THE FINANCIAL AND LABOR IMPACT OF CYBERNATION ON THE
AMERICAN REPUBLIC INSURANCE COMPANY

An abstract of a Thesis by
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The problem. Few studies of cybernation have been conducted on one specific company without any comparisons drawn with another company in a related industry. The problem of cybernation and its impact upon a single firm has not been well studied in economics, and this study seeks to remedy this gap in economic literature.

Procedure. The research procedure consisted of personal interviews with personnel in top management, middle management and some lower management. A guide composed of questions was prepared for these various levels in order to insure that a uniform procedure would be followed during the interview. The information obtained covered the period immediately preceding the introduction of the computer into the firm as well as the period of time during which the computer was used and also the immediate future.

Findings. The insurance industry was ready for computers. The most economical method of determining whether or not to implement a computer system was to have a feasibility study conducted. The results of this study showed that such a system would enhance the firm's competitive position and would help secure a continued profit growth.

It was cheaper to rent the computer system than to purchase it. Structurally, the operating costs of the new system were about the same as those of the pre-electronic data processing systems. Salaries, supplies, and equipment costs were somewhat higher because of higher skill requirements, greater quantities of material and more sophisticated machines. More cost was involved in unproductive time initially but decreased considerably over this period of time. Clerical costs decreased through a reduction in the clerical force. The computer saves not only all of the costs of separate file maintenance, but also the costs of clerical people needed to conduct search and transfer which existed under the old system. Conflicting and overlapping services have been eliminated. The productivity of clerical operations has increased through greatly improved processing techniques. Greater operating efficiency has been obtained in data processing through increased speed, improved accuracy, and decreased equipment idleness. Expense is reduced because of faster billing procedures. There is more flexibility for the expansion of the firm's data processing capabilities as growth occurs. More timely decisions can now be made by management. More control of information and strengthening of the organizational structure has resulted. There has been some displacement effect on the clerical level. The supervisory and managerial levels have remained unchanged for the most part. No problem of old-age versus young or skilled versus unskilled has existed. There has been an upgrading of the skill
levels of computer-affected personnel. Departments have become more functionalized. Cybernation enables a firm to handle larger volumes of insurance without requiring a substantial increase in employment.

In summary, cybernation has been a good investment at American Republic.
THE FINANCIAL AND LABOR IMPACT OF CYBERNATION ON THE
AMERICAN REPUBLIC INSURANCE COMPANY

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by
Edward Charles Kramer
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THE FINANCIAL AND LABOR IMPACT OF CYBERNATION ON THE
AMERICAN REPUBLIC INSURANCE COMPANY

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## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. THE PROBLEM AND INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>1</td>
</tr>
<tr>
<td>Background of Cybernation</td>
<td>2</td>
</tr>
<tr>
<td>Basic Principles</td>
<td>6</td>
</tr>
<tr>
<td>History of American Republic Insurance Company</td>
<td>8</td>
</tr>
<tr>
<td>Procedure</td>
<td>12</td>
</tr>
<tr>
<td>II. THE DECISION TO CYBERNATE</td>
<td>14</td>
</tr>
<tr>
<td>The Literature</td>
<td>14</td>
</tr>
<tr>
<td>The Decision to Cybernate at American Republic Insurance Company</td>
<td>30</td>
</tr>
<tr>
<td>III. THE IMPACT OF CYBERNATION ON LABOR FORCE</td>
<td>38</td>
</tr>
<tr>
<td>Historical</td>
<td>38</td>
</tr>
<tr>
<td>The Impact of Cybernation on Labor Force at American Republic Insurance Company</td>
<td>42</td>
</tr>
<tr>
<td>IV. CONCLUSION</td>
<td>76</td>
</tr>
<tr>
<td>V. THE PROSPECTS FOR THE FUTURE</td>
<td>84</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>87</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>91</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Changes in Centralization of Control in Computer-affected Departments</td>
<td>46</td>
</tr>
<tr>
<td>2. Computer Effects on Employment by Organizational Level for all Departments Using Computers Daily</td>
<td>59</td>
</tr>
<tr>
<td>3. Computer Impact on Job Content by Organizational Level for all Departments Using Computers Daily</td>
<td>59</td>
</tr>
<tr>
<td>4. Changes in Skill Level of Jobs at Different Organizational Levels</td>
<td>67</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Growth in Employment</td>
<td>55</td>
</tr>
<tr>
<td>2. Growth of value of Insurance in Force</td>
<td>57</td>
</tr>
</tbody>
</table>
CHAPTER I

THE PROBLEM AND INTRODUCTION

Statement of the problem. Many studies have been conducted on groups of companies in various industries on the impact of automation, computers, and technological change. However, few such studies have been conducted on one specific company without any comparisons drawn with another company in a related industry. The problem of cybernation and its impact upon a single firm has not been well studied in economics, and this study will seek to remedy this gap in economic literature.

The advent of the computer and automation in the insurance industry has caused many firms to make changes within their own organizations. Many firms have gone so far as to modify their goals. Some firms have been able to attain their goals much faster than they were able to do previously. Often times firms shy away from the computer and still are able to maintain a favorable position within their respective industry. There are many reasons why a firm does or does not decide to implement a computer system into its organization. The area of financial planning for such a venture can be staggering.

When a firm decides to obtain a computer system, new positions for personnel are usually created. New demands on present personnel as well as new personnel are expected.
Jobs can be downgraded or upgraded. New procedures and innovations might replace old procedures. There might be a displacement problem as well as a skilled versus unskilled problem. Organization structure can be changed. These changes, and many more, constitute the uncertainty as to the future. With this in mind, this study will attempt to evaluate the impact which automation and computers has had on the American Republic Insurance Company of Des Moines, Iowa. This company was selected for this study as it incorporated the use of automation and computers in its operational system as soon as the technology as made available for business purposes. The results of the last thirteen years will be presented along with projections into the next several years.

Much information has been obtained from persons in the responsible positions. These personnel are experienced in their respective fields and their backgrounds enable them to adequately foresee changes affecting them, their colleagues, and their subordinates, individually and jointly.

Background of cybertnation. Automation first began as technological change. Shakespeare recognized it in The Merchant of Venice when he said, "You take my life when you do take the means whereby I live."

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Humphrey Potter, the 12-year-old English boy who did himself out of a job by realizing that he could attach ropes to the piston of a steam engine which would open and close valves at the proper time without the necessity of his attention, experienced the problem in the early 16th century. The tail of a windmill which keeps the fan constantly into the wind, the whirling balls on a governor that regulate the speed by rising and closing a valve as their pace increases, were, in this sense, forms of automation.\(^1\)

Shortly after the end of World War II a new development began to take place in a number of advanced industrial countries which was to have an enormous impact upon productivity, at least in specific sectors of the economy. This process is called automation.\(^2\) Shultz and Baldwin say the following:

Today, people are calling every conceivable kind of technological change "automation." This is riding fashion too hard, because there are still thousands of technological changes occurring every week which have nothing at all to do with automation. The term is not a synonym for technological change; it is instead a particular kind of technological change that has gathered momentum since the second World War.\(^3\)

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\(^1\)Beirne, p. 43.


This view was also expressed in a publication of the U.S. Department of Labor which provides a concise definition of automation: "... automation refers to the use of machinery--computers, transfer devices, and automatic mechanisms to control and regulate industrial processes and to speed up compilation of data in offices. Technological change includes not only automatic devices but also other types of equipment and procedures which tend to increase and speed up the production and distribution of goods, materials, and services and to reduce manpower requirements per unit of output."¹

Engineers define automation as "the transference of control functions from human beings to computers and servomechanisms." To the economist, it means a smaller number of workers needed to produce a given quantity of goods and services. In that sense, there can be no doubt that automation destroys jobs, but there is nothing particularly new about that. Automation has been destroying jobs since the beginning of civilization--faster and faster since the Industrial Revolution--and yet the total number of jobs has, with occasional interruptions, risen continually.² This is


because automation also creates new jobs by virtue of increasing the capital-labor ratio.

Automation will pose unique problems for society. The basic values and the ways in which society expresses and enforces them are constantly being challenged. Society needs to know something of the nature and use of automation and computers. There are two important classes of devices. One class, usually referred to when one speaks of "automation," is made up of devices that automatically perform sensing and motor tasks, replacing or improving on human capabilities for performing these functions. The second class, usually referred to when one speaks of "computers," is composed of devices that perform, very rapidly, routine or complex logical and decision-making tasks, replacing or improving on human capacities for performing these functions.¹

The two classes of devices overlap. At one pole are the automatic producers of material objects and, at the other, the sophisticated analyzers and interpreters of complex data. In the middle zone are the mixed systems, in which computers control complicated processes, such as the operations of an oil refinery, on the basis of interpretations that they make of data automatically fed to them about the environment. Also in this middle zone are those routine,

automatic, data-processing activities which provide men with the bases for controlling, or at least understanding, what is happening to a particular environment.

In order to eliminate the awkwardness of repeating the words "automation" and "computers" each time it is wished to refer to both at the same time, and in order to avoid the semantic difficulties involved in using one term or the other to mean both ends of the continuum, the term "cybernation" is used to refer to both automation and computers. The word derives from "cybernetics," a term invented by Norbert Wiener to mean the processes of communication and control in man and machines. He derived it from the Greek word for "steersman." The theory and practice of cybernetics underlie all systematic design and application of automation and computers.¹

**Basic principles.** Present-day cybernation is based on five essential principles. They are, first of all, mechanization, by which is meant the use of machines to perform work. A machine, in this instance, may range from a simple lever to the most complex nuclear propulsion system of a submarine. The second essential principle of cybernation is the concept of continuous process. This is most easily visualized in an assembly-line process in which the work moves past the worker, as in the meatpacking houses, automobile plants,

¹Michael, pp. 223-224.
or electronic components factories. It is the integration by means of mechanical engineering techniques of conventionally separate manufacturing operations into lines of continuous production untouched by human hands. Thirdly, cybernation requires the principle of automatic control, as engineers term it, feed-back. The thermostat in a home heating system which governs the action of the furnace in accordance with its reading of the temperature, is a simple illustration. It is the use of "feed-back control devices or servomechanisms which permit individual operations to be performed, tested, and/or inspected, and controlled without human control by means of electrical engineering or electronic techniques. Fourthly, there is rationalization. In a production system, there must be an analysis of the entire process, from the raw material to the final product, so that every operation contributes to achieve the desired goal. Fifthly, there is what is referred to as "office automation," but is more frequently called electronic data processing. In banks, insurance companies, and in other enterprises which handle tremendous volumes of routine paperwork, electronic computers record data and make calculations with previously unheard-of speed. Computers have also been tied in with the telephone system permitting almost instantaneous transmission of data facilitating the centralization of record keeping and the rapid compilation of statistical data from widely
scattered geographical sources.¹

It is the application of these principles, in conjunction with each other, that constitutes cybernation. Wisdom must be exercised in using it and adapting to it. The first part of this wisdom is to anticipate results rather than to await them. It is necessary for the labor movement to examine the human problems of cybernation with a view toward anticipating them and erecting such safeguards as deemed feasible.

**History of American Republic Insurance Company.**

Early in 1929, Mr. Watson Powell, a pioneer in the health and accident insurance business, left the company in which he was managing the health and accident department to organize his own company.

On April 1, 1929, American Republic Insurance Company received its Charter from the State of Iowa. Soon after, the founder of the Company, Mr. Powell, wrote the first 200 charter policies to get the Company started. There was no need for elaborate office equipment. Policies were issued, claims were handled and letters were answered on one manual typewriter. This was the original piece of office equipment owned by American Republic.

The first years of the Company were difficult ones.

¹Beirne, pp. 43-44; Shultz and Baldwin, p. 114.
In 1929, the United States experienced two economic extremes. While American Republic was born in a month of prosperity, it began its youth in deep depression, following the stock market crash in October, 1929. However, the Company steadily grew, but slowly. By the end of World War II management was ready to expand operations beyond the borders of the State of Iowa, and in 1945 Minnesota became the second state in which American Republic was licensed to do business. Once started, the Company began to move rapidly into other states. In 1946, licenses were obtained in Colorado, Oklahoma, Nebraska, North Dakota, and South Dakota. In 1947, continuing the expansion, the states of Missouri, Wyoming, Arizona, Texas, and Utah were added. At the present time, American Republic is licensed in Puerto Rico, the District of Columbia, and all states except Hawaii and Alaska.

At about the same time that Mr. Powell organized American Republic, he also took over the management of a very small existing company, National Benefit Insurance Company, which was then writing the same type of accident and health coverage as was American Republic. These companies grew side by side, sharing the same offices and management personnel until December 31, 1954, when National Benefit’s business in force was one hundred percent reinsured by American Republic and National Benefit as a corporate entity ceased to exist.

The first American Republic life insurance policies
were sold in May, 1951, life insurance sold only on a part-
time basis by agents writing primarily health insurance.

By 1963, American Republic had grown large enough to see the need for a faster, more efficient way of servicing its more than 900,000 policyholders. It was then billing over 900,000 policies with Addressograph plates. It was time for new machinery. In 1963 American Republic began to use electronic data processing. The company's first computer was a 1401 which handled life insurance plus the small amount of guaranteed renewable business then being written. By November, 1964, the Addressograph plates had been converted manually to punch cards (at the rate of 3,000 a day) and two 1401 computers were in service. Later that year a large 1410 computer was added to give American Republic one of the ten largest computer installations in the state of Iowa.

In February of 1966, a System/360-Model 30 computer was delivered. At that time the company released one of the 1401 computers. In May, a System/360 Model 50 computer was installed and the second 1401 was released. This Model 50 computer was one of the first computers of its size to be delivered in America. With the Model 50 was delivered a storage unit known as a data cell. This cell will hold 400 million facts, permitting the storage of information from over two million policies.

In early 1967, IBM 2260 visual display terminals were installed. Each unit allows the user to have immediate
access to all information in the computer, and places all of
the calculating ability of the computer on the user's desk.

In June of 1967, a new, wholly-owned subsidiary of
American Republic Insurance Company came into being. It was
called the American Republic Assurance Company. It was the
first to be chartered in the State of Iowa specifically to
issue variable annuities. It was formed to further expand
the activities of the parent company in the field of life
insurance and to market variable annuities in three areas:
corporate pension and profit sharing plans, tax sheltered
annuities, and retirement plans for self-employed persons.

In May of 1970, the 601 Corporation was formed. This
is a downstream holding company. It is a wholly owned sub-
sidiary of American Republic Insurance Company. The 601
Corporation provides American Republic with possibilities for
expansion into related financial and insurance services. In
the same year, the American Republic Management Corporation
was formed to sponsor and manage mutual funds. The American
Republic Equities, Incorporated, was formed as a broker
dealer to handle the sale of all the equity products of the
entire conglomerate.

In June of 1970, American Republic added an Ampex
"Videofile" system. Using special display terminals at their
desks, the employees can instantly retrieve data visually,
or they can receive a hard copy print-out in seconds. The
information was previously stored on paper in conventional
files but is now photographed on high speed video tape.

Early in 1971, an IBM 370 Model 155 was installed. Also another company joined the American Republic congeneric conglomerate. This was the American Republic Life Insurance Company of New York.

In 1972, storage capacity was added to the 370-155 Computer system. Four times faster than the previous 360 computer, the 370 now has a core capacity of 2,000,000 bytes or commands—three times that of the 360. One out of every five American Republic employees communicates directly with the computer at random, and on a real time basis. Data can be input or retrieved from any of the more than one hundred terminal display units. American Republic's computer operation uses IMS-OS—the most advanced computer system and language yet developed for business.

Procedure. The method study was a straightforward gathering of information about the experiences, organizational structure, jobs, and individual reactions at American Republic. The information obtained covered the period of time during which the computer has been used within this firm as well as the period immediately preceding the introduction of the computer. The information was gathered by personnel under the guidance of an executive and by three top management personnel in the company.

The research procedure consisted of personal interviews
with personnel in top management, middle management, and lower management. A guide was made for the different levels of those interviewed so that a uniform procedure would be followed. Otherwise, gaps in information would have resulted. In some cases, it was necessary to eliminate some questions and in others to add questions based on the specific situation. Each interview was followed as much as possible according to the guide.

In each interview, as much documentary evidence was obtained as possible. A complete guide or checklist of questions was prepared and given to each person to be interviewed far in advance of the exact interview date. This, it was felt, gave the respondent substantial time in which to prepare information in advance. This helped conserve time and effort on all persons involved. It also helped keep the interview orderly and to the point.

The interviews differed in length, depending upon the amount of impact cybernation had on the specific person or department. The average length of time spent per interview was approximately twenty minutes. Permission was obtained to conduct this study from the Director of Personnel and Education as well as the Executive Vice-President of American Republic Insurance Company. Every person interviewed was informed that the researcher was gathering information for the express purpose of writing a thesis.

Examples of the type of questions asked during the interviews are found in the Appendix.
The literature. In the early days of data processing, the most costly piece of equipment was a typewriter, calculator and desk-top accounting machines. Early systems designers could easily investigate available equipment by calling on a few vendors and checking prices. The decision to buy was often made right on the spot. If a mistake was made, it was easily remedied as the machine was exchanged for another or a new one was purchased. The dollar loss to the firm was nominal. However, the decision to implement a modern business system is not a casual one. Alteration of the physical plant, installation of expensive air conditioning equipment, installation of special floors, and the purchase or lease of costly, highly specialized, complex equipment may be involved. The equipment may also require maintenance by trained equipment specialists. Errors in judgment in systems design can cost a firm hundreds of thousands of dollars.\textsuperscript{1}

Other factors such as the amount and complexity of data to be processed and the modern business firm's dependence upon it complicate the problem. A new system must be

implemented without disrupting the flow of data. There is the question of whether a new system should be implemented all at once or step by step or should it operate alongside the old method for awhile. These decisions are difficult to make, and once made, often cannot be recalled. If the right decision is made, the firm benefits from an improved data flow. If the wrong decision is made, more money, time, and resources may be needed for correction.¹

If a person is to begin properly in looking at the computer and the organization, it is necessary to start at that point in time when someone in the company first became aware of the potential benefits of a computer system. Few companies design and build their own computers. For most organizations, the computer and associated equipment that is used is already in the public domain. At some point, some member of the organization picks up information that eventually leads to the introduction and use of the computer.

Some companies get the idea of introducing a computer system either from professional sources, such as meetings or journals, or from representatives of computer manufacturers. Sometimes, individuals attending some sort of school on their own bring them in contact with people knowledgeable in the use of computers and this contact sets off a chain reaction

¹Ibid.
leading to the eventual use of the computer.¹

Once management is exposed to the computer and electronic data processing, it usually is flooded with information which it may find difficult to classify or to synthesize with its environment. Its central problem will be deciding between two alternatives: EDP (electronic data processing) or no EDP. Management's task as a planner therefore involves clarifying these alternatives, which, in turn, is a matter of acquiring knowledge of the ramifications of EDP—and the ramifications of continuing to use existing procedures.²

The most frequently used means of exploring existing ramifications are:

1. Analysis of the experience of others with EDP
2. Experimentation with EDP, and
3. Preparation and analysis of feasibility proposals.

The most reasonable avenue for the acquisition of EDP knowledge is ascertaining the experiences of others in EDP planning. Manufacturers of EDP equipment, universities, and "the literature" are the principal sources. Some major manufacturers of EDP systems equipment have developed general systems for segments of the business which provide the

framework for automatic processing of insurance record keeping and of most miscellaneous transactions, including testing and documentation. They also offer some training courses and other services to customers and potential customers, and are more than willing to explain, advise, and participate in EDP planning.\textsuperscript{1}

The facilities of the universities should be well-known; most major universities in fact have computers that are as advanced in technology as those of industry. Some universities conduct the principal research in the analytic and decision making aspects of computers. Professional as well as academic courses are offered, ranging from elemental programming to feasibility studies in the former category and from elemental algebra to computational aspects of equations and linear problems in the latter. Literature also abounds in these categories of study.\textsuperscript{2}

The experience of others in nonrelated industries is another source of information. It is somewhat limited in some respects, because insurance is unique in nature and because EDP experiences are largely particular, and thus have meaning and interpretations for the manager which are primarily applicable only at the individual company level. However, generalizations can be gathered, and, at high levels of abstraction, these generalizations can be quite valid.

\textsuperscript{1}Ibid. \textsuperscript{2}Ibid.
Furthermore, many types of EDP application, such as billing, accounts receivable, and other routine processes, are not unique to insurance operation. Experiences of others in non-related industries cannot always be ignored as information sources in this respect.

Another source is the experience of other firms in the same industry. Although the insurance industry has been historically characterized by cooperative energies, through interrelated managements as well as through common problems, there is a certain reluctance by many insurers to share EDP experiences at operational levels. This would involve much expenditure of manpower and equipment time.

Insurers generally do not rely on or utilize the experience of firms in nonrelated industries or that of the universities in planning for EDP. Dependence initially has been placed upon manufacturers' courses, self-study of the literature, and on the experiences of other insurers. But the formal and informal exchanges of the actuarial societies, the insurance-accounting associations, and the controllers' associations usually are very valuable.¹

Some firms favor acquiring EDP knowledge by experimentation. The experience of other insurers forms the basis of the decision for some firms to use EDP. Some insurers assume that the planning premises of competitors are identical or

¹Goshay, pp. 10-11.
similar to their own and thus, by a type of emulation logic, the decision of other insurers has formed the basis for their decision to enter EDP. This way of entering EDP is considered a competitive reaction, or an attempt to achieve "status" through EDP, or an attempt to capitalize on the planning expenses of others.

Another type of experimentation is the use of service bureaus, or the renting of machine time after system designing and after programming for pilot operations. This avenue is not usually undertaken because of developmental costs which are extensive prior to such experimentation. Costs are so extensive, that they are rarely undertaken unless lease or ownership of equipment is anticipated.

The planning of any activity is essentially the study of alternatives which are simply proposals that have been researched from internal and external premises and facts. The essential task of the planner is preparation of proposals for courses of action, anticipated costs, and operational results. In this manner, the alternatives are separated into components which can be analyzed to furnish quantitative data and/or qualitative expressions for decision making. The task is referred to as a feasibility study.¹

The preparation of feasibility studies is usually less expensive than dependence on experiences of others or

¹Ibid., pp. 11-12.
experimentation as a determination for entering EDP. Planned action is always preferable to unplanned action. The most successful adaptations of EDP have been those which are highly sophisticated. Sophisticated systems require extensive planning preparation. The feasibility study approach is probably the optimal method for achieving maximum profitability with computers.

Planning of any sort involves certain premises, some of which are necessarily approximations. It is essential that everyone engaged in EDP planning recognize the necessity of consistent planning premises which are flexible enough to allow for changing environments. Planning done with one set of premises becomes the basis for subsequent planning.

Planning premises can be classified as external and internal. The former concern the general business environment; the latter concern policies, anticipated sales, managerial attitudes, and the like. The managerial problem in planning premises is the isolation of those which are critical to the decision at hand. In this case it is EDP feasibility planning and EDP implementation.

External premises can be critical for EDP planning. The most cited premise, that competitive necessity dictates movement into EDP, is hardly a premise at all. It does not present any parameter to the decision to enter EDP; it presents only an affirmative vote. Another premise has been
that the technology of EDP is sufficiently advanced to resolve the insurer's information requirements.\(^1\)

Another premise is that EDP adaptations require very little tailoring to the individual needs of the firm. Unlike the adding machine, for example, which can be adapted instantaneously to the needs of a large or small insurer, the computer requires a long process of adaptation which is not only individual in nature by type of computer and peripheral equipment, but by individual enterprise as well. There is no instant computer solution--no established technology of adaptation exists.

The availability of computers is also a premise. Computers are available on either lease or ownership basis. There is also a flourishing "used computers" market as well. Insurers can plan with the premise that computer service bureaus may be able to resolve their needs also.

The acceptance of rising operational costs in general, primarily clerical and record keeping, has been another external premise of insurers.

A major area of investigation in planning has been the potential of EDP as a reducer of clerical and associated costs. Most feasibility studies reflect the preoccupation of insurers with reducing these costs of operation, so that this reduction has been the most popular goal of computer

\(^1\)Goshay, p. 15.
installations for all business enterprise. The internal premise is that these costs of the insurer are not only prominent but that they increase disproportionately with growth under information technology which utilized manual and punch card systems.

Additional internal premises have been that speed of service, accuracy of information, and new information are essential for the policyholder as well as for management's control and governmental purposes.

One of the most important internal premises in planning is that there will be support by management of any decision to enter EDP. Most EDP planning has had the premise of strong management support.\(^1\)

The most consistent internal premise has been the necessity for reducing clerical and associated costs. It has been emphasized that the computer possesses this potential for cost reduction and that the pursuit of this potential will not jeopardize other interests of the firm. This internal premise is inextricable from the most popular of the external premises: the positive effect EDP has on the competitive position of the firm.\(^2\)

When a firm decides to have a feasibility study

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\(^1\) Goshay, pp. 15-18.

\(^2\) Ibid., p. 18.
conducted, there are three major areas of direct financial costs that have to be considered. They are as follows: (1) Estimate cost of operating the present system, (2) Estimate cost of operating proposed system, and (3) The cost of subsequent electronic data processing operations.

In the first area, flow charts help determine what the information uses and sources are. Data sheets should be used to describe the tasks performed in the process of flow. Costs sheets help relate the financial costs of these operations. The costs which would appear as displaced by the initial design construction would be payroll, fringe benefits, indirect expenses of space (such as heat, light, and power), and equipment rental and maintenance. For computational as well as conceptual purposes, these costs were regarded as a stress of payments which would no longer be made in the future.¹

The second area consists of the initial cost of the new system. There are five types of costs which are usually incurred with a proposed system. These are: (1) site preparation, (2) systems design, (3) programming, (4) file conversion, and (5) dual operating costs.

Site preparation includes the cost of preparing for the physical installation of the computer and for its peripheral operations. The nature and consideration of this cost

¹Goshay, pp. 23-24.
is the concern of all management. Actually, the costs involved in this category are separated into engineering and managerial costs. From an engineering view, the computer requires special temperature, humidity, and filtering facilities. There is also fire protection, flooring support, and power requirements which differed from those normally encountered. These requirements are determined by the particular type of computer and peripheral equipment being adopted and the costs are determined by engineering personnel in conjunction with the computer firm.

Again, from a managerial viewpoint, the computer requires policy considerations as to its effect upon public relations, and upon the provisions for future expansion and the flow of traffic. Some firms place stress on the public relations aspect since computers may be new to the particular industry involved. Another reason for the stress on public relations is to familiarize personnel with the technology within the firm so as to allay any suspicion of job displacement.

Provision for expansion can be a safety-margin type of consideration and a function of the degree to which a firm can expect the EDP system to grow. The growth of the EDP system often exceeds expectations, particularly as faster machines, requiring peripheral equipment, are introduced in the market. Provision for expansion involves engineering as well as managerial considerations.
A further managerial consideration which would influence the locus and cost of the installation is the expected flow of traffic around the computer. Depending on the type of facility envisioned, actual paths and volume of traffic by programmers, machine operators, tabulating and key-punch personnel, maintenance personnel has to be anticipated. Closely related to this consideration is management policy as to the "security" of the computer installation. Because of the nature of computer records, the firm must impose restrictions as to access by personnel. This would necessitate extensive reshuffling of physical facilities, as well as additional security personnel which would add more costs.

System design costs would involve computer firm fees, with payroll and payroll-related fringe benefits, and with subsequent manpower costs of the initial system design. In other words, the process involves the conceptualization of the computer technology to existing procedures but without entering into any of the operational aspects. System design costs cannot be precisely measured, since they depend largely on the level of skill of the analyst and the requirements of the proposed system.

The next cost is that of programming. This is the cost of preparing operational instructions for the computer for the work which it is to perform. This includes training and manpower costs, the cost of preparing instructions to determine what, where, and how often data will move, and the
cost of documenting these instructions for information and control purposes. The personnel training costs are usually the responsibility of the firm obtaining the computer. Training costs are somewhat difficult to estimate since they are based on the complexity of the system and the ability of the staff to absorb the details of the training program.\footnote{Ibid.}

Another type of cost incurred is usually coding and converting the data. Coding is determining the classifications, arrangements, and form of the information to be utilized. Converting is the task of changing the form of the information from its existing state to the form of the communication media that the computer required. The cost would not only be that of personnel, training, and wages, but also that of adjusting errors and inconsistencies, correcting converted data, and of the extra equipment which is usually required for the task.

A major cost of any system is going to be represented by the cost of having equipment available, whether the equipment is owned, leased or rented. When one group of equipment is scheduled to replace another group, there is a tendency to minimize the amount of time both groups overlap in the operation; it is unlikely that the present equipment will be taken out at the same time the new equipment is brought in. In short, the user must be prepared for some period of double
machine costs, or operating dual systems, and he must be realistic as to how long the period will last. Although the scheduled computer is able to sort, collate, and print, there are many times when it cannot do these jobs efficiently and the existing equipment may have to be retained for some time.

The third area of direct costs centers around the operating costs of the new system. The operating costs of an EDP system are, structurally, the same as those of pre-EDP systems: (1) salaries, supplies, and miscellaneous, and (2) equipment costs; although these costs differ in magnitude. The first category includes the salaries of operational personnel, those engaged in additional systems planning and related managerial costs associated with the computer. Supplies include forms and their design, and inventory of tapes, cards, as well as the maintenance of a parts inventory, and heat, light, and power.¹

From a cost viewpoint, these supplies, such as forms, tapes, cards, are not as significant as the additional cost of what nonproductive computer time might be. Even though there may be a normal amount of preventive maintenance, which may result in nonproductive computer time, there will be unscheduled maintenance, operator setup, down-time because of environmental conditions, re-runs, new program testing,

¹Ibid.
training, and probably a host of other factors which may involve costs.¹

Equipment costs would probably be considered as operating costs because (1) a fixed investment is considered as a flow of funds over future operating periods, and (2) regardless of the means by which any fixed investment is procured, market pressures tend to equate the costs of these various means.

The financial planning also consisted of determining whether or not it would be profitable to purchase or lease a computer—should the firm commit itself to the system. Many firms lease a computer chiefly because of the technological obsolescence factor. New computers are put on the market each year. Manufacturers improve and modify the equipment constantly and, periodically offer it in a better form and a larger capacity. Leasing also permits flexibility in adapting a new system to the firm's particular problems, whereas outright purchase may mean that revising the system may be required if the company expands in the future.²

Leasing usually includes maintenance and repair. The computer manufacturer prefers to provide his own personnel to service the equipment, to make sure that it remains in good

¹Goshay, p. 27.

operating condition, relieving the user of the responsi-bility. If the system is purchased, however, the firm may need to contract maintenance personnel to service the system. The manufacturer also can be expensive to a firm that is responsible for servicing its own system. If a computer is leased and later proves unsatisfactory, it can be returned to the manufacturer at little cost. This depends largely upon the terms of the lease agreement.

The cost of the computer system rented should be considered. A company with a good cash position, expecting to use a particular computer for a long time, might find purchasing more profitable than renting the equipment. Purchasing also gives the company the advantage of depreciating the cost as an asset—a tax advantage. The rent is a fixed cost which will have to be paid whether or not the system is used at capacity. Rental charges plus the daily operating costs constitute the total processing cost.¹

If a change in computers is dictated after a few years use, it must be remembered that a secondhand market for used computers has never fully developed. If disposal is made through a "trade-in" on a new system, this will probably "tie" the purchaser to the manufacturer who sold the previous equipment. This may prevent having the freedom desired in

¹Ibid.
selecting the "best equipment for the job." ¹

In most cases, leasing is more expensive than purchasing; however, leasing can be justified if the usage is to be temporary, if only a few applications are to be employed, if the firm anticipates the introduction of improved models in the relatively near future, or, of course, if capital funds are not available for the investment required.

The decision to cybernate at American Republic Insurance Company. In order to obtain pertinent information for this chapter, it was necessary to interview several officers of American Republic. The first officer interviewed was Mr. Chester Estell. He is the Executive Vice-President. The second officer interviewed was Mr. Tom Trusty. He holds the position of Vice-President in charge of the Corporate Information Systems Department.

This study involves the period of time between 1960 and 1973. In 1960 American Republic was servicing more than 800,000 policyholders. It was billing them on an addressograph machine using addressograph plates. As new information was received concerning a policyholder's account, a new plate would have to be made. The amount of time and cost involved in this process alarmed management. They saw the need for a

faster, more efficient way of servicing these policyholders. The existing method of processing data was no longer adequate to do the job.

Management of American Republic felt that, for a company to survive competitive pressure and to secure continued profit growth, methods other than manual or electromechanical alternatives to information processing were necessary. This meant utilization of an efficient data-processing system capable of offering management vital information and reports for making decisions.

In early 1960, computers were relatively new to the city of Des Moines. Representatives of various computer firms were busy canvassing various firms in the Des Moines area in an attempt to sell their product. It was at this time that a representative of International Business Machines, which had an office in Des Moines, asked to talk with an officer of American Republic concerning his product—the 1401 Computer. Management of American Republic was now exposed to the potential benefits that the new computer would offer.

The IBM representatives were persistent. Management of American Republic began to realize that the insurance industry should be able to adapt rather easily to the use of computers since the principal characteristic of a home-office insurance company has been the need to process a vast number of essentially identical transactions, all of which relate to information about the status of a contract. This required a
large clerical staff with many different people performing identical tasks. A certain confidence level soon began to develop at American Republic in the tremendous amount of potential that the computer had to offer.

The representatives of IBM indicated that there were several other health and accident and life insurance companies in the United States that already were using the new computer and they had adapted well to it. However, this would be a new concept for the city of Des Moines in the insurance industry. What worked well for one firm in a related industry may not necessarily work for American Republic! Nevertheless, the fact that the computer was incorporated in a similar industry and was well received and working well was a talking point and was not taken lightly by management of American Republic.

IBM personnel suggested a feasibility study be made by representatives of IBM and of American Republic if management of American Republic was interested in the computer. This course of action was recommended by IBM. They knew from past experience that this was the preferred method for a firm to achieve maximum profitability with computers. IBM indicated that a sophisticated system requires a lot of planning preparation. A feasibility study would perhaps take a full year to conduct. However, management of American Republic demanded thorough planning in all of its investments. It felt that a feasibility study would be less expensive than any other
means of trying to determine whether or not such a sophis­
ticated system would work at American Republic. It decided
to go ahead with the study as soon as possible.

The feasibility study took less than a year to con­
duct. The results of the study were encouraging. It showed
that although the cost of operating the system would remain
relatively constant or even increase, the increased mana­
gerial control that would be possible should make it a pro­
fitable investment. Management knew that the cost of
cybernation should be regarded in the same light as any other
major capital expenditure—a carefully planned investment
which is expected to produce long-run benefits over the life
of the asset being acquired.

Now that the feasibility study was concluded and the
results were very encouraging, management was faced with the
decision of whether it should or should not implement the
new electronic data processing system at American Republic.

Management recognized the necessity of consistent
planning premises which would be flexible enough to allow for
changing environments. Des Moines is an important insurance
and finance center for the Midwest. American Republic was a
relatively small insurer compared to several other large
insurers in the Des Moines area. Management felt that a move
to computers might help strengthen or increase its competi­
tive position and status in the health and accident and life
insurance industry. Furthermore, the past experience of
other insurers in related industries, as indicated by IBM, indicated that electronic data processing was advanced sufficiently to be able to resolve most of American Republic's information requirements. In fact, IBM was putting newer models on the market already.

The results of the feasibility study showed that the computer would reduce clerical and other costs. Management felt this would be an important goal. Also service would be increased greatly along with more accuracy of information as well as new information. Increased speed and service was also a primary goal of management. The computer would be able to provide these and many more benefits.

Management was impressed. There was unanimous agreement to implement the new system as soon as possible. American Republic was in a unique position to convert to computers. It planned to build a new National Building in several years and all the facilities necessary to house a new computer system could easily be incorporated in the early planning stage of the new building which would tend to reduce costs in the future because of the ease of implementing the system when the building would be built. So the decision was made to go ahead and implement the new 1401 IBM computer in its location at 6th and Grand Avenue in the Liberty Building.

Programming tests were conducted immediately within American Republic to locate specific talent within the firm.
Also, several outside programmers with experience were hired to expedite the training process. Several programmers were sent to IBM schools throughout the United States. IBM furnished expertise in help and guidance and to help in the conversion process from addressograph plates to punch cards. This would take over a year to complete.

In the meantime, preparation for computer facilities were begun. A temporary department would be set up with the necessary facilities to handle one 1401 computer with the possibility of handling several. Over-development of the department was to be avoided at all costs as more emphasis would be placed on the facilities in the planning of the new building.

Management decided to lease the 1401 computer to begin the new system. It decided to do this because it definitely was going to expand in the near future and it would provide more flexibility in adapting to the firms particular problems whereas an outright purchase would mean revising the system in the future. Of course, the leasing of the equipment would tend to be more expensive than purchasing but the fact that American Republic anticipated the introduction of improved models in the relatively near future contributed to the decision to lease. The 1401 computer would lease for between ten and fifteen thousand dollars per month depending on the amount of peripheral equipment necessary. The cost of outright purchase would amount to an
equivalent to about five years rental. American Republic did not plan to keep any one computer for that length of time as there was a tremendous market for newer models.

System design costs and programming costs were difficult to determine. The costs of training these personnel were nominal in terms of from five hundred to one thousand dollars per person. American Republic paid this cost and IBM gave initial assistance in the early application.

By November of 1964, the addressograph plates had been converted manually to punch cards at the rate of three thousand a day. It then acquired a second 1401 to keep up with the conversion process. In the meantime, the older machines were kept in use which necessitated dual operating cost. The conversion took about a year and a half. It was necessary to keep the older machines for security purposes to insure that the new system was going to work. Progress was being made faster than expected and the use of a new 1410 computer was seen and leased to keep up with the increasing demand.

The operating costs of the EDP system were, structurally, the same as those of pre-EDP systems. Salaries, supplies, and equipment costs were included. These costs were somewhat higher than previously because of the higher degree of skill requirements for the new system, and because of the need for improved tapes and a greater quantity of paper for print-out data for different departments. There was also a
somewhat higher cost involved because of more unproductive computer time than was expected. Besides the normal amount of preventive maintenance, there was, and still is, much unscheduled maintenance, operator set-up, and down-time because of environmental conditions, re-runs, new program testing, and training. The amount of down-time spent on normal maintenance was low. The machines are very dependable. New-program testing requires a lot of time in comparison with the other items listed. The average amount of down-time during the first year of computer use amounted to between five and ten hours a week. However, as more and more programs were placed on the computer, it was utilized by more and more personnel. This made it necessary to continue to keep abreast of newer and more improved computers and related peripheral equipment in order to get more efficiency and better service.
CHAPTER III

THE IMPACT OF CYBERNATION ON LABOR FORCE

Historical. Cybernation is often times associated by changes in (1) formal and informal organization, (2) manpower requirements, training, and personnel administration, and (3) direction and control.

Formal organization included the establishment of authority relationships, with provision for structural coordination between positions assigned tasks to achieve the firm’s objectives. Informal organization included the human relationship structures which the departmentation of activities evokes within the firm.¹

Manpower requirements, training and personnel administration presented careful planning also. The demand for insurance industry personnel which has been imposed by cybernation has been particularly critical from a staffing viewpoint. One reason for this is that suitable personnel must have a knowledge of insurance information systems and insurance functions as well as the technological skills necessary to design information systems and to program them into being. Such personnel is in short supply. Also, EDP personnel will become a most significant source of managerial talent to the

firm, and will tend to develop significant functional authority.

Cybernation also introduced a new element in the environment of directing and controlling activities and subordinates. There would be many problems of authority delegation which would have to be solved. The lack of managerial and technological experience with EDP in a new firm shapes a less-than-optimal environment for management to direct EDP activities. The lack of established routines, criteria for guiding and overseeing, and clear methods of measurement of performance are characteristic of this environment. Each decision-making process which requires managerial judgment concerns a question which is often more familiar to subordinates than to superiors in many stages of cybernation. Cybernation could change the direction environment from a close, continual, and somewhat formalized nature, to one characterized of managers of broad authority.¹

The design of a control system must be basically compatible with the operation being controlled, expenditures in reporting where measurements do not meet norms, flexible in encountering deviations, economical, understandable, and able to disclose the source as well as the amount of trouble encountered. The computer could be used as a tool, as a single record keeping and processing device for information. It

¹Goshay, p. 72.
could also be used as a control system in itself because of its ability to receive information which, after calculation, becomes the means by which automatic process corrects an operation.¹

Cybernation is often times accompanied by some personnel displacement. In order to discover the extent of personnel displacement at American Republic, Orville Allen, Vice-President of Personnel and Education and Secretary of American Republic was interviewed.

Computer programs are being and will be substituted for "human programs" and human hand-eye-muscle activities; that is, much of the computation, information transfer, and paper-handling formerly performed by individuals at various levels will be done by computers. The result to be expected is displacement of personnel.

Norbert Wiener was a man who helped develop the high-speed computer. He realized that the day would come when automation would cause some labor displacement. However, he wanted to see machines doing the dreary work instead of man. He predicted that automation would lead to "the human use of human beings"—that is, to our using man's specifically human qualities, his ability to think, to analyze, balance and synthesize, to decide and to act purposefully—instead of using

¹Goshay, p. 78.
him, as we have done for thousands of years.\(^1\)

If automation were a simple matter of technology, or replacement of human labor by machines, its labor impact would be precisely what Walter Reuther predicted: large-scale displacement of workers. However, it must be considered in its larger dimension.\(^2\) The first steps toward automating the production processes proceeded slowly. They were made at a time of full employment. The initial job displacements were minor. In many plants there were enormous gains in productivity without any increase in labor requirements. Cases can be cited of whole industries that increased their total employment after the introduction of automation. The use of dial equipment by the telephone industry, beginning about 1920, is one example. Since 1920, the operating telephone companies have more than doubled their employment. The use of continuous-flow methods in the oil refining industry also began about 1920 and this industry's employment has about doubled, too. The reason for this outcome is the development of more and cheaper methods of producing telephone service and motor fuels, resulting in


a greater expansion of their use.¹

It is also true that labor displacement has been severe in some industries such as the longshore industry. Automation has taken over the manual loading and unloading of ships at the dockside and it has had a profound impact on the meat packing industry.² It hurt the motion-picture industry when the introduction of "talking" motion pictures at the end of the 1920's directly eliminated jobs of more than 20,000 musicians who had accompanied the silent films in theaters. But the illustrations are very rare.³ The extent of displacement has been minor in general.

The impact of cybernation on labor force at American Republic. Concerning formal organization, American Republic began the new system on a "single operation" approach. Clerical and record keeping procedures were organized, prior to EDP, as a series of separate and relatively distinct operations. These operations were organized in this fashion by tradition and by virtue of the great masses of work


involved. Only through the division of clerical and record keeping procedures into a series of single operations were these operations capable of being performed economically.

The single operations approach to EDP system design tends to adhere to conventional divisions of clerical and record keeping. It involves the adaptation of EDP to a single operation or to several single operations. It is an approach which is philosophically oriented to the existing mode of operations in the firm. In terms of operations, a single operations approach encompassed only the accounting function of the billing and receipts operation to begin with.

American Republic grew rapidly. The single operations concept soon began to take on a "total operation" outlook. It developed into this through the process of evolution. A one-sentence statement of the philosophy might be: Interrelationships in the source and use of data are such that information flows can be minimized. Thus, an EDP system, which is designed to coordinate major uses of data throughout the firm, is said to incorporate a "systems" approach. The approach depends on minimizing flows of information by having one or more work processes automatically feeding another, thus achieving a type of record and operational self-containment.

The EDP department was small initially. An actuarial vice-president headed the department. An operations supervisor and assistant supervisor helped manage the department.
The department consisted of several programmers, key-punch operators and clerical personnel. American Republic attempted to minimize change in organization patterns when it first introduced cybernation to such a large extent. This reflected the natural desire of management to minimize change when its present environment was one of established work specializations and relative certainty.

When the single operations approach was used, there was little change in organization until the EDP facility began to branch out into other areas of the company's operations. EDP was no longer headed by an actuary, but rather by a chief programmer with much experience. He became an Assistant Vice-President. This position created a more centralization of work activities under his control. He had the authority and responsibility for EDP. This action was evolutionary, evidencing itself after about four years of EDP experience.

Reorganization of the Home Office's computer service areas in early 1973 has resulted in the creation of a new Corporate Information Systems Department that directs all of American Republic's computer services. This new Department incorporates three formerly independent activities: Systems and Programming, EDP Operations, and Videofile. The reorganization was the result of recommendations made by an IBM Study Group that evaluated administrative and technical service requirements across the range of Home Office
operations. The study group's recommendations indicated that due to the existence of parallel services and the use of advanced computer technology in the Home Office, there was an increasing need for unity of direction in providing computer services.

As a result of the reorganization, American Republic's computer and other technical resources have been centralized to provide the unity of direction recommended. For a detailed example of centralization of control at American Republic, see Table 1. The departments listed in column one cannot be identified for reasons of inter-corporate security. The centralization of resources now provides the framework for more effective use of these services while at the same time integrating separate technologies for more coordinated support. The new Corporate Information Systems Department is composed of six divisions: Methods and Plans, Insurance Systems, Equities Systems, Graphic Systems, Technical Services, and Computer Operations. Each division in CIS has its own specific area of responsibility but maintains close contact with developments and changes occurring in other divisions. Mr. Tom Trusty, Vice-President, CIS, is responsible for the over-all direction of the Department. So, we see that technology tends to move a firm from parallel to functional departmentation. Due to the uniformities which cybernation imposes and the lack of knowledge of non-EDP personnel, it becomes necessary that systems personnel then have
TABLE 1

CHANGES IN CENTRALIZATION OF CONTROL IN COMPUTER-AFFECTED DEPARTMENTS

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<thead>
<tr>
<th>Department</th>
<th>Pre-Computer</th>
<th>Current</th>
<th>More Centralized</th>
<th>More Decentralized</th>
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authority to prescribe procedures, practices, and policies for EDP, which is a development of a functional authority as well. In the management of American Republic, functional operations contain a high element of record keeping and processing of data. In fact, much of the authority and responsibility delegated to managers and, most of the managerial man-hours have been spent supervising fairly routine data processing activities. A far lesser amount of managerial man-hours is spent performing the traditional managerial tasks, even at fairly high levels of management.

Concerning the informal organization, the development of functional authority at American Republic by EDP management, and by EDP innovation in general, manifests itself in the informal organization of the company. It is those interactions of individuals which arise intrinsically from the formal organization structure. This involves the human relationship structures which the departmentation of activities evokes within the firm. Sociologically, managerial and operational personnel connected with EDP innovation and operation have attained an elite status relative to other managerial and operational personnel at comparable operational activity levels within the firm. Also, the influence of non-EDP managers tended to decline in the EDP environment initially but now has tended to increase.

The original implementation and adaptation of EDP was made by a small group of individuals in American Republic.
The fact that these persons were able to get relatively inert elements within the company to move into the area of EDP systems did qualify them for technological elitism and status. The decision to enter EDP carried the fiat of implementation and control, and implanted the need for the socio-structural elitism, or status, within the company's organization.¹

As management aspires to higher levels of program sophistication it has become mandatory that greater authority be at least recognized in EDP managers and personnel, such recognition being merely a "means" to accomplishment of the economic goals of the computer system. This attitude is also a natural rationalization of the decision and its economic commitment.² The development of additional control tends to be a natural evolution. This control is present and persists not only in terms of the EDP system itself but also in terms of the many administrative elements in agency, claims, actuarial, and policyowner service, and the other functions and tasks with which the system interacts.

The status of non-EDP personnel and the manager's perception of the changed nature of their tasks as a result of EDP has been mixed to some extent. The complexity of

¹Goshay, p. 49.
²Ibid.
computer design and operation resigned some non-EDP managerial personnel to believe that they no longer had opportunities for promotion even within those lines which are not involved in EDP activities. This was the feeling initially but has not, in fact, happened that way. Some managers believe that the systems approach seldom calls for their judgment. It is true that some decisions can now be programmed, but the majority of decisions still have to be made by the manager. Also, some control functions can now be performed by EDP because they can now be performed routinely, more accurately, and more quickly. Most of the managers at American Republic welcome this fact as it makes their work less burdensome. It also facilitates their report making and cuts down on their amount of time spent controlling the department. The complexity of the computer technology makes it difficult for some managers to understand how to translate their creativity into positive action. Some times there are problems of expressing the idea in machine-sensible form or of overcoming the communication barriers existing between the source of the idea and the implementation, and also of overcoming the difficulty in interrupting the EDP cycle of activities in exploring or implementing the idea. Also, extensive programming and indirect costs are involved in even a minor improvement. However, these impacts have not been too great because they have been mostly transitory changes which seem to have lost their impact as the managers have attained
sufficient maturity in EDP technology.

The personnel chosen to staff the EDP operation use a technology to rearrange and manage information flows in patterns which differ from those of the past. These patterns of information are less easily understood and less within the control of others within the company. Therefore, it is necessary to staff EDP personnel with two types of experience background. One is characterized by functional experience in one or more of the functional operations of the company. The other type of background is experience with general services, systems, accounting, and related data and information flows. Each type of experience entails certain attitudes, beliefs, or outlooks on the operation, character, and goals of the firm. The personnel involved in EDP at American Republic are placed in a position of mediating and resolving the internal philosophical and operational variances. Diplomacy and ability to synthesize are also required.

Personnel selected to perform the manual tasks, such as converting data to machine-sensible form, have been selected from the clerical personnel already within the firm, with no particular experience qualifications. At the next level of work, such as programming, coding, and operating, American Republic as used personnel with knowledge of insurance functions, training them with systems knowledge in their

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1 Goshay, p. 55.
respective tasks. At the higher levels of managerial work, personnel have been utilized who are more experienced on the systems side rather than on the insurance operations and functions side. American Republic examines its own resources, utilizing and training personnel where possible and hiring only when necessary. Testing is conducted periodically for anyone who desires to be tested within the company for EDP work. Also, managers tend to recognize talent and they are often surveyed to give their recommendations as to who would possibly be suitable for EDP activities. If the firm does not feel it has sufficient talent within to draw from, it will hire personnel. American Republic hires about one out of four personnel for EDP operations.

Most of the training required is in the area of specific skills which are to be applied in the area of EDP. However, it also presents a new challenge for management. Even though they will have very little direct connection with the program, they must be oriented as to the potential and limits of an EDP system. Full cooperation is necessary and a broad background is desirable so that the supervision and coordination of the data processing operation will be successful. At the beginning of the initial system design and during the operation of the dual systems which we covered earlier, American Republic did encounter some bottlenecks which lack of coordination created. Most firms will encounter this in coordinating training programs and the operation of the new
system. There was the need for more programmers and for more experienced ones. The bottlenecks resulted in idle personnel; some costs of delays through experimentation which was necessitated by incompletely trained personnel; some costs of resorting to outside personnel; and costs of unutilized machine time. These problems were overcome to a large extent once the manpower requirements were met. American Republic had tried to place more attention to planning in general and staffing in particular.

A point that is sometimes overlooked is that even after the staff is complete and the systems change is in operation, there is a continuing need for a personnel development program in the firm. American Republic understands the need for better-trained personnel who can assume the positions which will become available through the company's growth and normal attrition. A prime example of the aforementioned is that recently three Home Office employees, including Mr. Trusty, earned a certificate in Data Processing awarded by the Certification Council of the Data Processing Management Association. The three individuals took coursework from a DPMA sponsored class held at the Des Moines Area Community College.

In the area of personnel administration, American Republic found itself with little experience in competing for scientifically and technologically trained personnel. Much of the recruiting policy in the firm had been characterized
by very little flexibility in salary negotiation. EDP development forced the industry to compete for personnel against firms in many other industries with greater flexibility in salary structure and greater ability to absorb such costs through their pricing system. So American Republic and other insurance firms were forced to ignore its long-established salary structure to a degree. Basically, employees are now paid higher wages than prior to EDP. So the introduction of cybertnation does tend to increase costs for a firm in terms of salary structure. Specific data substantiating this was not made available.

Direction and control have both been discussed somewhat previously. However, to summarize the computer's contribution to a control system, it is primarily the character it provides to the control environment. The contributions include the maintenance of data integrity as processing and measuring takes place and providing opportunities for differing types of control procedures. These contributions arose, basically, from the technical aspects of the computer operation. First, the computer is highly reliable in processing and calculating. Second, because the logic of computer systems permits data to be exposed to unprecedented frequency and variety of testing, the potential validity of data is practically unlimited. Third, data needed for control purposes are elicited simultaneously with the processing and measuring operations. Unlike previous control procedures, the
computer does need to undertake retrospective evaluations of its procedures and activities. And fourth, the speed of data processing and calculating allows the employment of new control procedures which were impractical under the previous information technology. These technical aspects of the computer are clearly complementary to the requirements of a successful control system.

It was difficult to measure the displacement effect at American Republic. The introduction of the EDP system required an extended period of time for it to be planned, installed, and put into operation. Therefore, there was ample time to plan for the reorganization of the staff. During the period of time included in this study, growth of American Republic greatly increased as evidenced by Figure 1. The significant growth between 1971 and 1972 was caused by the introduction of a new life insurance plan. In 1960, approximately one employee was needed to service $100,000 worth of insurance. In 1972, approximately one employee was needed to service $940,000 worth of insurance. This indicates that automation enabled the firm to grow in a greater proportion than to the amount of increase in employment. Such growth has helped offset the tendency of the computer to displace personnel.

The displacement effect is centered primarily on areas in which the computer has been applied; in the insurance industry at American Republic, this means the clerical area
Figure 1. Growth in employment.
as indicated by Figure 2. Automation usually means a sharp decrease in employment for routine office work. Jobs of routine nature are eliminated by normal attrition. These positions are staffed by young women among whom the turnover rate is quite high. This area is not a major segment of the working population; it is largely composed of young, unmarried girls fresh out of school, who are in short supply today and probably will be for some time. When a Wisconsin insurance company automated, employment increased slightly following the installation of the computer and many routine, monotonous, and time-consuming jobs were eliminated, but there was increased clerical activity in preparing data for the computers.¹ This experience has been duplicated at American Republic as evidenced by Figure 1. The total work force actually increased because the computer system performs so many additional activities which require personnel in data gathering and analytical interpretation procedures. In 1962, prior to the computer, data on the composition of the labor force showed the total number of employees to be about 325. Of that amount, 2 percent was top management, 5 percent middle management, 5 percent supervisory and 88 percent was clerical. In 1970, data showed 650 employees; 3 percent in top management, 10 percent middle management, 5.5 percent

Figure 2. Growth of value of insurance in force.

*These figures represent total Health and Accident premium and Life Insurance in force.
supervisory and 81.5 percent was clerical.

The displacement effect at the supervisory level has remained basically unchanged. It seems that the focus of the computer system in this insurance company is at the clerical level. The scope of activity of the supervisor's job has been enlarged but there has been no change as far as displacement as evidenced by Table 3.

The managerial level has slightly increased. This has happened because the personnel concerned with development of computer systems are managerial and technical people.

It has been established that there has been some displacement in the clerical level at American Republic. American Republic attempts to retain employees whose jobs have been replaced by the new system. They are either retrained or transferred to another job or department. This is also true regarding those who may be too old to learn but not ready to retire. Their replacement would seem to be an appropriate step, knowing that the goal of the new installation is maximizing efficiency and minimizing costs. However, a company cannot lay off those employees gradually or abruptly without suffering undesirable side effects such as low employee morale and poor community-company relations. Generally, a company cannot realize significant savings in retaining employees who do not perform adequate service because of the new computer system. However, the entire answer depends on each individual's circumstances which lead to the
TABLE 2

COMPUTER EFFECTS ON EMPLOYMENT BY ORGANIZATIONAL LEVEL
FOR ALL DEPARTMENTS USING COMPUTERS DAILY

<table>
<thead>
<tr>
<th>Organization Level</th>
<th>Employment Increased</th>
<th>Employment Decreased</th>
<th>Employment Stayed the Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clerical</td>
<td>0</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Supervisory</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Management</td>
<td>7</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

TABLE 3

COMPUTER IMPACT ON JOB CONTENT BY ORGANIZATIONAL LEVEL
FOR ALL DEPARTMENTS USING COMPUTERS DAILY

<table>
<thead>
<tr>
<th>Organization Level</th>
<th>Routinized</th>
<th>Enlarged</th>
<th>Unchanged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clerical</td>
<td>30</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>Supervisory</td>
<td>5</td>
<td>25</td>
<td>70</td>
</tr>
<tr>
<td>Management</td>
<td>0</td>
<td>5</td>
<td>95</td>
</tr>
</tbody>
</table>
decision to retain or displace them. No company can or should retain employees who were formerly engaged in the operation of a replaced system and whose background offers little to the new system. There are exceptions to this and they would include:

(1) Those who are qualified and willing to be retrained for a new position. For example, in the clerical area, a typist whose job previously was typing statements can now be retrained for secretarial positions. Of course, the employees attitude and ability are of utmost importance. The employee should want to accept a new challenge. Those persons with a good attitude and an ability to get the job done will find the new challenges rewarding.

Applicants at American Republic indicate in what areas lie their strengths and weaknesses. They list in what areas academically they favor and what type of position they feel capable of handling. This gives management an idea for the future in the event that the employee's position is no longer necessary as to whether or not transfer or retraining is best.

(2) Those who can be transferred to another department where, with a brief orientation, they can render useful service. The employees hired at American Republic have generally been able to easily transfer to other departments with very little difficulty. This has been especially possible where the work of one department is similar to that of another department. Obviously, the vocational and academic school
system is performing an invaluable function in that they pro-
vide a broad base and the adaptability which the young work-
ers need in order to learn quickly when they get into the
job market. This has helped industry tremendously.

New job openings have arisen as a result of displace-
ment. However, the system of job transfers has worked very
effectively. Many file clerks and typists displaced have
found new positions as secretaries and some as Videofile
machine operators. Specific data supporting this is not
available. Since American Republic is a large company,
there is a great diversity of work, and, consequently, a re-
adjustment through transfer is easier to manage.

By a rather extensive re-education and retraining
program, displaced workers can be prepared for jobs that are
completely different from those they previously held. For
example, the office clerk can be sent to a programming
school and taught to operate a computer; the machine opera-
tor who is sent to technical school can be taught enough to
be a maintenance electrician. Some personnel who were felt
to be less capable of completing such intensive programs
were trained to take charge of the operating and changing of
magnetic metal tape; many of the secretarial typists were
quickly taught to operate the electromechanical typewriter
for compiling patterns of magnetic spots on the tape; still
others were shown how to operate the printer used to decode
the processed results from the tapes on an electronic type-
writer. The shift in job opportunities has been a healthy one thus far. It imposes on management a responsibility to plan systematically for the retraining and placement of workers during the shift to automation.

In some industries, the problem of old-age versus young poses quite a threat. Countless cases can be cited pointing to the fact that the older worker has been brushed aside in favor of the younger worker. The industrial structure has changed rapidly because of automation and it has thrown an unfair burden on the older workers shoulders in many cases. They are forced to change jobs more frequently with a social setting which penalized them arbitrarily due to their age.

In some respects, automation has changed the job content in such a manner as to make the older worker a much more desirable worker than a younger worker. The automated job really has had the physical effort removed. Whereas the job may have necessitated much inter-department or inter-company movement prior to the computer, now the job may entail sitting at a machine which has increased the responsibility and the amount of machinery under the employees control is much larger than formerly.¹

¹James Stern, "Possible Effects of Automation on Older Workers," an Address, 8th Annual Conference on the Aging, University of Michigan, Ann Arbor, Michigan, June 28, 1955, p. 15.
The decreased physical effort and increased responsibility placed on most automated jobs make the mature, responsible worker a much better choice than the husky adolescent in many instances. The older worker has a family, home, and a much more responsible outlook on life. This man looks at disputes with a view to their direct effect upon himself and his family.

Fortunately, the insurance industry has not been faced with the problem of old versus young to any large extent. American Republic has not experienced this problem to any noticeable degree. The average age of personnel at American Republic is quite young even at the middle management level. The displacement effect was focused in the clerical level where most personnel consisted of young women. When these personnel were displaced because of cybernation, they easily adapted to other positions within the company. Since this insurance company is office oriented, there was not any physical hardship encountered in any displacement. Most positions involved do not require much physical effort. So American Republic has not had any noticeable problem as far as old versus young thus far and does not anticipate any in the future.

The insurance industry has not experienced any problem as far as skilled workers versus unskilled thus far and does not anticipate any in the future. Maintenance personnel represent the primary area of unskilled workers but there has
not been any problem area here. The unskilled worker is often capable of only the most routine and repetitive type of job; yet it is this very type of activity that is most readily automated and mechanized. However, the demand for unskilled workers will never disappear completely. For example, it is hard to imagine that the window cleaners, floor cleaners and security guards or night watchmen and cleaning personnel will ever be automated out of their jobs.

The educational deficiencies of unskilled workers are much the same as those of the unemployed—not surprisingly, since a large percentage of the unemployed are also without skills. Some employers are hesitant to interview anyone without a high school diploma. However, American Republic is an Equal Opportunity Employer and tries to employ personnel in specific positions regardless of the educational level attained.

Cybernation can have an effect on job skills. Norbert Wiener, in his book entitled The Human Use of Human Beings, stated that the "human machine" is too complicated to do such jobs as pasteing labels on tin cans, or sorting and packing spears of asparagus, or tightening one or two bolts on a car on an assembly line. He stated it was a degradation of the human being to chain him to a machine and use him as a source of power; but it is also equal degradation to assign him a purely repetitive task in a factory which demands less than a millionth of his brain capacity. Of course, this same
philosophy can be applied to the office in an insurance company such as routine filing, sorting and compiling of records.

Norbert Wiener is referring to the very jobs that machines take over in the office as well as in the factory. Considerable fewer workers will be needed for the routine, monotonous jobs because the machines will do the work. The positions left for people will be those requiring judgment and those that a machine cannot readily be built to do. The result should be in more interesting jobs as well as more rewarding.

Much more human evaluation and know-how is necessary in the newer jobs since automation was introduced. There is much less need for physical work and more use of judgment than previously. The supervision of an automatic machine requires a highly skilled person even though it requires no more physical exertion than the pushing of a button or changing the setting on a controller. It does require a higher level of education and skill in order to adequately monitor them.¹ In the clerical area, the introduction of the computer called for a new set of activities, or at least that a new coding system has to be learned by the clerk. It is helpful that the clerk have some working knowledge of the capabilities

of the computer. Hence, the level of skill required is increased, since some of the "old" skills must still be present also. Refer to Table 4.

One may ask how there can be an upgrading of clerical skills as well as a routinization of clerical jobs at the same time. The explanation for this is most likely that, while activities in the job have indeed been routinized, the demands on the employee have increased. These demands are for greater reliability in performance. In computerized systems, it is critical that employees perform in precisely the way that the system demands at precisely the time required. These new demands are translated as higher "skill requirements." In marketplace terms, this does make sense. A greater demand on the individual requires greater compensation. Although "skills" seem to have been programmed out of the job in one sense, the net effect appears to be that of asking for a greater input, a greater commitment from the individual. To obtain such a commitment, it is necessary to pay more. In terms of wage-and-salary administration, the job is defined as having been upgraded. Specific figures on wages and salary were not made available.

With respect to supervisory and middle-management jobs, the effects are related to the stage of system development. During the period in time in which system development is in process, the effect is to precipitate a level of joint problem-solving and analytic activity more intense than that
## TABLE 4

### CHANGES IN SKILL LEVEL OF JOBS AT DIFFERENT ORGANIZATIONAL LEVELS

<table>
<thead>
<tr>
<th>Organizational Level</th>
<th>Percent of Computer-affected Departments in Which it is Reported That:</th>
<th>Percent of Reported Changes in Skill Level (Col. A) in Which Skill Want:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) Skill Changes Occurred</td>
<td>(B) No Skill Changes Occurred</td>
</tr>
<tr>
<td>Clerical</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>Supervisory</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>M. Management</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>T. Management</td>
<td>10</td>
<td>90</td>
</tr>
</tbody>
</table>
required in the stable situation that existed before the introduction of the computer. However, as the integrated systems were finally developed and became operational, the effect was somewhat the reverse. Some of the "computational" aspect of supervisory and middle-management jobs was taken over by the computer. However, along with the slight loss of computational skills, this supervisory and middle-management job area must now be able to deal with people to a much greater extent. More skill is needed in dealing with people. More skill is needed in dealing with studies and facts in general terms. Interpreting reports and data is a much needed requirement also.

Top-management has not really felt the impact of upgrading of their skill level as yet as evidenced by referring to Table 4. This seems to be an evolutionary process. It is clear that there will be an upgrading of skill in the long run. In addition to their basic long-range planning and goal-setting responsibilities, top executives will probably play a greater role in operational decisions with the growth of computer systems. In the American Republic Insurance Company, the current stage of development of computer systems has not generally involved top-management. Top-management has realized the need for skill in dealing with people effectively as well as more skill in dealing with interpreting data. They are beginning to realize just what the computer can do and what the potential benefits will be. A general knowledge
Many surveys have shown that automation involves a substantial upgrading of labor skills, and there is no lack of testimony to support such conjecture on the skill impact of automation. Drucker says automation will bring with it "... the greatest upgrading of the labor force ever seen." Studies by the Bureau of Labor Statistics of office automation indicate that there is an upgrading of the skill level of office personnel and that the upgrading is achieved by extensive use of unskilled as well as skilled workers employed to operate the computers. Over the long term, shifts in the composition in the work force will upgrade jobs. However, it will be the younger, newer workers who can expect to fill the highly skilled jobs, while their fathers and mothers seek to adapt their present skills to new situations.

The serious problem is not employment but the need to

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upgrade whole segments of the population in a very short time. Automation requires trained and educated people in vast numbers. The quantitative need will be great but the greatest need is above all qualitative—for better-educated people. There will be the need for men to fill new, highly skilled jobs as accountants, actuaries, computer programmers, computer-maintenance workers, data-processing systems analysts and investment analysts. Large numbers will be needed for new managerial jobs requiring a high ability to think, to analyze, to make decisions and to assume risks. This increase, both in the numbers of managers and in the demands made on them, may well be the largest of all the labor impacts of automation.¹

The greatest educational need may well be in management. To be a manager in an automated business, a man need not have a formal education but in the sense of being able to handle systematic knowledge, he will have to be highly educated. This education job will have to be done to a large extent by the business itself. Large companies will have to interest themselves more in formal education even more than they do today. Adult education—largely on the job—will be needed. It is clear that the most important impact of automation will not be on employment but on the qualifications and functions of employees. American Republic places a great

¹Drucker, Promise, pp. 222-224.
emphasis on personnel continuing their education. The company implemented a free-tuition plan with Drake University and Grandview College wherein any full time employee may enroll for up to six hours of course work per semester and be fully funded by American Republic. This is for night school participation. This provides the employees an excellent way of continuing their education and personal advancement. These schools provide excellent courses appropriate for each individual to gain a greater insight into their particular areas of work. This helps upgrade the skill level of employees also.

Automation will affect future workers at American Republic. Everyone is living in a society now where automation is in existence. It is an accepted fact. The students who are now in the high schools and colleges can be given the education that they will need in order to prepare themselves for the world of automation. The children in grammar school will grow up in a world of new technology, and they should readily adjust to the changing world. However, society should not take this adjustment for granted. The educational system of the nation is confronted with a great task which is staggering in size. To be ready, society must be prepared to pay whatever it takes to keep this educational system up to date at all times so when the youngsters of the nation reach the age of earning a living, they can do so as well prepared as possible. Schools must be provided with
equipment and ideas which are synonymous with automation and not the horse and buggy. The schools should stress more mathematics and the sciences which they are now beginning to do since the advent of space exploration. The subjects must be adjusted to fit the great technology that the offices and factories need. The students must be soundly equipped citizens, prepared to participate fully in society. But in the short run society must face the immediate obsolescence on a large scale of the skills of adults.¹

American Republic Insurance Company has established an Americare Scholarship-Internship Program which is designed to discover able and financially needy young people in the greater Des Moines community and to aid them in obtaining a college education in Liberal Arts or Business Administration at Drake University. The program also entitles the recipient to work at American Republic while attending school.

There are two winners each year selected from among students in Des Moines area high schools. The work-internship program provides an opportunity to apply and test the knowledge and insights gained through the university experience. Recipients work part-time during the academic year and full-time during the summer months. For their work, students receive a salary and a two weeks summer vacation with pay.

The four-year scholarships are awarded annually and cover full tuition, fees, and books. The plan stipulates that one scholarship is to be awarded to a white applicant and one to a non-white applicant. Applicants may be male or female. Following graduation, the recipients are free to select any career and are under no obligation to American Republic.

In testimony before the Sub-committee on Economic Stabilization of the Joint Committee on Economic Report of the United States Congress, October 1955, Walter Reuther, President of CIO and UAW-CIO, said that society must take as one of its major goals the assurance that every young person will have not only the physical opportunity but also the economic means to gain the fullest education of which he or she is capable.\(^1\) Obviously, American Republic is trying to do this now and will continue to do so in the future.

The introduction of computers in factories naturally has much more of an impact on jobs as far as physical and mental stress is concerned than in the office. The obvious trend is for far less physical stress and increased mental stress. There is now the need for more skill in dealing with

people as well as dealing with facts and figures. Necessary interpretation of reports and data and various studies is stressed. This requires mental stress and little physical stress. This is true of the clerical level, supervisory level, middle-management, and also top-management. Cybernation takes the physical effort away from the worker to a great extent. Physical effort and stress was reduced more in the clerical level, somewhat less at the supervisory level and still less at the middle-management and top-management levels. However, all the levels have been affected.

The impact of cybernation on American Republic has brought about changes in the worker's performance. The impact of cybernation on the office worker seems to be directly proportional to the degree to which the computer is used efficiently. It requires changes in the worker's performance. For one thing, accuracy becomes more important because it is easier to detect error and attribute it to a specific individual. The person's performance becomes very visible. An efficient integrated computer system demands that certain things be done at certain times. Consequently, there are pressures for meeting deadlines. This in turn greatly affects the pace of work and reduces the possibility of deviating from a tight schedule. So, the mental pressures have increased. However, personnel generally seem to be happier operating electronic equipment than when they worked with non-automated machinery. There is greater satisfaction from their increased
salary, a more interesting job, and their talents and skills were in greater demand. They enjoy their increased responsibility, and their is less monotony. They believe that cybernation will bring greater employment, an increased standard of living, and a need for increasing skills and training which is a healthy attitude. There is a need for more initiative on the part of the worker. So, what is now present is a lessening of physical stress and an increase of mental stress.
CHAPTER IV
CONCLUSION

Management of American Republic felt that the firm's ability to expand and grow at such an accelerated speed during the years in this study was due in large part to cybernation. One cannot chart or pinpoint in dollars and cents just how much of the growth and expansion and increased service was due to cybernation. It would be nice if it could be done. Rather than try and list results in dollars and cents, examples of results in more practical terms will be mentioned. This will be a list of the more noticeable results in addition to the results already mentioned throughout the previous chapters.

1. Clerical costs have decreased through a reduction in the clerical force. The computer system operated by a staff of ten can process applications once handled by one hundred clerks. Under manual and punched-card systems, many different files were required, each containing virtually identical information. With the latest computer, the consolidated file that can be developed saves not only all of the costs of separate file maintenance, but also the costs of clerical people needed to conduct search and transfer that existed under the older systems. One of the characteristics distinguishing the most advanced computer systems is the degree to which the files are integrated and consolidated.
Of course, there is a constant need for clerical help. However, there has been a decrease. Part of the gains here have been offset by a general upgrading of the positions retained. Some savings in the office space required also has resulted.

2. Conflicting and overlapping services have been eliminated by combining some of the many functions and activities now performed by separate departments in the preparation and processing of data and in duplication in file maintenance. An example of this is an IBM 1287 Optical Reader. It reads numerically printed information through the use of an electronic beam. The information is then transmitted directly into the computer. It is used basically to process premium notices. Previously, premium notices were punched cards which required frequent sorting prior to being mailed. Upon receipt of the premium payments, the stubs required duplication to 80-column tabulating cards. The cards were then entered into the computer, which in turn balances with the daily totals by the Accounting Department. The new procedure utilizes paper premium notices. Through the design of the new program, the sorting is done prior to the notices' being printed. When the stubs are returned from the policyholders, they are fed into the optical reader, and the data is entered directly into the computer--thus eliminating the duplication process. It will require one-sixth of the time than is presently used. It is also space saving and less costly to operate than what was used previously. Thus,
this machine eliminates the need to involve the Accounting Department as far as balancing the daily total. Cybernation tends to move a firm from parallel to functional departmentation.

3. Employee relations have been improved by providing them with additional information in such reporting areas as those of payroll, pensions, taxes, and insurance.

4. The productivity of clerical operations has increased through greatly improved processing techniques which are not only faster but which also become more accurate with the elimination of human intervention in the processing and preparation of reports. The computer is the heart of the Electronic Data Processing Department. It can write premium notices, record cash payments and pay claims all at the same time. It is with the aid of such equipment as this that American Republic can handle a 50 percent increase in new business. A typical example of the increased productivity obtainable and improved processing techniques available is in the Policyholder Service Department. If a policyowner calls by telephone long distance for information concerning his policy, in most cases the person receiving the call would have to take the insured's phone number to call him back after looking up the necessary information from a file. The information needed might necessitate obtaining the complete file with premium record information along with all claim records. On a rush basis, this might take from several hours
to a day or so depending whether or not all the information was available. However, with the aid of the computer and the visual display terminal, the employee has access to all information in the computer and will place all of the calculating ability of the computer on the employee's desk. All information necessary concerning a policyowner's coverage is available from the terminal. This is obtained in seconds from the machine and the employee can answer any question in a matter of seconds over the phone whereas previously it may have taken days to obtain all the information! The information on the terminal is up-to-date information.

The Claims Department pays approximately 50 percent of the claims the same week that they arrive in the Claims Department since they have had the use of the same terminal. Claim examiners pay claims directly by way of the terminal. The terminal is also connected with an IBM 1403 printer which means that it can write a claim letter and draft in less than two seconds. It makes 150,000 key strokes per minute or 2,500 key strokes per second. These two departments have benefited greatly from the computer.

5. Greater operating efficiency has been obtained in data processing through increased speed, improved accuracy, and decreased equipment idleness due to infrequent "downtime" and reliability of the computer system. Newer models of computers and the other types of associated equipment have provided more storage capacity, more accuracy as well as more
speed, and the operators become more experienced. This also
tends to lower costs. The newer models of computers usually
incorporate the same programs in most cases which do not
need more training on the part of the programmers or opera­
tors. Newer models usually are smaller and thus take up less
space. For example, the IBM 360-Model 50 computer uses a
data cell. The data cell stores 40 million facts. This
means it can hold the information on over 250,000 policies.
This is the equivalent of the information filed in 15 tons
of file folders. The information on all American Republic
policies can be recorded on about eight cells. This informa­
tion is available through the computer and through the TV
sets to the entire firm in a fraction of a second.

Through experience and expert training, the most up­
to-date equipment available to an insurance company is
operated with top efficiency. Downtime is now at a minimum.
The average amount of downtime for the past seventeen months
per week amounted to 21 hours. Previously, it amounted to
considerably more hours per day. The machines are reliable
and only periodically require maintenance because of a break­
down. They are extremely dependable.

6. Expense is reduced because of the faster billing
procedures. The present computerized system is at least six
times faster than the old system. It requires much fewer
personnel to operate the new system, less operating time and
fewer machines. This is in addition to more accuracy and
dependability.

7. There is more flexibility for the expansion of the firm's data processing capabilities as growth occurs. There is a ready market for newer machines available whenever the firm sees the need for them. Growth has been rapid at American Republic and by doing business with one computer firm which up-dates its equipment often, this allows the incorporation of newer equipment without changing the existing procedures greatly. This allows for reduction of costs.

8. One cannot realize in monetary value the great improvement in customer relations and competitive position through accuracy and timeliness in reporting, billing, corresponding, paying claims and other service now available. American Republic has attained a position of world leadership in Electronic Data Processing. This leadership is an example of the firm's continuing search for progressive ideas with which to maintain the lowest possible operating costs. It is only through such cost saving methods that American Republic can retain its unexcelled position as the Company with the Number One claim paying record.

9. More timely decisions can now be made by management. This is made possible through the current reports and data provided by the speed of the computer and more complete reporting in the form of information which would not have been economically feasible or available using conventional methods. Decision-making moves to a higher level in the
organization because of cybernation.

10. There is a gain of greater control of information and a consequent strengthening of the organizational structure through improved system and accounting controls which minimize human intervention by incorporating checks and balances which are automatically performed as the data is processed.

11. It is just beginning to use operations research and other management science techniques which could bring such typical future benefits as the reduction of inventory investments and other working capital requirements; reductions in production costs through more efficient costing techniques; and reductions in selling costs through improved market and sales analyses. However, this is just in the infant stages as yet. There is great potential in this area. In other words, to utilize the full capability of a computer system, the functions it performs must be extended beyond the conventional record system. This may involve additional managerial reports, such as detailed costing procedures would provide and it may also result in the use of some of the newer operations research or management science techniques which we just mentioned. This utilization will, of course, increase costs but at the same time will provide better managerial control and greater anticipated returns from operations. On the other hand, as the integrated systems concept is more widely adopted, there are more and more applications which
can be placed on the computer. This will have the effect of getting more out of each dollar spent on data processing.

12. The displacement effect has been centered primarily on the clerical area where many jobs of a routine nature have been eliminated. The supervisory and managerial levels have remained unchanged for the most part. There has been virtually no problem of old-age versus young at American Republic. Neither has there been any problem of skilled workers versus unskilled. There has been an upgrading of the skill levels of those personnel affected by cybernation.

13. Cybernation has enabled American Republic to substantially increase the amount of insurance in force without requiring a large increase in employment to service it. American Republic has just begun to realize some of the benefits from cybernation. However, there is unlimited potential in cybernation yet to be realized. American Republic is looking forward to the future!
CHAPTER V

THE PROSPECTS FOR THE FUTURE

Up to this point, this study has largely relied on before-and-after analysis. "Before" represents the period just preceding installation of the computer. "After" represents the period of time during which the information was gathered for analysis. Attention is now focused on the future as to what plans have been drawn as far as new computers, changes in organizational structure, job content and decision-making.

American Republic has nearly completed installation of a new IBM 370 Model 165 computer. It has basically the same capabilities as the 370-155 but the new model will be approximately four times as fast. This computer is expected to be operational on December 10th of 1973.

In June of 1974 a new IBM 370 Model 168 computer will be operational. This computer is similar to the Model 165 but is less costly. The new model can use more software than the old model and will be more efficient and have more versatility.

The transition from one model to another will be made with little downtime. Each model is similar but with an added advantage. The personnel operating the different models will have ample time in which to become familiar and efficient with each model and the transition will be made with a minimum
operating time loss.

Further development of computer systems will most likely change organizational structure somewhat. There will probably be more emphasis on a project type approach where a group of people of various skills and disciplines are brought together to carry out a project. As more and more of the routine work is computerized, a large part of the organization will consist of highly skilled professionals and technicians who will not be involved in day-to-day operations but will deal with various projects. This could tend to put a strain on the present form of organization.

For the immediate future a further centralization of departments will occur. There may come a time when decentralization will occur but not in the immediate future. For example, the actuarial department can foresee the potential of having its own computer for actuarial calculations and studies. The need for computer-oriented personnel at the management level is highly important.

The expectation is that operating functions will continue to be consolidated. There will be more use of project teams in the future as the attention of management shifts to dealing with new problems and attempting to make use of the computer in their solution.

There will probably be fewer routine jobs, more technicians, and about the same number of supervisors.

Department structure will move more toward function-
alization. The effect of EDP is to allow American Republic to organize functionally, based on who needs a particular service rather than on who can perform a particular service, as was done previously. The push toward putting repetitive, day-to-day operating functions on the computers will continue, leaving managers to wrestle with new or unresolved problems.

Concerning changes in job content, managerial jobs will probably continue to develop a higher research content. There should be a continued upgrading of skills at all levels. Managers as well as non-managerial personnel should develop computer-related skills to a greater extent. Computer programs are becoming more general in nature and the range of their use increases. The understanding of these programs by everyone becomes more important.

There will probably be some decision-making changes also. There will probably be fewer decision-making executives. These executives will be making more decisions after getting ideas from more specialists. There might be some inflexibility in making changes to larger computer systems because of highly complex programs involved.

There is the need to design man-machine systems with more in mind than maximal exploitation of the machine's capability. Perhaps more important than advances in computer design will be the advances that can be made in the understanding of human information processing such as thinking, problem solving, and decision making.
BIBLIOGRAPHY
BIBLIOGRAPHY

A. BOOKS


B. PERIODICALS


C. PUBLICATIONS OF LEARNED SOCIETIES AND OTHER ORGANIZATIONS


D. ADDRESSES AND PANEL DISCUSSIONS


INTERVIEW QUESTIONS

The greatest possible effort was made by the interviewer to follow a uniform procedure. The following questions were prepared in advance and sent to the various respondents in order to give them an opportunity to gather information in advance of the interview itself. Every effort was made to obtain as much documentary evidence as possible to present a powerful case.

(Of Management)

1. What circumstances evolved around which you decided to cybernate? Did this evolve slowly over a long period of time or quite rapidly?

2. Did you decide to cybernate because other firms were doing it or did you really feel this would benefit your company? Was it conducted on a trial run or were long-range plans developed?

3. Who in the company made the initial proposal for installation? What prompted or stimulated his interest?

4. Did you then consult other representative firms in similar industries to get their opinions? Just what outside sources did you consult before you decided to go ahead with cybernation?

5. Who supervised the feasibility study and what was the date of the start and finish of this study? What was the date of computer installation and what type of machine was used?

6. Once you had begun to cybernate, what were some of the larger areas of problems you were confronted with and how did you cope with them?

7. Has cybernation resulted in a closer monitoring of departments?
8. Would you say that cybernation, as a whole, resulted in a greater centralization of administrative control? In a greater decentralization? Has cybernation affected relationships between top management and middle management? Between top management and lower management levels? Have lines of authority become clearer as a consequence of cybernation? Less clear?

9. At what level of the organization has decision-making been most strongly affected by cybernation (lower, middle, top management)? Have your top-level executives made any important use of cybernation? Do they see any future uses for themselves?

10. In what percentage of top-level jobs has the number of variety of responsibilities of the individual increased, decreased or remained the same, as a consequence of cybernation?

11. As a consequence of cybernation, does top management spend more, less or about the same percentage of his time communicating with subordinates? Communicating with middle-management? Working alone?

12. Have the skill requirements been upgraded, downgraded, or unaffected at the top-management level? In which function have the changes been the greatest?

13. Do you have one particular person designated for cybernation planning? Are organizational changes brought about usually by this same person or do you hire outside firms or individuals to conduct surveys to help plan these changes?

14. Have problems of organizational or personal adaptation ever held up application of cybernation?

15. Do you have an orientation and training program related to the introduction and use of computers set up for the different levels of management and below?

16. Do you find that, as your business grows, your machines must be replaced at a much greater rate than you had anticipated? Do you find that the newer, more improved machines available to select from are few or is there a wide selection? Are newer, more advanced computers and other machines made available soon enough to keep up with your growing firm? Could you advance even faster if newer technology was available when needed?
17. Do you have any figures available concerning any cost-savings percentage as a result of cybernation? Do you feel that you have reached the point where you have passed the "break-even-point" and that cybernation is now in the profit stage or would you say you are in the "loss" column? If you are in the profit stage, at what point in time would you say you reached this stage?

18. What are your future plans for cybernation?

(Of Department Heads-Middle Management)

1. How has cybernation affected your department operations? To what degree have you automated?

2. Do you have specific sections within your department designated to handle problems with cybernation? How much time is spent on the average dealing with these problems? Have any special sections been created as a result of cybernation introduction?

3. Have the numbers of personnel changed at the supervisory level and clerical level as a consequence of cybernation? Do you believe you would have to hire more personnel to produce the same amount of output if you were not cybernated? If so, how many more?

4. Has cybernation resulted in a closer control and monitoring of individuals than before? Looser? Are the relationships between your level and your supervisors and subordinates changed? Have lines of authority become clearer as a consequence of cybernation?

5. Has your decision-making been made more flexible? Less? In what percentage of your jobs has the number and variety of responsibilities increased, decreased, or shown no change? How about your supervisors and clerical levels?

6. As a result of cybernation, do you spend more, less or about the same percentage of your time communicating with your superiors, subordinates, other managers and working alone?

7. Are specific jobs eliminated or reduced as a result of cybernation? Have there been new jobs created? What types? What are their functions? Have there been changes in department functions, methods, and
procedures? What type of worker is affected most and least by these changes? (Administrative, clerical, production, maintenance.)

8. When new jobs are created, are new skills in demand? Are any skills being replaced by machines? What skills are more in demand than before? Do you believe the skill requirements in general have been upgraded, downgraded, or unaffected at your level? The supervisory level? The clerical level? Which level has the effect been the greatest?

9. When changes are made in your department, do you believe these changes force the mobility upward or downward in terms of skill levels of the workers displaced if they are placed in another position within your department or another? How about the skill level of those operating and maintaining the new machines?

10. What special skills do you look for when hiring a new employee because of the cybernation advances? What skills are in greatest demand? What about future skills? What courses do you believe would be most helpful in general, for the future employee, in a firm as advanced as this? Do new employees need to possess a higher or different kind of aptitude than present employees?

11. What level of education do you feel is necessary for the different levels including your level, supervisory and clerical? Do you have the opportunity for advanced education within your firm or outside?

12. For anyone being displaced by cybernation, do you have a retraining program, or is any planned? Are new skills usually required or can the individual utilize the same aptitudes and abilities in his new job? If an individual is to be retrained, how long does this training take?

13. Do you believe there have been fewer or more problems since cybernation has played such an active role? Have you been able to cope effectively with these problems? Do you work closely with top-management concerning these problems?

14. Do you believe the transition to cybernation has been slow, average, fast? Do you believe it should be slower to cope with the amount of problems accompanying it? How fast do you feel it should progress? Could it advance even faster?
15. Do you have any suggestions or recommendations for making the department cope with cybernation? Do you have any figures available to indicate what the savings as opposed to cost has been as a consequence of cybernation?

(Of Supervisory Level)

The same basic questions were asked of the supervisory level as was asked of the Department Head level. It was found that the Department Head level had most of the answers concerning questions about all levels within their departments. Answers given by these two lower levels were incorporated in the study.
**BRIEF ANSWERS TO QUESTIONS**

### TOP MANAGEMENT

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>8</td>
<td>More centralization of control. There is a closer relationship between top management and middle management. About the same between top management and lower management. Lines of authority are much more clear as a result of cybernation.</td>
</tr>
<tr>
<td>9</td>
<td>Middle management. Reporting and analyzing data has been much improved. The reports and data provided by the speed and accuracy of the computer makes this possible. Top management will be able to use operations research and other management science techniques in the future.</td>
</tr>
<tr>
<td>10</td>
<td>Only about 5 percent has been enlarged and 95 percent unchanged. More is foreseen in the future.</td>
</tr>
<tr>
<td>12</td>
<td>In the small percentage of cases involved, it has been upgraded. There is more working with EDP on projects.</td>
</tr>
<tr>
<td>14</td>
<td>In only a small number of instances.</td>
</tr>
<tr>
<td>15</td>
<td>Yes, but time has not permitted their fullest utilization.</td>
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</tbody>
</table>

### MIDDLE MANAGEMENT

(These answers represent majority opinions from the middle management, supervisory, and clerical levels.)

<table>
<thead>
<tr>
<th>Question</th>
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<tbody>
<tr>
<td>1</td>
<td>There is much more precision and accuracy. Most personnel utilize the use of the computer.</td>
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<tr>
<td>2</td>
<td>No. Usually anyone having a problem consults first with supervisor and then the department head. If necessary, an EDP Specialist is consulted.</td>
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</table>
Question | Answer
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3 | Clerical level decreased somewhat while the supervisory level increased slightly. More personnel would have to be hired to produce the same amount of output if it was not for automation. Figures are difficult to arrive at. No estimate given.
4 | Closer control. Relationship between supervisors and subordinates has decreased slightly. Lines of authority are clearer.
5 | Decision-making is somewhat less flexible. Responsibilities have increased at the top management level whereas they have been largely increased at the supervisory level. The clerical level has increased slightly.
6 | Spend more time with all levels. Supervisors spend more time with superiors and somewhat less with clerical level.
7 | Some new jobs and positions have been created. There is a move from parallel to functionalization of departments. Jobs at the supervisory level have remained the same for the most part. The clerical level was most affected as many new jobs were created.
8 | New skills are demanded in many instances. Some skills are replaced by machines such as filing and recording data. Skills required for operating and monitoring machines are in demand. Skills requiring the ability to motivate personnel and handle personnel are required and are in demand. Skill levels have been upgraded for all levels.
9 | Upward in most cases. Skill levels are upgraded.
10 | A mathematical aptitude is helpful. A good personality is also beneficial to aid in getting along with other personnel. It depends on the type of position involved. Skills in the sciences are needed. New employees must possess an aptitude easily adapted to a particular position.
11 | A college education is helpful. However, an ability to motivate and to provide leadership are strong points to look for. Education is an advantage in today's society as it is becoming very complex. The supervisory level also needs similar
question | Answer
--- | ---
characteristics. The more education one obtains, the more likely that individual will be able to cope with the many problems he will encounter. This holds true for the clerical level as well.

12 A retraining program is utilized. It depends on the position. Some new skills are usually required. On the job training is used to a large extent and the length of time involved depends on the particular individual. This is true of all these levels.

13 Fewer problems. Yes. Yes.

14 Fast. No. As fast as the personnel can adapt. Possibly.

15 Hire personnel with reasonable aptitudes for the specific position. No. None available.