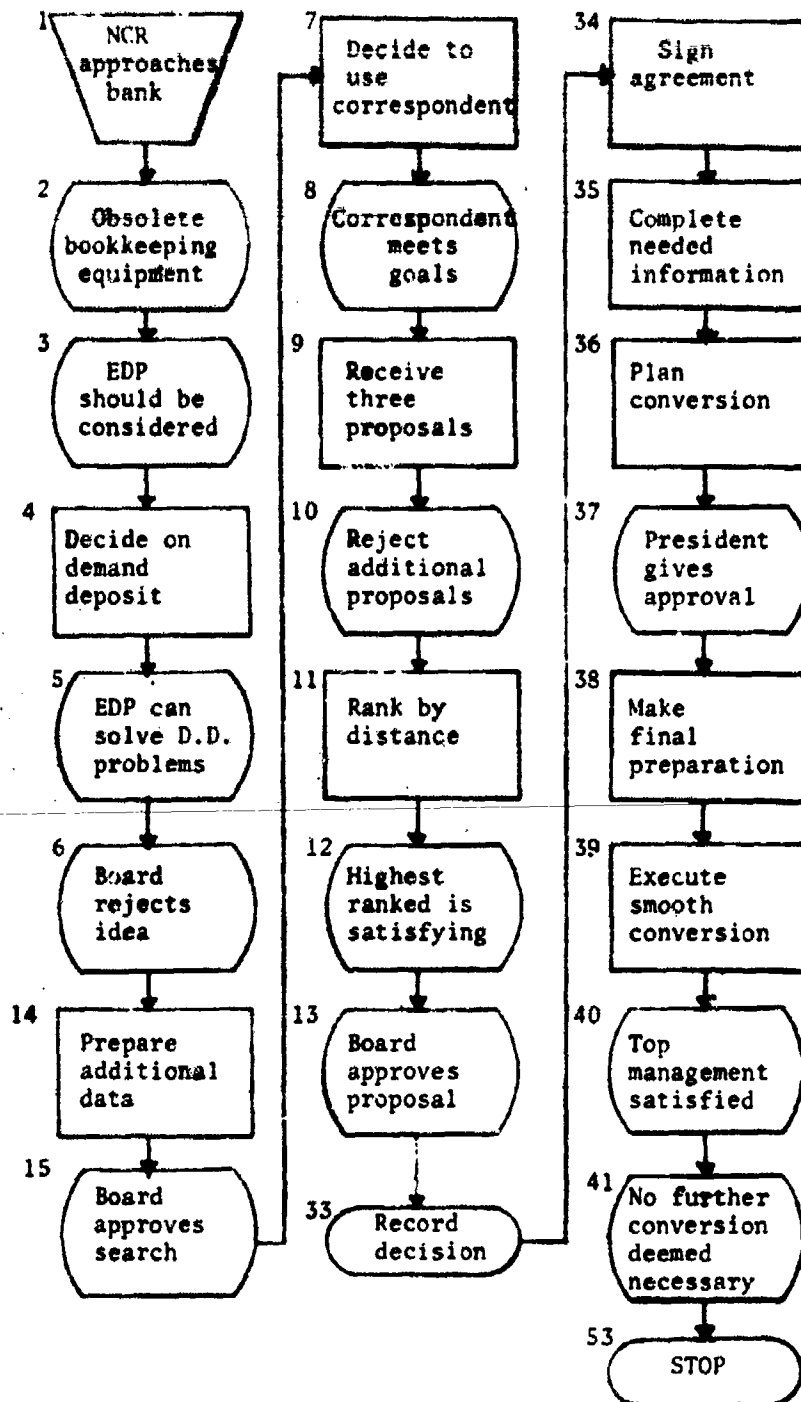
3. The Mountains Bank (23) - Using an Off-Premises Service

a. Background Information. The Mountains Bank is a \$25 million bank in the Rocky Mountains. It was established at the turn of the century and is located in a small industrial town. The majority of the bank's stock is held in trust for a single family. Since 1964 the bank did not grow in assets, and the bank does not operate branches. There are seven banks in the town of which three had been using computers when the decision process in The Mountains Bank started.

b. The Decision Process. Late in 1964, the junior operations officer was invited by NCR to visit its facilities, and he returned impressed with what he had seen (#1). In the middle of 1965 the bank faced the need to replace conventional, obsolete bookkeeping machines (#2) and the junior operations officer suggested considering EDP (#3) to replace the obsolete equipment in the demand deposits section (#4). Throughout the second part of 1965 he investigated the issues involved in automation (#5) and presented the idea of using EDP to the president and Board of Directors in December, 1965 (#6). The members of the Board rejected the idea altogether, although the president gave partial support. During the first half of 1966, the operations officer collected additional data (#14) mainly on the cost aspect of automation versus conventional processing. With the help of the president, visits to computer installations were organized for several members of the Board of Directors. In June, 1966, the subject was raised again in a special Board meeting and this time approval was given (#15) to proceed with the investigation.

FIGURE D-3

THE MOUNTAINS' BANK-DECISION PROCESS



The arrangement of using a correspondent service was identified as the most suitable (#7) because:

1. Management felt their bank was too small to afford its own EDP.
2. Management felt it did not know enough about EDP to run it itself, and it would cost too much to hire qualified people to run it on-premises.

The advantages of the correspondent bank were given as follows:

1) The correspondent bank had the money to back the bank in case of failure; 2) the correspondent bank had the experience needed to supply suitable operation; 3) the bank could get its "feet wet" and learn from the experience of a larger bank before it went on its own computer. (#8). Three banks were asked to submit proposals (#9), and although two other banks and a service bureau offered to supply services, the management felt it had sufficient information on hand (#10). All three proposals were about the same in regard to cost and most other features, but the operations officer guiding the process preferred the bank that was closest in distance, yet still outside the immediate competitive area (about fifty miles away) (#11). The proposal of this bank was also slightly cheaper and was considered satisfactory by the operations officer and president (#12). It was brought to the Board for approval (#13), which was given this time with only little discussion and without any objections (#33).

c. The Conversion. The final decision was made at the end of 1966, and the demand deposits function was converted in May of 1967. Additional information was collected at the request of the service provider (#35), and the planning was left to the representatives of the

service provider and the junior operations officer (#36).

The president was kept informed (#37) but did not take an active part in the planning or execution of the conversion. Following a successful conversion, in which minor problems were solved in a three-day parallel run (#39), satisfaction with the results was expressed by the entire senior management (#40). Some discussion on the possibility of converting other functions developed in the bank, but it was decided by top management that no operational problems existed in other areas and thus there was no need for further conversions at that time (#41, 83).

d. Evaluation. Opposition to the consideration of automation developed at the top level in the early stages due to lack of information and unfamiliarity with the subject. But once the junior officer got the support of the president, he was able to carry the whole project through with no active resistance cropping up. The process was simplified because of the limited goals of the decision makers (replacement of obsolete equipment in only one function.)

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13 ABSTRACT The decision process involved in deciding to automate the small commercial bank is examined from a behavioral point of view. A descriptive model which provides an outline of the process is suggested, and principles of the behavioral theory of the firm are applied in its examination. Results of a field study including 23 banks are presented in support of the model.		

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	computers banks behavioral theory decision making decision process search and choice role of decision makers decision model conversion influence						

INSTRUCTIONS

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